

NORSAR Scientific Report No. 1-96/97

# **Semiannual Technical Summary**

**1 April 1996 - 30 September 1996**

Kjeller, November 1996

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### Abstract (cont.)

The NORSAR Detection Processing system has been operated throughout the period with an average uptime of 99.9%. A total of 2392 seismic events have been reported in the NORSAR monthly seismic bulletin for April - September 1996. The performance of the continuous alarm system and the automatic bulletin transfer to AFTAC has been satisfactory. The system for direct retrieval of NORSAR waveform data through an X.25 connection has been used successfully for acquiring such data by AFTAC. Processing of requests for full NORSAR and regional array data on magnetic tapes has progressed according to established schedules.

The new hardware installed at the NORSAR array in the recently completed refurbishment project has in general functioned well. However, we have identified a problem with artificial strong signals ("spikes") that are occasionally seen on some data channels, especially during thunderstorms. This problem is currently being investigated. A flexible program to convert NORSAR data recorded in the new format to CSS 3.0 files has been developed.

This Semiannual Report also presents statistics from operation of the Regional Monitoring System (RMS). The RMS has been operated in a limited capacity, with continuous automatic detection and location and with analyst review of selected events of interest for GSETT-3. Data sources for the RMS have comprised all the regional arrays processed at NORSAR. The Generalized Beamforming (GBF) program is now used as a pre-processor to RMS.

On-line detection processing and data recording at the NORSAR Data Processing Center (NDPC) of NORESS, ARCESS, FINESS and GERESS data have been conducted throughout the period. Data from two small-aperture arrays at sites in Spitsbergen and Apatity, Kola Peninsula, as well as the Hagfors array in Sweden, have also been recorded and processed. Monthly processing statistics for the arrays as well as results of the RMS analysis for the reporting period are given.

Maintenance activities in the period comprise preventive/corrective maintenance in connection with all the NORSAR subarrays, NORESS and ARCESS. Other activities have involved repair of defective electronic equipment after thunderstorms in the array area, cable splicing and work in connection with the small-aperture array in Spitsbergen.

Summaries of five scientific contributions are presented in Chapter 7 of this report.

Section 7.1 summarizes the activities and experience gained at the Norwegian NDC so far during the full-scale phase of the GSETT-3 experiment. Norway has been contributing primary station data from three arrays: ARCESS, NORESS and Spitsbergen. NORESS has been a temporary substitute for the large-aperture NORSAR array, awaiting completion of a technical refurbishment of this array. Norway's NDC is also acting as a regional data center, forwarding data to the IDC from GSETT-3 primary stations in several countries. These currently include FINESS (Finland), GERESS (Germany), Hagfors (Sweden) and Sonseca (Spain). In addition, communications for the GSETT-3 auxiliary station at Nilore,

Pakistan, are provided through a VSAT satellite link between Norway's NDC and Pakistan's NDC in Nilore.

The work at the Norwegian NDC has continued to focus on operational aspects, like stable forwarding of data using the Alpha protocol, proper handling of outgoing and incoming messages, improvement to routines for dealing with failure of critical components, as well as implementation of other measures to ensure maximum reliability and robustness in providing data to the IDC. We will continue the efforts towards improvements and hardening of all critical data acquisition and data forwarding hardware and software components, so that future requirements related to operation of IMS stations can be met to the maximum extent possible.

Section 7.2 describes NORSAR's status and plans for implementing algorithms at the GSETT-3 IDC. A prototype system for global Threshold Monitoring (TM) was delivered to the IDC already in October 1994, and a significant software development effort has taken place to integrate the TM software into the operational system at the IDC. The resulting modules were delivered in August 1996. At the same time, software for processing of data from the NORSAR teleseismic array was delivered, and both of these systems are due to be operational at the IDC in the near future. Current plans comprise inter alia the finalization of an operational module for automatic onset time analysis, previously described in NORSAR Semiannual Technical Summaries. Algorithms to improve the tuning of signal processing for GSETT-3 arrays and to implement automatic event post-processing are currently under development. During the next reporting period, we will complete the tuning of the IMS primary network for the global TM system. After this we will technically and seismologically verify the results for threshold monitoring using the full IMS primary network, assist in transferring the TM system into the operational system at the IDC, and develop products for making the output from the TM system available to the international community.

Section 7.3 describes the current status of our algorithms developed so far for tuning the processing parameters of the global Threshold Monitoring system at the IDC. We have used the ASAR array in Australia as an example for illustration purposes. Among the topics analyzed in this paper are:

- The choice of optimum prefilter prior to the STA calculation
- The relationship between event magnitude ( $\log A/T$ ) and  $\log STA$
- Signal loss patterns due to beamforming
- Signal loss due to "missteering" of beams (i.e., for target points which are not on the global grid)
- Beam deployment at different distance ranges and frequencies to ensure homogeneous coverage.

In the future, additional stations will be tuned to the global TM following a similar methodology as described in this paper.

Section 7.4 is a study of low-magnitude seismic events near the Novaya Zemlya test site for the past 30 years. The Novaya Zemlya region is a low-seismicity area, with only one earthquake clearly identified over this time period. This is in spite of the fact that this area

is well covered with regard to seismic stations at both teleseismic and regional distances. Thus, the detection threshold of the global network has been estimated at close to  $m_b$  4.0 for Novaya Zemlya. Since 1970, the NORSAR array has provided a detection capability near  $m_b$  3.0. Currently, the detection capability for this area is near  $m_b$  2.5, due to the excellent regional array network that has been developed for CTBT monitoring.

Examples have shown that events of magnitude well below 3.0 can be not only detected, but also located with good accuracy (estimated uncertainty 20-30 km) using the present regional network. However, this capability is by no means matched by the capability to identify detected events as either earthquakes or underground explosions. Even identifying the earthquake of 1 August 1986 ( $m_b=4.3$ ) was not easy, and required extensive work before a positive identification could be made. A study of the 13 June 1995 event ( $m_b = 3.5$ ) indicates that the available data are not sufficient to confidently identify an event this size.

This study has shown that the calculation of body-wave magnitudes at regional distances needs to take into account the bias effects caused when using high-frequency filters. In fact, a positive bias of up to 0.5 magnitude units is introduced in the examples shown here, when comparing a 4-8 or 8-16 Hz filter band to a "teleseismic" 2-4 Hz band.

Section 7.5 is a study of the calibration explosion on 29 September 1996 in the Kola Peninsula. The explosion, which had a total charge of 350 tons, was detonated in an underground mine in the Khibiny Massif, with coordinates 67.675N, 33.728E. The explosion was applied to provide data to calibrate the GSETT-3 network in this region.

The calibration experiment was carried out as a joint cooperative project between the Ministry of Defense of the Russian Federation and the Kola Regional Seismological Centre of the Russian Academy of Sciences. NORSAR participated in this experiment by providing seismic recordings as well as contributing to the data analysis. The explosion was recorded by several stations in the GSETT-3 network, all of them at regional distances. The event was listed in the Reviewed Event Bulletin (REB) of the IDC with coordinates 67.57N, 32.54E and a magnitude ( $M_L$ ) of 3.4.

In this paper we analyze available recordings of this explosion, with emphasis on recordings by stations at local distances. We further compare the signal characteristics to those of previously recorded underground explosions in the same mine. The IDC location estimates of this suite of explosions is compared to their true locations, and the differences are used to suggest a velocity model that is expected to largely eliminate systematic bias in the IDC location results for events in this region.

**Frode Ringdal**

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NORSAR Contribution No. 604

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# 1 Summary

This Semiannual Technical Summary describes the operation, maintenance and research activities at the Norwegian Seismic Array (NORSAR), the Norwegian Regional Seismic Array (NORESS), the Arctic Regional Seismic Array (ARCESS) and the Spitsbergen Regional Array for the period 1 April - 30 September 1996. Statistics are also presented for additional seismic stations, which through cooperative agreements with institutions in the host countries provide continuous data to the NORSAR Data Processing Center (NPDC). These stations comprise the Finnish Regional Seismic Array (FINESS), the German Regional Seismic Array (GERESS), the Hagfors array in Sweden and the regional seismic array in Apatity, Russia.

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**Frode Ringdal**

## 2 NORSAR Operation

### 2.1 Detection Processor (DP) operation

There have been 3 breaks in the otherwise continuous operation of the NORSAR online system within the current 6-month reporting interval. The uptime percentage for the period is 99.9.

Fig. 2.1.1 and the accompanying Table 2.1.1 both show the daily DP downtime for the days between 1 April and 30 September 1996. The monthly recording times and percentages are given in Table 2.1.2.

The breaks can be grouped as follows:

|    |                                        |   |
|----|----------------------------------------|---|
| a) | Hardware failure                       | 0 |
| b) | Stops related to program work or error | 1 |
| c) | Hardware maintenance stops             | 0 |
| d) | Power jumps and breaks                 | 0 |
| e) | TOD error correction                   | 0 |
| f) | Communication lines                    | 2 |

The total downtime for the period was 4 hours and 18 minutes. The mean-time-between-failures (MTBF) was 45.7 days.

**J. Torstveit**

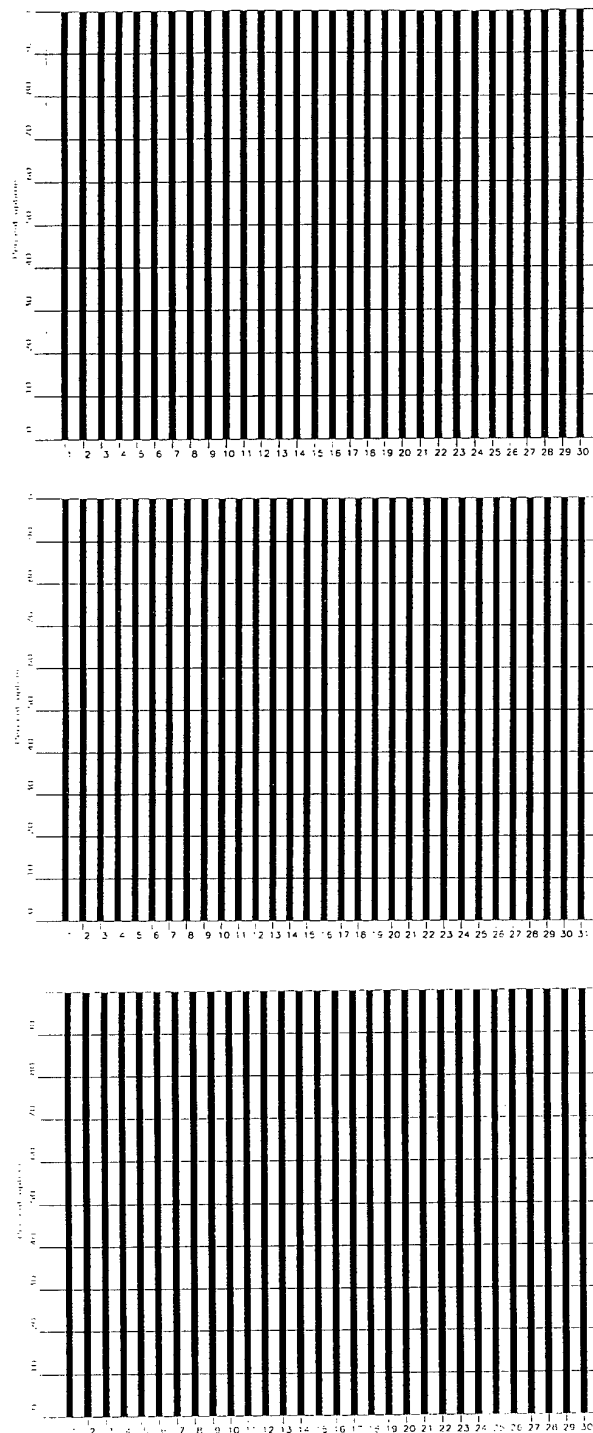


**Fig. 2.1.1.** Detection Processor uptime for April (top), May (middle) and June (bottom) 1996.

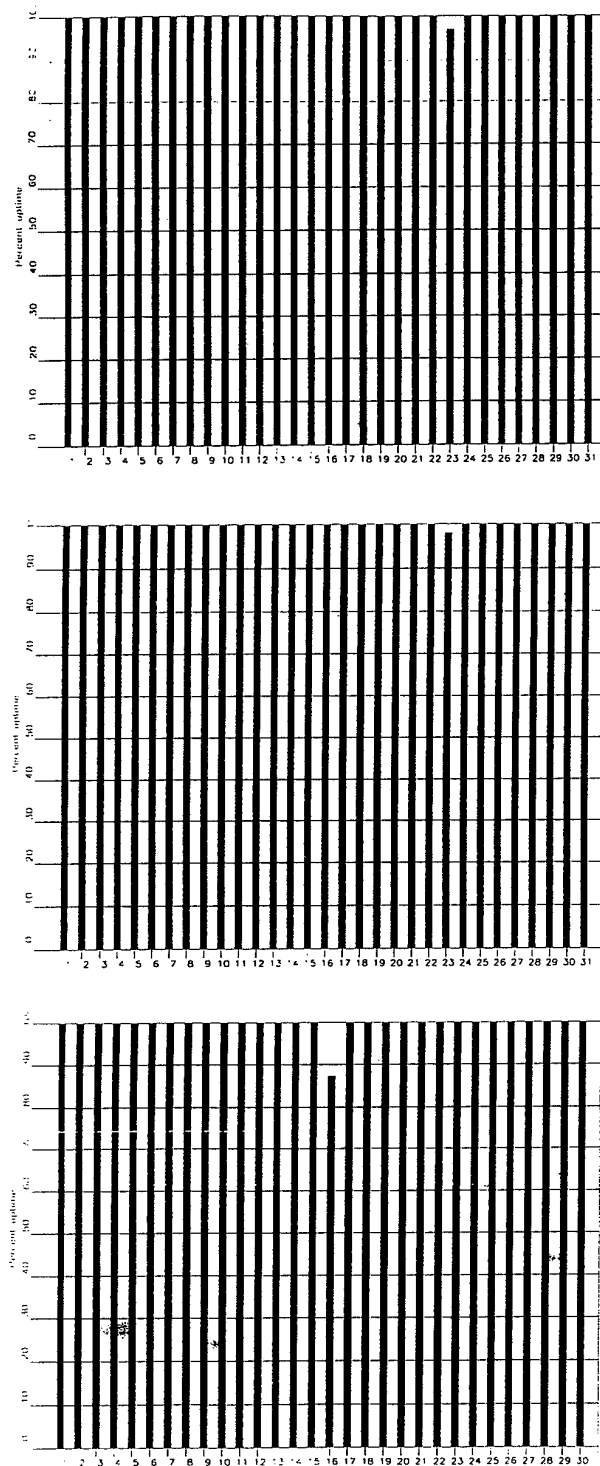


**Fig. 2.1.1.** Detection Processor uptime for July (top), August (middle) and September (bottom) 1996.

| Date   | Time        | Cause                     |
|--------|-------------|---------------------------|
| 23 Jul | 1041 - 1127 | Software maintenance      |
| 23 Aug | 1058 - 1128 | Transmission line failure |
| 16 Sep | 1018 - 1320 | Transmission line failure |

**Table 2.1.1.** The major downtimes in the period 1 April - 30 September 1996.

| Month  | DP Uptime Hours | DP Uptime % | No. of DP Breaks | No. of Days with Breaks | DP MTBF* (days) |
|--------|-----------------|-------------|------------------|-------------------------|-----------------|
| Apr 96 | 720.00          | 100         | 0                | 0                       | 30.0            |
| May 96 | 744.00          | 100         | 0                | 0                       | 31.0            |
| Jun 96 | 720.00          | 100         | 0                | 0                       | 30.0            |
| Jul 96 | 743.25          | 99.90       | 1                | 1                       | 15.5            |
| Aug 96 | 743.50          | 99.93       | 1                | 1                       | 15.5            |
| Sep 96 | 716.96          | 99.58       | 1                | 1                       | 15.0            |
|        |                 | 99.90       | 3                | 3                       | 45.7            |

\*Mean-time-between-failures = total uptime/no. of up intervals.

**Table 2.1.2.** Online system performance, 1 April - 30 September 1996.

## **2.2 Array Communications**

After completion of the NORSAR refurbishment project, the operation of the subarray communication lines has proceeded normally.

For a complete description of the NORSAR refurbishment project, reference is made to Section 4.1 of the NORSAR Semiannual Technical Summary, 1 April - 30 September 1995.

From April through September 1996, there were, with only a few exceptions, no significant communications outages at any of the NORSAR subarrays.

A simplified daily summary of the communications performance for the seven individual subarray lines is summarized, on a month-by-month basis, in Table 2.2.1.

**F. Ringdal**

**Table 2..2.1 (Page 1 of 6)**  
**NORSAR Communication Status Report**  
**Month: April 1996**

| Day                                 | Subarray |     |     |     |     |     |     |
|-------------------------------------|----------|-----|-----|-----|-----|-----|-----|
|                                     | 01A      | 01B | 02B | 02C | 03C | 04C | 06C |
| 01                                  | X        | X   | X   | X   | X   | X   | X   |
| 02                                  | X        | X   | X   | X   | X   | X   | X   |
| 03                                  | X        | X   | X   | X   | X   | X   | X   |
| 04                                  | X        | X   | X   | X   | X   | X   | X   |
| 05                                  | X        | X   | X   | X   | X   | X   | X   |
| 06                                  | X        | X   | X   | X   | X   | X   | X   |
| 07                                  | X        | X   | X   | X   | X   | X   | X   |
| 08                                  | X        | X   | X   | X   | X   | X   | X   |
| 09                                  | X        | X   | X   | X   | X   | X   | X   |
| 10                                  | X        | X   | X   | X   | X   | X   | X   |
| 11                                  | X        | X   | X   | X   | X   | X   | X   |
| 12                                  | X        | X   | X   | X   | X   | X   | X   |
| 13                                  | X        | X   | X   | X   | X   | X   | X   |
| 14                                  | X        | X   | X   | X   | X   | X   | X   |
| 15                                  | X        | X   | X   | X   | X   | X   | X   |
| 16                                  | X        | X   | X   | X   | X   | X   | X   |
| 17                                  | X        | X   | X   | X   | X   | X   | X   |
| 18                                  | X        | X   | X   | X   | X   | X   | X   |
| 19                                  | X        | X   | X   | X   | X   | X   | X   |
| 20                                  | X        | X   | X   | X   | X   | X   | X   |
| 21                                  | X        | X   | X   | X   | X   | X   | X   |
| 22                                  | X        | X   | X   | X   | X   | X   | X   |
| 23                                  | X        | X   | X   | X   | X   | X   | X   |
| 24                                  | X        | X   | X   | X   | X   | X   | X   |
| 25                                  | X        | X   | X   | X   | X   | X   | X   |
| 26                                  | X        | X   | X   | X   | X   | X   | X   |
| 27                                  | X        | X   | X   | X   | X   | X   | X   |
| 28                                  | X        | X   | X   | X   | X   | X   | X   |
| 29                                  | X        | X   | X   | X   | X   | X   | X   |
| 30                                  | X        | X   | X   | X   | X   | X   | X   |
| 31                                  | X        | X   | X   | X   | X   | X   | X   |
| <b>Total hours normal operation</b> | 720      | 720 | 720 | 720 | 720 | 720 | 720 |
| <b>% normal operation</b>           | 100      | 100 | 100 | 100 | 100 | 100 | 100 |

**Legend:**

- X : Normal operations
- A : All channels masked for more than 12 hours that day
- B : All SP channels masked for more than 12 hours that day
- C : All LP channels masked for more than 12 hours that day
- I : Communication outage for more than 12 hours

**Table 2.2.1 (Page 2 of 6)**  
**NORSAR Communication Status Report**  
**Month: May 1996**

| Day                                 | Subarray |     |     |     |     |     |     |
|-------------------------------------|----------|-----|-----|-----|-----|-----|-----|
|                                     | 01A      | 01B | 02B | 02C | 03C | 04C | 06C |
| 01                                  | X        | X   | X   | X   | X   | X   | X   |
| 02                                  | X        | X   | X   | X   | X   | X   | X   |
| 03                                  | X        | X   | X   | X   | X   | X   | X   |
| 04                                  | X        | X   | X   | X   | X   | X   | X   |
| 05                                  | X        | X   | X   | X   | X   | X   | X   |
| 06                                  | X        | X   | X   | X   | X   | X   | X   |
| 07                                  | X        | X   | X   | X   | X   | X   | X   |
| 08                                  | X        | X   | X   | X   | X   | X   | X   |
| 09                                  | X        | X   | X   | X   | X   | X   | X   |
| 10                                  | X        | X   | X   | X   | X   | X   | X   |
| 11                                  | X        | X   | X   | X   | X   | X   | X   |
| 12                                  | X        | X   | X   | X   | X   | X   | X   |
| 13                                  | X        | X   | X   | X   | X   | X   | X   |
| 14                                  | X        | X   | X   | X   | X   | X   | X   |
| 15                                  | X        | X   | X   | X   | X   | X   | X   |
| 16                                  | X        | X   | X   | X   | X   | X   | X   |
| 17                                  | X        | X   | X   | X   | X   | X   | X   |
| 18                                  | X        | X   | X   | X   | X   | X   | X   |
| 19                                  | X        | X   | X   | X   | X   | X   | X   |
| 20                                  | X        | X   | X   | X   | X   | X   | X   |
| 21                                  | X        | X   | X   | X   | X   | X   | X   |
| 22                                  | X        | X   | X   | X   | X   | X   | X   |
| 23                                  | X        | X   | X   | X   | X   | X   | X   |
| 24                                  | X        | X   | X   | X   | X   | X   | X   |
| 25                                  | X        | X   | X   | X   | X   | X   | X   |
| 26                                  | X        | X   | A   | X   | X   | X   | X   |
| 27                                  | X        | X   | A   | X   | X   | X   | X   |
| 28                                  | X        | X   | X   | X   | X   | X   | X   |
| 29                                  | X        | X   | X   | X   | X   | X   | X   |
| 30                                  | X        | X   | X   | X   | X   | X   | X   |
| 31                                  | X        | X   | X   | X   | X   | X   | X   |
| <b>Total hours normal operation</b> | 744      | 744 | 685 | 744 | 744 | 744 | 744 |
| <b>% normal operation</b>           | 100      | 100 | 92  | 100 | 100 | 100 | 100 |

**Legend:**

- X : Normal operations  
 A : All channels masked for more than 12 hours that day  
 B : All SP channels masked for more than 12 hours that day  
 C : All LP channels masked for more than 12 hours that day  
 I : Communication outage for more than 12 hours

**Table 2.2.1 (Page 3 of 6)**  
**NORSAR Communication Status Report**  
**Month: June 1996**

| Day                                 | Subarray |     |     |     |     |     |     |
|-------------------------------------|----------|-----|-----|-----|-----|-----|-----|
|                                     | 01A      | 01B | 02B | 02C | 03C | 04C | 06C |
| 01                                  | X        | X   | X   | X   | X   | X   | X   |
| 02                                  | X        | X   | X   | X   | X   | X   | X   |
| 03                                  | X        | X   | X   | X   | X   | X   | X   |
| 04                                  | X        | X   | X   | X   | X   | X   | X   |
| 05                                  | X        | X   | X   | X   | X   | X   | X   |
| 06                                  | X        | X   | X   | X   | X   | X   | X   |
| 07                                  | X        | X   | X   | X   | X   | X   | X   |
| 08                                  | X        | X   | X   | X   | X   | X   | X   |
| 09                                  | X        | X   | A   | X   | X   | X   | X   |
| 10                                  | X        | X   | A   | X   | X   | X   | X   |
| 11                                  | X        | X   | A   | X   | X   | X   | X   |
| 12                                  | X        | X   | A   | X   | X   | X   | X   |
| 13                                  | X        | X   | X   | X   | X   | X   | X   |
| 14                                  | X        | X   | X   | X   | X   | X   | X   |
| 15                                  | X        | X   | X   | X   | X   | X   | X   |
| 16                                  | X        | X   | X   | X   | X   | X   | X   |
| 17                                  | X        | X   | X   | X   | X   | X   | X   |
| 18                                  | X        | X   | X   | X   | X   | X   | X   |
| 19                                  | X        | X   | X   | X   | X   | X   | X   |
| 20                                  | X        | X   | X   | X   | X   | X   | X   |
| 21                                  | X        | X   | X   | X   | X   | X   | X   |
| 22                                  | X        | X   | X   | X   | X   | X   | X   |
| 23                                  | X        | X   | X   | X   | X   | X   | X   |
| 24                                  | X        | X   | X   | X   | X   | X   | X   |
| 25                                  | X        | X   | X   | X   | X   | X   | X   |
| 26                                  | X        | X   | X   | X   | X   | X   | X   |
| 27                                  | X        | X   | X   | X   | X   | X   | X   |
| 28                                  | X        | X   | X   | X   | X   | X   | X   |
| 29                                  | X        | X   | X   | X   | X   | X   | X   |
| 30                                  | X        | X   | X   | X   | X   | X   | X   |
| 31                                  | -        | -   | -   | -   | -   | -   | -   |
| <b>Total hours normal operation</b> | 720      | 720 | 609 | 720 | 720 | 720 | 720 |
| <b>% normal operation</b>           | 100      | 100 | 85  | 100 | 100 | 100 | 100 |

**Legend:**

- X : Normal operations  
 A : All channels masked for more than 12 hours that day  
 B : All SP channels masked for more than 12 hours that day  
 C : All LP channels masked for more than 12 hours that day  
 I : Communication outage for more than 12 hours

Table 2.2.1 (Page 4 of 6)  
NORSAR Communication Status Report  
Month: July 1996

| Day                                 | Subarray |      |      |      |      |      |      |
|-------------------------------------|----------|------|------|------|------|------|------|
|                                     | 01A      | 01B  | 02B  | 02C  | 03C  | 04C  | 06C  |
| 01                                  | X        | X    | X    | X    | X    | X    | X    |
| 02                                  | X        | X    | X    | X    | X    | X    | X    |
| 03                                  | X        | X    | X    | X    | X    | X    | X    |
| 04                                  | X        | X    | X    | X    | X    | X    | X    |
| 05                                  | X        | X    | X    | X    | A    | X    | X    |
| 06                                  | X        | X    | X    | X    | X    | X    | X    |
| 07                                  | X        | X    | X    | X    | X    | X    | X    |
| 08                                  | X        | X    | X    | X    | X    | X    | X    |
| 09                                  | X        | X    | X    | X    | X    | X    | X    |
| 10                                  | X        | X    | X    | X    | X    | X    | X    |
| 11                                  | X        | X    | X    | X    | X    | X    | X    |
| 12                                  | X        | X    | X    | X    | X    | X    | X    |
| 13                                  | X        | X    | X    | X    | X    | X    | X    |
| 14                                  | X        | X    | X    | X    | X    | X    | X    |
| 15                                  | X        | X    | X    | X    | X    | X    | X    |
| 16                                  | X        | X    | X    | X    | X    | X    | X    |
| 17                                  | X        | X    | A    | X    | X    | X    | X    |
| 18                                  | X        | X    | A    | X    | X    | X    | X    |
| 19                                  | X        | X    | X    | X    | X    | X    | X    |
| 20                                  | X        | X    | X    | X    | X    | X    | X    |
| 21                                  | X        | X    | X    | X    | X    | X    | X    |
| 22                                  | X        | X    | X    | X    | X    | X    | X    |
| 23                                  | X        | X    | X    | X    | X    | X    | X    |
| 24                                  | X        | X    | X    | X    | X    | X    | X    |
| 25                                  | X        | X    | A    | X    | X    | X    | X    |
| 26                                  | X        | X    | A    | X    | X    | X    | X    |
| 27                                  | X        | X    | X    | X    | X    | X    | X    |
| 28                                  | X        | X    | A    | X    | X    | X    | X    |
| 29                                  | X        | X    | A    | X    | X    | X    | X    |
| 30                                  | X        | X    | X    | X    | X    | X    | X    |
| 31                                  | X        | X    | X    | X    | X    | X    | X    |
| <b>Total hours normal operation</b> | 743      | 743  | 647  | 743  | 726  | 743  | 743  |
| <b>% normal operation</b>           | 99.9     | 99.9 | 86.9 | 99.9 | 97.6 | 99.9 | 99.9 |

**Legend:**

- X : Normal operations  
 A : All channels masked for more than 12 hours that day  
 B : All SP channels masked for more than 12 hours that day  
 C : All LP channels masked for more than 12 hours that day  
 I : Communication outage for more than 12 hours

**Table 1 (Page 5 of 6)**  
**NORSAR Communication Status Report**  
**Month: August 1996**

| Day                                 | Subarray |      |      |      |      |      |      |
|-------------------------------------|----------|------|------|------|------|------|------|
|                                     | 01A      | 01B  | 02B  | 02C  | 03C  | 04C  | 06C  |
| 01                                  | X        | X    | X    | X    | X    | X    | X    |
| 02                                  | X        | X    | A    | X    | X    | X    | X    |
| 03                                  | X        | X    | A    | X    | X    | X    | X    |
| 04                                  | X        | X    | A    | X    | X    | X    | X    |
| 05                                  | X        | X    | X    | X    | A    | X    | X    |
| 06                                  | X        | X    | X    | X    | X    | X    | X    |
| 07                                  | X        | X    | X    | X    | X    | X    | X    |
| 08                                  | X        | X    | X    | X    | X    | X    | X    |
| 09                                  | X        | X    | X    | X    | X    | X    | X    |
| 10                                  | X        | X    | X    | X    | X    | X    | X    |
| 11                                  | X        | X    | A    | X    | X    | X    | X    |
| 12                                  | X        | X    | A    | X    | X    | X    | X    |
| 13                                  | X        | X    | X    | X    | X    | X    | X    |
| 14                                  | X        | X    | A    | X    | X    | X    | X    |
| 15                                  | X        | X    | A    | X    | X    | X    | X    |
| 16                                  | X        | X    | A    | X    | X    | X    | X    |
| 17                                  | X        | X    | A    | X    | X    | X    | X    |
| 18                                  | X        | X    | A    | X    | X    | X    | X    |
| 19                                  | X        | X    | A    | X    | X    | X    | X    |
| 20                                  | X        | X    | X    | X    | X    | X    | X    |
| 21                                  | X        | X    | A    | X    | X    | X    | X    |
| 22                                  | X        | X    | A    | X    | X    | X    | X    |
| 23                                  | X        | X    | A    | X    | X    | X    | X    |
| 24                                  | X        | X    | A    | X    | X    | X    | X    |
| 25                                  | X        | X    | A    | X    | X    | X    | X    |
| 26                                  | X        | X    | X    | X    | X    | X    | X    |
| 27                                  | X        | X    | X    | X    | X    | X    | X    |
| 28                                  | X        | X    | X    | X    | X    | X    | X    |
| 29                                  | X        | X    | X    | X    | X    | X    | X    |
| 30                                  | X        | X    | X    | X    | X    | X    | X    |
| 31                                  | X        | X    | X    | X    | X    | X    | X    |
| <b>Total hours normal operation</b> | 743      | 743  | 405  | 743  | 743  | 743  | 743  |
| <b>% normal operation</b>           | 99.9     | 99.9 | 54.5 | 99.9 | 99.9 | 99.9 | 99.9 |

**Legend:**

- X : Normal operations
- A : All channels masked for more than 12 hours that day
- B : All SP channels masked for more than 12 hours that day
- C : All LP channels masked for more than 12 hours that day
- I : Communication outage for more than 12 hours

**Table 2.2.1 (Page 6 of 6)**  
**NORSAR Communication Status Report**  
**Month: September 1996**

| Day                                 | Subarray |      |      |      |      |      |      |
|-------------------------------------|----------|------|------|------|------|------|------|
|                                     | 01A      | 01B  | 02B  | 02C  | 03C  | 04C  | 06C  |
| 01                                  | X        | X    | A    | X    | X    | X    | X    |
| 02                                  | X        | X    | X    | X    | X    | X    | X    |
| 03                                  | X        | X    | X    | X    | X    | X    | X    |
| 04                                  | X        | X    | X    | X    | X    | X    | X    |
| 05                                  | X        | X    | X    | X    | A    | X    | X    |
| 06                                  | X        | X    | X    | X    | X    | X    | X    |
| 07                                  | X        | X    | X    | X    | X    | X    | X    |
| 08                                  | X        | X    | X    | X    | X    | X    | X    |
| 09                                  | X        | X    | X    | X    | X    | X    | X    |
| 10                                  | X        | X    | X    | X    | X    | X    | X    |
| 11                                  | X        | X    | X    | X    | X    | X    | X    |
| 12                                  | X        | X    | X    | X    | X    | X    | X    |
| 13                                  | X        | X    | X    | X    | X    | X    | X    |
| 14                                  | X        | X    | X    | X    | X    | X    | X    |
| 15                                  | X        | X    | X    | X    | X    | X    | X    |
| 16                                  | X        | X    | X    | X    | X    | X    | X    |
| 17                                  | X        | X    | X    | X    | X    | X    | X    |
| 18                                  | X        | X    | X    | X    | X    | X    | X    |
| 19                                  | X        | X    | X    | X    | X    | X    | X    |
| 20                                  | X        | X    | X    | X    | X    | X    | X    |
| 21                                  | X        | X    | X    | X    | X    | X    | X    |
| 22                                  | X        | X    | X    | X    | X    | X    | X    |
| 23                                  | X        | X    | X    | X    | X    | X    | X    |
| 24                                  | X        | X    | X    | X    | X    | X    | X    |
| 25                                  | X        | X    | X    | X    | X    | X    | X    |
| 26                                  | X        | X    | X    | X    | X    | X    | X    |
| 27                                  | X        | X    | X    | X    | X    | X    | X    |
| 28                                  | X        | X    | X    | X    | X    | X    | X    |
| 29                                  | X        | X    | X    | X    | X    | X    | X    |
| 30                                  | X        | X    | X    | X    | X    | X    | X    |
| 31                                  | X        | X    | X    | X    | X    | X    | X    |
| <b>Total hours normal operation</b> | 718      | 718  | 684  | 718  | 718  | 718  | 718  |
| <b>% normal operation</b>           | 99.6     | 99.6 | 95.0 | 99.6 | 99.6 | 99.6 | 99.6 |

**Legend:**

- X : Normal operations  
 A : All channels masked for more than 12 hours that day  
 B : All SP channels masked for more than 12 hours that day  
 C : All LP channels masked for more than 12 hours that day  
 I : Communication outage for more than 12 hours

## 2.3 NORSAR Event Detection operation

In Table 2.3.1 some monthly statistics of the Detection and Event Processor operation are given. The table lists the total number of detections (DPX) triggered by the on-line detector, the total number of detections processed by the automatic event processor (EPX) and the total number of events accepted after analyst review (teleseismic phases, core phases and total).

|        | Total<br>DPX | Total<br>EPX | Accepted events |                | Sum  | Daily |
|--------|--------------|--------------|-----------------|----------------|------|-------|
|        |              |              | P-phases        | Core<br>Phases |      |       |
| Apr 96 | 11950        | 809          | 315             | 67             | 382  | 12.7  |
| May 96 | 8805         | 1041         | 256             | 55             | 311  | 10.0  |
| Jun 96 | 8550         | 1421         | 489             | 50             | 539  | 18.0  |
| Jul 96 | 9952         | 1089         | 350             | 86             | 436  | 14.1  |
| Aug 96 | 7415         | 1417         | 273             | 59             | 332  | 10.7  |
| Sep 96 | 10463        | 1428         | 327             | 65             | 392  | 13.1  |
|        |              |              | 2010            | 382            | 2392 | 13.1  |

**Table 2.3.1.** Detection and Event Processor statistics, 1 April - 30 September 1996.

### NORSAR Detections

The number of detections (phases) reported by the NORSAR detector during day 092, 1996, through day 274, 1996, was 51,582, giving an average of 282 detections per processed day (183 days processed). Table 2.3.2 shows daily and hourly distribution of detections for NORSAR.

**B. Paulsen**

## NB2 .DPX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13  | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 92  | 16 | 12 | 14 | 22 | 6  | 9  | 9  | 1  | 8  | 3  | 4  | 17 | 1  | 10  | 14 | 2  | 6  | 2  | 13 | 4  | 10 | 7  | 8  | 6  | 204 | Apr 01 Monday    |
| 93  | 8  | 12 | 11 | 10 | 7  | 3  | 5  | 4  | 11 | 8  | 7  | 10 | 21 | 10  | 20 | 16 | 13 | 15 | 15 | 25 | 20 | 12 | 11 | 15 | 289 | Apr 02 Tuesday   |
| 94  | 15 | 12 | 8  | 16 | 14 | 9  | 11 | 9  | 17 | 13 | 12 | 23 | 10 | 17  | 14 | 20 | 27 | 24 | 11 | 18 | 20 | 23 | 16 | 18 | 377 | Apr 03 Wednesday |
| 95  | 28 | 24 | 11 | 8  | 25 | 25 | 13 | 23 | 31 | 23 | 29 | 37 | 22 | 26  | 27 | 15 | 22 | 20 | 29 | 30 | 23 | 23 | 21 | 23 | 558 | Apr 04 Thursday  |
| 96  | 29 | 25 | 20 | 27 | 32 | 33 | 28 | 18 | 25 | 31 | 22 | 28 | 22 | 25  | 26 | 17 | 29 | 20 | 30 | 31 | 26 | 21 | 20 | 16 | 601 | Apr 05 Friday    |
| 97  | 34 | 20 | 17 | 15 | 32 | 23 | 15 | 14 | 19 | 23 | 20 | 15 | 31 | 16  | 21 | 10 | 14 | 12 | 11 | 19 | 7  | 18 | 14 | 16 | 436 | Apr 06 Saturday  |
| 98  | 26 | 21 | 21 | 11 | 21 | 12 | 31 | 10 | 12 | 4  | 12 | 6  | 12 | 16  | 21 | 22 | 10 | 5  | 10 | 13 | 14 | 4  | 5  | 15 | 334 | Apr 07 Sunday    |
| 99  | 19 | 6  | 1  | 11 | 9  | 7  | 8  | 5  | 9  | 4  | 6  | 20 | 4  | 5   | 4  | 7  | 3  | 21 | 15 | 9  | 6  | 15 | 2  | 4  | 200 | Apr 08 Monday    |
| 100 | 9  | 12 | 11 | 12 | 7  | 0  | 9  | 3  | 5  | 5  | 5  | 14 | 3  | 6   | 1  | 0  | 2  | 6  | 2  | 4  | 1  | 2  | 7  | 11 | 137 | Apr 09 Tuesday   |
| 101 | 9  | 4  | 13 | 1  | 1  | 0  | 1  | 0  | 2  | 4  | 0  | 9  | 6  | 9   | 7  | 6  | 1  | 7  | 5  | 7  | 7  | 13 | 4  | 16 | 132 | Apr 10 Wednesday |
| 102 | 18 | 15 | 27 | 8  | 14 | 16 | 4  | 13 | 14 | 13 | 16 | 13 | 16 | 8   | 9  | 15 | 18 | 20 | 7  | 19 | 19 | 10 | 22 | 17 | 351 | Apr 11 Thursday  |
| 103 | 21 | 14 | 11 | 19 | 7  | 8  | 2  | 3  | 11 | 7  | 22 | 11 | 16 | 3   | 9  | 21 | 14 | 10 | 6  | 16 | 9  | 6  | 13 | 15 | 274 | Apr 12 Friday    |
| 104 | 15 | 6  | 2  | 5  | 11 | 8  | 8  | 12 | 6  | 13 | 10 | 9  | 7  | 16  | 5  | 13 | 15 | 4  | 8  | 11 | 12 | 9  | 9  | 13 | 227 | Apr 13 Saturday  |
| 105 | 16 | 11 | 9  | 8  | 16 | 12 | 9  | 9  | 15 | 6  | 8  | 4  | 16 | 4   | 9  | 4  | 2  | 5  | 4  | 4  | 7  | 9  | 9  | 12 | 208 | Apr 14 Sunday    |
| 106 | 16 | 19 | 11 | 3  | 11 | 4  | 3  | 6  | 5  | 7  | 9  | 2  | 10 | 5   | 4  | 14 | 5  | 9  | 9  | 11 | 21 | 17 | 13 | 27 | 241 | Apr 15 Monday    |
| 107 | 23 | 19 | 16 | 17 | 11 | 5  | 6  | 5  | 9  | 9  | 17 | 4  | 11 | 16  | 16 | 7  | 11 | 13 | 22 | 26 | 18 | 19 | 28 | 22 | 350 | Apr 16 Tuesday   |
| 108 | 30 | 23 | 34 | 26 | 13 | 10 | 7  | 7  | 7  | 19 | 12 | 15 | 10 | 8   | 17 | 14 | 18 | 13 | 3  | 8  | 10 | 13 | 20 | 16 | 353 | Apr 17 Wednesday |
| 109 | 24 | 19 | 18 | 18 | 10 | 4  | 10 | 1  | 7  | 5  | 6  | 20 | 8  | 5   | 5  | 7  | 6  | 15 | 9  | 12 | 18 | 21 | 33 | 13 | 294 | Apr 18 Thursday  |
| 110 | 30 | 19 | 35 | 17 | 7  | 3  | 6  | 11 | 5  | 21 | 10 | 8  | 18 | 17  | 17 | 11 | 14 | 15 | 10 | 23 | 16 | 15 | 15 | 23 | 366 | Apr 19 Friday    |
| 111 | 18 | 20 | 21 | 25 | 38 | 22 | 26 | 18 | 8  | 26 | 15 | 10 | 20 | 19  | 14 | 18 | 31 | 26 | 21 | 15 | 26 | 8  | 15 | 23 | 483 | Apr 20 Saturday  |
| 112 | 16 | 16 | 17 | 15 | 12 | 9  | 3  | 17 | 14 | 10 | 13 | 16 | 4  | 6   | 5  | 12 | 16 | 6  | 5  | 5  | 8  | 10 | 14 | 14 | 263 | Apr 21 Sunday    |
| 113 | 16 | 15 | 18 | 13 | 19 | 13 | 7  | 0  | 0  | 7  | 6  | 13 | 5  | 12  | 17 | 14 | 4  | 5  | 6  | 6  | 10 | 7  | 4  | 7  | 224 | Apr 22 Monday    |
| 114 | 14 | 14 | 10 | 10 | 15 | 1  | 3  | 10 | 6  | 0  | 4  | 11 | 3  | 22  | 4  | 6  | 3  | 3  | 7  | 10 | 17 | 10 | 12 | 9  | 204 | Apr 23 Tuesday   |
| 115 | 17 | 23 | 11 | 20 | 9  | 4  | 0  | 2  | 4  | 16 | 5  | 9  | 11 | 17  | 6  | 17 | 10 | 20 | 9  | 22 | 13 | 5  | 9  | 12 | 271 | Apr 24 Wednesday |
| 116 | 15 | 17 | 18 | 10 | 8  | 5  | 10 | 5  | 3  | 4  | 5  | 7  | 11 | 8   | 8  | 6  | 11 | 3  | 16 | 15 | 11 | 8  | 17 | 6  | 227 | Apr 25 Thursday  |
| 117 | 7  | 15 | 11 | 8  | 8  | 5  | 5  | 11 | 5  | 1  | 9  | 6  | 16 | 1   | 9  | 4  | 12 | 11 | 8  | 4  | 5  | 7  | 10 | 8  | 186 | Apr 26 Friday    |
| 118 | 23 | 14 | 8  | 16 | 15 | 12 | 10 | 6  | 10 | 2  | 5  | 3  | 5  | 5   | 4  | 9  | 6  | 8  | 5  | 11 | 12 | 7  | 7  | 7  | 210 | Apr 27 Saturday  |
| 119 | 18 | 14 | 17 | 14 | 17 | 21 | 20 | 21 | 25 | 17 | 23 | 29 | 19 | 15  | 13 | 13 | 18 | 9  | 12 | 13 | 21 | 19 | 11 | 11 | 410 | Apr 28 Sunday    |
| 120 | 12 | 15 | 21 | 10 | 9  | 3  | 3  | 12 | 0  | 1  | 10 | 0  | 9  | 5   | 34 | 13 | 7  | 5  | 3  | 19 | 14 | 7  | 21 | 13 | 246 | Apr 29 Monday    |
| 121 | 5  | 7  | 8  | 12 | 5  | 12 | 8  | 3  | 5  | 8  | 12 | 11 | 5  | 13  | 4  | 7  | 4  | 4  | 3  | 11 | 10 | 8  | 19 | 11 | 195 | Apr 30 Tuesday   |
| 122 | 17 | 17 | 14 | 21 | 17 | 15 | 14 | 27 | 8  | 15 | 17 | 15 | 9  | 13  | 12 | 12 | 13 | 30 | 18 | 1  | 9  | 29 | 26 | 42 | 411 | May 01 Wednesday |
| 123 | 17 | 41 | 66 | 39 | 11 | 35 | 37 | 42 | 16 | 1  | 4  | 4  | 10 | 28  | 21 | 8  | 12 | 8  | 10 | 10 | 7  | 15 | 13 | 11 | 466 | May 02 Thursday  |
| 124 | 12 | 18 | 23 | 23 | 26 | 7  | 5  | 10 | 6  | 4  | 4  | 9  | 8  | 8   | 15 | 14 | 10 | 17 | 24 | 16 | 20 | 20 | 28 | 25 | 352 | May 03 Friday    |
| 125 | 23 | 20 | 25 | 23 | 23 | 25 | 26 | 25 | 21 | 22 | 19 | 27 | 19 | 18  | 13 | 18 | 32 | 20 | 25 | 29 | 18 | 25 | 25 | 24 | 545 | May 04 Saturday  |
| 126 | 26 | 25 | 36 | 24 | 23 | 22 | 20 | 26 | 23 | 29 | 16 | 24 | 25 | 22  | 24 | 15 | 19 | 15 | 23 | 23 | 23 | 19 | 16 | 24 | 542 | May 05 Sunday    |
| 127 | 18 | 18 | 16 | 16 | 11 | 9  | 9  | 12 | 8  | 7  | 9  | 11 | 15 | 13  | 3  | 7  | 10 | 14 | 30 | 22 | 24 | 14 | 12 | 10 | 318 | May 06 Monday    |
| 128 | 12 | 18 | 25 | 13 | 13 | 6  | 3  | 6  | 10 | 18 | 10 | 2  | 15 | 22  | 4  | 5  | 3  | 2  | 5  | 4  | 14 | 8  | 16 | 17 | 251 | May 07 Tuesday   |
| 129 | 11 | 17 | 15 | 9  | 14 | 3  | 2  | 5  | 4  | 14 | 11 | 30 | 52 | 23  | 18 | 6  | 5  | 10 | 6  | 6  | 14 | 12 | 11 | 17 | 315 | May 08 Wednesday |
| 130 | 21 | 13 | 14 | 23 | 15 | 3  | 3  | 4  | 4  | 5  | 14 | 7  | 10 | 9   | 16 | 17 | 8  | 15 | 13 | 11 | 17 | 14 | 15 | 17 | 288 | May 09 Thursday  |
| 131 | 12 | 10 | 30 | 14 | 25 | 10 | 10 | 9  | 4  | 9  | 3  | 7  | 7  | 5   | 4  | 9  | 11 | 7  | 6  | 10 | 11 | 12 | 12 | 14 | 251 | May 10 Friday    |
| 132 | 18 | 18 | 15 | 21 | 19 | 10 | 4  | 6  | 7  | 9  | 7  | 1  | 4  | 5   | 14 | 5  | 14 | 10 | 5  | 8  | 2  | 10 | 9  | 8  | 229 | May 11 Saturday  |
| 133 | 8  | 7  | 35 | 9  | 7  | 8  | 5  | 2  | 3  | 1  | 6  | 3  | 3  | 1   | 6  | 9  | 2  | 0  | 4  | 4  | 4  | 2  | 7  | 0  | 136 | May 12 Sunday    |
| 134 | 0  | 2  | 7  | 1  | 7  | 9  | 0  | 0  | 10 | 0  | 7  | 4  | 15 | 9   | 1  | 3  | 4  | 1  | 0  | 6  | 0  | 1  | 5  | 4  | 96  | May 13 Monday    |
| 135 | 28 | 13 | 3  | 9  | 55 | 26 | 18 | 3  | 4  | 4  | 9  | 13 | 41 | 118 | 14 | 9  | 16 | 11 | 20 | 25 | 16 | 13 | 7  | 10 | 485 | May 14 Tuesday   |
| 136 | 14 | 14 | 12 | 11 | 13 | 6  | 13 | 1  | 3  | 17 | 16 | 9  | 17 | 13  | 17 | 14 | 15 | 16 | 19 | 9  | 16 | 14 | 20 | 13 | 312 | May 15 Wednesday |
| 137 | 9  | 19 | 14 | 11 | 19 | 18 | 17 | 18 | 9  | 17 | 13 | 12 | 12 | 13  | 9  | 15 | 15 | 17 | 18 | 12 | 13 | 17 | 16 | 10 | 343 | May 16 Thursday  |
| 138 | 13 | 17 | 10 | 23 | 9  | 6  | 12 | 9  | 10 | 6  | 22 | 14 | 11 | 10  | 8  | 6  | 6  | 14 | 10 | 9  | 14 | 8  | 7  | 10 | 264 | May 17 Friday    |
| 139 | 14 | 14 | 8  | 23 | 4  | 12 | 10 | 9  | 5  | 2  | 10 | 5  | 10 | 10  | 6  | 7  | 11 | 15 | 5  | 14 | 19 | 21 | 16 | 16 | 266 | May 18 Saturday  |
| 140 | 18 | 20 | 21 | 37 | 13 | 9  | 17 | 18 | 8  | 11 | 12 | 8  | 15 | 10  | 14 | 5  | 11 | 6  | 6  | 12 | 18 | 11 | 7  | 23 | 330 | May 19 Sunday    |
| 141 | 10 | 8  | 12 | 14 | 6  | 3  | 2  | 4  | 3  | 10 | 4  | 9  | 2  | 3   | 7  | 4  | 7  | 8  | 1  | 10 | 2  | 6  | 4  | 6  | 145 | May 20 Monday    |
| 142 | 14 | 8  | 6  | 12 | 7  | 2  | 0  | 0  | 3  | 2  | 21 | 2  | 7  | 6   | 14 | 1  | 0  | 7  | 0  | 1  | 14 | 4  | 4  | 7  | 142 | May 21 Tuesday   |
| 143 | 11 | 2  | 8  | 2  | 2  | 0  | 0  | 5  | 5  | 4  | 3  | 9  | 7  | 3   | 10 | 5  | 8  | 0  | 0  | 0  | 9  | 7  | 0  | 10 | 110 | May 22 Wednesday |
| 144 | 4  | 10 | 10 | 5  | 7  | 2  | 7  | 1  | 18 | 10 | 9  | 4  | 9  | 2   | 4  | 0  | 0  | 2  | 7  | 6  | 2  | 4  | 4  | 4  | 131 | May 23 Thursday  |
| 145 | 8  | 8  | 5  | 6  | 2  | 2  | 18 | 19 | 2  | 9  | 9  | 3  | 9  | 7   | 0  | 11 | 13 | 6  | 9  | 6  | 8  | 19 | 11 | 17 | 207 | May 24 Friday    |
| 146 | 3  | 0  | 0  | 2  | 7  | 6  | 2  | 4  | 2  | 6  | 9  | 10 | 70 | 27  | 15 | 5  | 5  | 10 | 5  | 2  | 10 | 4  | 3  | 11 | 218 | May 25 Saturday  |
| 147 | 5  | 7  | 15 | 11 | 13 | 3  | 10 | 8  | 8  | 22 | 22 | 13 | 14 | 58  | 38 | 19 | 5  | 8  | 5  | 6  | 10 | 16 | 2  | 6  | 324 | May 26 Sunday    |

Table 2.3.2 (Page 1 of 4)

## NB2 .DPX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05  | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14  | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|-----|-----|----|----|----|----|----|----|----|----|-----|------------------|
| 148 | 10 | 9  | 6  | 15 | 12 | 11  | 10 | 4  | 6  | 11 | 21 | 17 | 33 | 27 | 36  | 25  | 23 | 18 | 23 | 19 | 32 | 29 | 24 | 29 | 450 | May 27 Monday    |
| 149 | 27 | 27 | 2  | 22 | 12 | 1   | 1  | 4  | 8  | 2  | 12 | 1  | 7  | 4  | 8   | 2   | 9  | 7  | 4  | 2  | 4  | 8  | 9  | 11 | 194 | May 28 Tuesday   |
| 150 | 16 | 22 | 20 | 18 | 13 | 23  | 5  | 2  | 4  | 2  | 3  | 5  | 6  | 13 | 7   | 10  | 4  | 10 | 5  | 4  | 2  | 3  | 10 | 13 | 220 | May 29 Wednesday |
| 151 | 16 | 14 | 7  | 20 | 4  | 3   | 6  | 2  | 9  | 2  | 17 | 12 | 8  | 7  | 2   | 9   | 5  | 3  | 12 | 3  | 3  | 6  | 7  | 13 | 190 | May 30 Thursday  |
| 152 | 16 | 20 | 13 | 6  | 9  | 4   | 4  | 9  | 3  | 18 | 20 | 8  | 3  | 8  | 12  | 12  | 14 | 19 | 15 | 11 | 12 | 12 | 19 | 20 | 287 | May 31 Friday    |
| 153 | 15 | 18 | 15 | 8  | 14 | 16  | 14 | 18 | 12 | 13 | 16 | 11 | 17 | 7  | 17  | 17  | 4  | 12 | 19 | 20 | 19 | 13 | 15 | 17 | 347 | Jun 01 Saturday  |
| 154 | 23 | 16 | 28 | 18 | 18 | 15  | 5  | 13 | 10 | 12 | 15 | 7  | 18 | 11 | 14  | 15  | 5  | 11 | 18 | 11 | 16 | 9  | 13 | 15 | 336 | Jun 02 Sunday    |
| 155 | 21 | 28 | 14 | 16 | 20 | 3   | 11 | 2  | 13 | 4  | 6  | 36 | 11 | 1  | 7   | 19  | 22 | 9  | 9  | 6  | 15 | 7  | 16 | 19 | 315 | Jun 03 Monday    |
| 156 | 16 | 9  | 16 | 13 | 7  | 3   | 3  | 5  | 18 | 6  | 1  | 7  | 8  | 0  | 18  | 65  | 73 | 54 | 30 | 8  | 11 | 16 | 12 | 21 | 420 | Jun 04 Tuesday   |
| 157 | 13 | 15 | 11 | 18 | 8  | 4   | 1  | 2  | 2  | 11 | 7  | 2  | 8  | 20 | 30  | 8   | 6  | 8  | 7  | 20 | 7  | 12 | 7  | 12 | 239 | Jun 05 Wednesday |
| 158 | 21 | 18 | 17 | 11 | 3  | 5   | 16 | 1  | 2  | 3  | 6  | 9  | 7  | 6  | 15  | 11  | 12 | 10 | 11 | 3  | 11 | 4  | 12 | 9  | 223 | Jun 06 Thursday  |
| 159 | 7  | 14 | 8  | 8  | 2  | 18  | 8  | 1  | 5  | 5  | 5  | 7  | 13 | 11 | 6   | 0   | 2  | 0  | 1  | 2  | 3  | 4  | 5  | 14 | 149 | Jun 07 Friday    |
| 160 | 3  | 2  | 4  | 13 | 6  | 13  | 7  | 4  | 6  | 21 | 60 | 74 | 1  | 2  | 1   | 2   | 17 | 5  | 7  | 4  | 7  | 4  | 5  | 15 | 283 | Jun 08 Saturday  |
| 161 | 7  | 29 | 5  | 19 | 22 | 10  | 11 | 9  | 15 | 25 | 16 | 2  | 2  | 7  | 3   | 3   | 6  | 2  | 2  | 0  | 8  | 0  | 4  | 26 | 233 | Jun 09 Sunday    |
| 162 | 15 | 23 | 13 | 13 | 41 | 48  | 20 | 57 | 54 | 35 | 43 | 20 | 8  | 27 | 7   | 24  | 14 | 42 | 15 | 13 | 7  | 12 | 4  | 7  | 562 | Jun 10 Monday    |
| 163 | 8  | 16 | 10 | 12 | 50 | 117 | 79 | 40 | 77 | 38 | 12 | 25 | 16 | 20 | 9   | 3   | 18 | 20 | 31 | 4  | 4  | 28 | 7  | 6  | 650 | Jun 11 Tuesday   |
| 164 | 11 | 3  | 11 | 17 | 7  | 3   | 0  | 0  | 2  | 18 | 3  | 10 | 21 | 25 | 61  | 57  | 17 | 5  | 11 | 11 | 8  | 8  | 12 | 11 | 332 | Jun 12 Wednesday |
| 165 | 23 | 12 | 17 | 11 | 4  | 8   | 2  | 11 | 3  | 8  | 1  | 8  | 11 | 13 | 9   | 13  | 12 | 9  | 10 | 11 | 12 | 5  | 14 | 11 | 238 | Jun 13 Thursday  |
| 166 | 19 | 14 | 15 | 13 | 8  | 4   | 6  | 5  | 9  | 8  | 1  | 9  | 3  | 6  | 5   | 24  | 7  | 8  | 3  | 10 | 8  | 10 | 16 | 4  | 215 | Jun 14 Friday    |
| 167 | 8  | 12 | 13 | 8  | 14 | 9   | 6  | 5  | 6  | 1  | 4  | 4  | 14 | 3  | 9   | 7   | 9  | 4  | 10 | 5  | 7  | 6  | 6  | 10 | 180 | Jun 15 Saturday  |
| 168 | 21 | 15 | 15 | 19 | 0  | 7   | 2  | 3  | 4  | 7  | 3  | 5  | 6  | 8  | 1   | 12  | 1  | 7  | 2  | 17 | 5  | 9  | 2  | 9  | 180 | Jun 16 Sunday    |
| 169 | 9  | 3  | 10 | 9  | 9  | 3   | 2  | 1  | 4  | 1  | 6  | 64 | 27 | 60 | 135 | 100 | 35 | 14 | 17 | 6  | 8  | 12 | 8  | 8  | 551 | Jun 17 Monday    |
| 170 | 10 | 5  | 15 | 7  | 7  | 1   | 1  | 6  | 20 | 0  | 15 | 14 | 10 | 10 | 19  | 32  | 27 | 13 | 4  | 16 | 16 | 14 | 20 | 17 | 299 | Jun 18 Tuesday   |
| 171 | 8  | 12 | 14 | 15 | 6  | 2   | 5  | 2  | 3  | 6  | 2  | 11 | 11 | 17 | 16  | 5   | 8  | 11 | 6  | 11 | 10 | 15 | 7  | 10 | 213 | Jun 19 Wednesday |
| 172 | 19 | 14 | 8  | 15 | 6  | 9   | 2  | 6  | 9  | 12 | 10 | 15 | 11 | 22 | 9   | 10  | 7  | 9  | 10 | 10 | 11 | 11 | 10 | 11 | 256 | Jun 20 Thursday  |
| 173 | 22 | 15 | 16 | 17 | 11 | 6   | 2  | 7  | 6  | 11 | 12 | 21 | 2  | 15 | 15  | 13  | 12 | 9  | 10 | 15 | 16 | 25 | 14 | 19 | 311 | Jun 21 Friday    |
| 174 | 13 | 23 | 12 | 22 | 18 | 8   | 11 | 12 | 11 | 10 | 11 | 17 | 15 | 7  | 7   | 28  | 11 | 6  | 10 | 13 | 8  | 8  | 11 | 19 | 311 | Jun 22 Saturday  |
| 175 | 11 | 32 | 18 | 35 | 13 | 13  | 13 | 14 | 17 | 8  | 6  | 22 | 24 | 14 | 17  | 24  | 12 | 9  | 7  | 5  | 17 | 21 | 15 | 9  | 376 | Jun 23 Sunday    |
| 176 | 9  | 16 | 11 | 16 | 6  | 3   | 7  | 3  | 4  | 5  | 6  | 12 | 0  | 8  | 17  | 10  | 0  | 1  | 9  | 4  | 12 | 10 | 9  | 7  | 185 | Jun 24 Monday    |
| 177 | 15 | 8  | 22 | 11 | 5  | 7   | 2  | 11 | 0  | 10 | 16 | 4  | 9  | 7  | 18  | 0   | 12 | 2  | 19 | 3  | 9  | 12 | 3  | 8  | 213 | Jun 25 Tuesday   |
| 178 | 9  | 8  | 20 | 11 | 13 | 4   | 5  | 1  | 11 | 8  | 22 | 14 | 20 | 8  | 13  | 1   | 5  | 12 | 31 | 10 | 2  | 6  | 7  | 6  | 247 | Jun 26 Wednesday |
| 179 | 6  | 3  | 3  | 5  | 2  | 8   | 3  | 2  | 8  | 9  | 9  | 9  | 13 | 3  | 12  | 0   | 15 | 10 | 3  | 3  | 4  | 9  | 11 | 9  | 159 | Jun 27 Thursday  |
| 180 | 1  | 6  | 2  | 11 | 4  | 0   | 4  | 6  | 9  | 11 | 5  | 2  | 5  | 2  | 1   | 15  | 4  | 2  | 2  | 3  | 13 | 10 | 6  | 5  | 129 | Jun 28 Friday    |
| 181 | 7  | 10 | 6  | 6  | 10 | 6   | 5  | 1  | 15 | 0  | 3  | 4  | 3  | 5  | 6   | 3   | 8  | 7  | 8  | 12 | 9  | 4  | 7  | 11 | 156 | Jun 29 Saturday  |
| 182 | 7  | 10 | 7  | 16 | 11 | 9   | 14 | 9  | 17 | 16 | 11 | 10 | 22 | 5  | 7   | 6   | 8  | 12 | 5  | 10 | 11 | 12 | 16 | 20 | 271 | Jun 30 Sunday    |
| 183 | 17 | 24 | 14 | 10 | 9  | 11  | 6  | 4  | 8  | 0  | 15 | 9  | 12 | 7  | 7   | 1   | 5  | 9  | 10 | 7  | 4  | 12 | 17 | 7  | 225 | Jul 01 Monday    |
| 184 | 11 | 9  | 7  | 16 | 8  | 1   | 2  | 13 | 0  | 4  | 0  | 9  | 17 | 6  | 14  | 4   | 9  | 7  | 6  | 8  | 8  | 6  | 8  | 12 | 185 | Jul 02 Tuesday   |
| 185 | 16 | 11 | 7  | 11 | 1  | 0   | 10 | 2  | 10 | 1  | 11 | 8  | 0  | 13 | 6   | 9   | 8  | 9  | 5  | 6  | 4  | 8  | 3  | 3  | 162 | Jul 03 Wednesday |
| 186 | 1  | 2  | 1  | 14 | 8  | 1   | 2  | 2  | 7  | 5  | 0  | 10 | 13 | 8  | 5   | 17  | 15 | 9  | 7  | 4  | 5  | 3  | 13 | 7  | 159 | Jul 04 Thursday  |
| 187 | 6  | 17 | 11 | 6  | 4  | 5   | 6  | 1  | 6  | 2  | 27 | 19 | 18 | 7  | 25  | 13  | 8  | 6  | 16 | 10 | 7  | 8  | 4  | 8  | 240 | Jul 05 Friday    |
| 188 | 3  | 5  | 6  | 4  | 7  | 13  | 3  | 7  | 7  | 3  | 9  | 9  | 13 | 8  | 0   | 3   | 9  | 12 | 10 | 6  | 7  | 10 | 5  | 5  | 164 | Jul 06 Saturday  |
| 189 | 5  | 15 | 3  | 2  | 9  | 4   | 3  | 5  | 4  | 10 | 6  | 17 | 3  | 21 | 10  | 11  | 11 | 8  | 11 | 9  | 0  | 15 | 9  | 3  | 194 | Jul 07 Sunday    |
| 190 | 15 | 20 | 10 | 10 | 8  | 1   | 1  | 1  | 0  | 6  | 1  | 17 | 14 | 2  | 1   | 3   | 5  | 8  | 6  | 6  | 5  | 8  | 7  | 9  | 164 | Jul 08 Monday    |
| 191 | 24 | 7  | 4  | 6  | 13 | 3   | 1  | 3  | 6  | 3  | 10 | 7  | 17 | 17 | 4   | 3   | 5  | 11 | 14 | 5  | 9  | 7  | 6  | 11 | 196 | Jul 09 Tuesday   |
| 192 | 12 | 13 | 8  | 15 | 12 | 15  | 7  | 6  | 4  | 1  | 6  | 1  | 2  | 3  | 17  | 4   | 7  | 5  | 6  | 6  | 7  | 10 | 8  | 8  | 183 | Jul 10 Wednesday |
| 193 | 10 | 9  | 11 | 9  | 5  | 5   | 4  | 5  | 3  | 4  | 4  | 6  | 10 | 5  | 2   | 2   | 5  | 9  | 13 | 11 | 4  | 6  | 14 | 13 | 169 | Jul 11 Thursday  |
| 194 | 5  | 15 | 12 | 11 | 9  | 5   | 4  | 3  | 2  | 15 | 13 | 5  | 8  | 16 | 14  | 19  | 14 | 14 | 90 | 47 | 34 | 20 | 9  | 13 | 397 | Jul 12 Friday    |
| 195 | 10 | 15 | 10 | 7  | 8  | 12  | 8  | 9  | 9  | 12 | 17 | 15 | 20 | 16 | 16  | 18  | 15 | 9  | 17 | 25 | 17 | 25 | 15 | 20 | 345 | Jul 13 Saturday  |
| 196 | 26 | 25 | 17 | 15 | 24 | 29  | 22 | 26 | 15 | 11 | 8  | 15 | 17 | 21 | 13  | 33  | 29 | 19 | 20 | 30 | 15 | 25 | 22 | 26 | 503 | Jul 14 Sunday    |
| 197 | 28 | 18 | 29 | 17 | 22 | 19  | 20 | 5  | 14 | 16 | 5  | 9  | 13 | 15 | 14  | 13  | 12 | 18 | 17 | 16 | 12 | 25 | 16 | 19 | 392 | Jul 15 Monday    |
| 198 | 20 | 20 | 16 | 25 | 23 | 12  | 13 | 8  | 8  | 10 | 18 | 10 | 1  | 17 | 6   | 18  | 10 | 10 | 10 | 16 | 10 | 18 | 21 | 10 | 330 | Jul 16 Tuesday   |
| 199 | 19 | 19 | 15 | 16 | 20 | 6   | 4  | 9  | 2  | 13 | 4  | 6  | 7  | 5  | 3   | 7   | 2  | 4  | 8  | 5  | 13 | 21 | 22 | 17 | 247 | Jul 17 Wednesday |
| 200 | 5  | 17 | 13 | 11 | 10 | 2   | 1  | 0  | 6  | 19 | 13 | 7  | 3  | 6  | 9   | 2   | 0  | 7  | 1  | 3  | 5  | 6  | 5  | 21 | 172 | Jul 18 Thursday  |
| 201 | 6  | 4  | 28 | 6  | 3  | 3   | 11 | 1  | 10 | 10 | 16 | 5  | 1  | 1  | 6   | 10  | 7  | 7  | 4  | 23 | 3  | 5  | 6  | 7  | 183 | Jul 19 Friday    |
| 202 | 14 | 22 | 10 | 12 | 17 | 9   | 17 | 11 | 16 | 22 | 3  | 8  | 8  | 7  | 9   | 9   | 13 | 17 | 21 | 15 | 7  | 18 | 13 | 14 | 312 | Jul 20 Saturday  |
| 203 | 18 | 17 | 4  | 9  | 13 | 10  | 14 | 10 | 5  | 9  | 7  | 9  | 4  | 5  | 15  | 7   | 3  | 2  | 15 | 4  | 15 | 10 | 9  | 15 | 229 | Jul 21 Sunday    |

Table 2.3.2. (Page 2 of 4)

## NB2 .DPX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10  | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 204 | 18 | 18 | 11 | 6  | 13 | 12 | 7  | 7  | 11 | 8  | 7   | 12 | 3  | 3  | 38 | 12 | 23 | 6  | 7  | 6  | 11 | 12 | 12 | 6  | 269 | Jul 22 Monday    |
| 205 | 16 | 22 | 11 | 15 | 12 | 12 | 14 | 4  | 9  | 3  | 6   | 14 | 28 | 6  | 7  | 13 | 0  | 10 | 16 | 4  | 7  | 10 | 23 | 9  | 271 | Jul 23 Tuesday   |
| 206 | 13 | 19 | 5  | 11 | 9  | 3  | 21 | 6  | 9  | 6  | 7   | 12 | 10 | 11 | 7  | 22 | 11 | 39 | 19 | 13 | 18 | 16 | 6  | 12 | 305 | Jul 24 Wednesday |
| 207 | 26 | 19 | 12 | 25 | 13 | 6  | 10 | 5  | 7  | 6  | 8   | 0  | 0  | 30 | 68 | 64 | 33 | 41 | 32 | 48 | 19 | 9  | 1  | 11 | 493 | Jul 25 Thursday  |
| 208 | 8  | 5  | 4  | 6  | 3  | 4  | 2  | 13 | 5  | 8  | 6   | 1  | 12 | 20 | 9  | 10 | 34 | 9  | 9  | 17 | 11 | 14 | 9  | 8  | 227 | Jul 26 Friday    |
| 209 | 12 | 8  | 14 | 9  | 3  | 4  | 11 | 4  | 17 | 4  | 10  | 12 | 7  | 6  | 6  | 10 | 17 | 11 | 10 | 13 | 10 | 10 | 20 | 14 | 242 | Jul 27 Saturday  |
| 210 | 10 | 19 | 12 | 15 | 8  | 10 | 10 | 17 | 9  | 8  | 8   | 3  | 8  | 4  | 14 | 3  | 6  | 10 | 2  | 8  | 6  | 2  | 1  | 2  | 195 | Jul 28 Sunday    |
| 211 | 4  | 14 | 5  | 12 | 5  | 3  | 5  | 0  | 0  | 0  | 0   | 5  | 6  | 9  | 4  | 0  | 1  | 6  | 1  | 2  | 16 | 6  | 3  | 4  | 111 | Jul 29 Monday    |
| 212 | 2  | 10 | 5  | 14 | 9  | 0  | 0  | 0  | 0  | 3  | 15  | 3  | 7  | 13 | 26 | 5  | 0  | 6  | 4  | 0  | 5  | 6  | 4  | 4  | 141 | Jul 30 Tuesday   |
| 213 | 25 | 6  | 4  | 5  | 6  | 7  | 0  | 0  | 18 | 14 | 1   | 10 | 7  | 10 | 12 | 4  | 2  | 9  | 9  | 3  | 6  | 1  | 14 | 6  | 179 | Jul 31 Wednesday |
| 214 | 4  | 13 | 6  | 13 | 17 | 1  | 0  | 3  | 4  | 7  | 14  | 9  | 8  | 3  | 9  | 1  | 4  | 4  | 4  | 8  | 5  | 9  | 13 | 4  | 163 | Aug 01 Thursday  |
| 215 | 9  | 5  | 15 | 9  | 5  | 1  | 3  | 8  | 4  | 4  | 1   | 15 | 5  | 35 | 33 | 15 | 16 | 12 | 3  | 13 | 6  | 7  | 11 | 6  | 241 | Aug 02 Friday    |
| 216 | 9  | 13 | 14 | 16 | 18 | 25 | 7  | 11 | 9  | 4  | 7   | 10 | 9  | 5  | 6  | 4  | 10 | 11 | 5  | 7  | 6  | 10 | 12 | 18 | 246 | Aug 03 Saturday  |
| 217 | 8  | 7  | 16 | 8  | 9  | 16 | 9  | 10 | 12 | 6  | 7   | 3  | 5  | 7  | 8  | 12 | 2  | 12 | 5  | 6  | 8  | 5  | 3  | 6  | 190 | Aug 04 Sunday    |
| 218 | 20 | 3  | 13 | 5  | 14 | 5  | 0  | 0  | 1  | 5  | 0   | 3  | 6  | 8  | 8  | 5  | 1  | 5  | 6  | 7  | 9  | 5  | 15 | 11 | 155 | Aug 05 Monday    |
| 219 | 17 | 4  | 9  | 8  | 0  | 2  | 4  | 0  | 0  | 1  | 15  | 20 | 47 | 17 | 0  | 1  | 2  | 2  | 0  | 0  | 9  | 5  | 4  | 7  | 174 | Aug 06 Tuesday   |
| 220 | 1  | 6  | 6  | 2  | 1  | 0  | 3  | 1  | 0  | 8  | 5   | 2  | 8  | 11 | 4  | 4  | 5  | 0  | 3  | 4  | 2  | 4  | 3  | 2  | 85  | Aug 07 Wednesday |
| 221 | 3  | 2  | 3  | 4  | 6  | 0  | 4  | 0  | 1  | 7  | 12  | 5  | 20 | 8  | 3  | 7  | 4  | 21 | 11 | 1  | 3  | 0  | 8  | 6  | 139 | Aug 08 Thursday  |
| 222 | 13 | 5  | 5  | 2  | 8  | 10 | 5  | 0  | 9  | 6  | 6   | 5  | 10 | 2  | 13 | 14 | 8  | 6  | 14 | 9  | 3  | 7  | 3  | 8  | 171 | Aug 09 Friday    |
| 223 | 4  | 5  | 5  | 6  | 10 | 15 | 13 | 5  | 1  | 4  | 4   | 8  | 3  | 5  | 11 | 18 | 9  | 9  | 12 | 12 | 9  | 7  | 14 | 14 | 203 | Aug 10 Saturday  |
| 224 | 6  | 15 | 13 | 13 | 10 | 10 | 10 | 9  | 12 | 7  | 2   | 10 | 11 | 3  | 9  | 6  | 6  | 8  | 3  | 9  | 0  | 3  | 5  | 0  | 180 | Aug 11 Sunday    |
| 225 | 6  | 2  | 3  | 6  | 2  | 12 | 3  | 4  | 0  | 0  | 5   | 0  | 4  | 5  | 3  | 6  | 0  | 20 | 4  | 2  | 4  | 1  | 4  | 6  | 102 | Aug 12 Monday    |
| 226 | 9  | 3  | 5  | 0  | 0  | 0  | 11 | 2  | 3  | 2  | 42  | 4  | 16 | 11 | 8  | 0  | 0  | 3  | 7  | 5  | 8  | 1  | 5  | 30 | 175 | Aug 13 Tuesday   |
| 227 | 9  | 2  | 27 | 21 | 7  | 0  | 1  | 5  | 0  | 3  | 4   | 18 | 20 | 6  | 14 | 7  | 3  | 6  | 1  | 2  | 0  | 1  | 3  | 9  | 169 | Aug 14 Wednesday |
| 228 | 1  | 6  | 2  | 4  | 7  | 2  | 0  | 7  | 7  | 0  | 0   | 0  | 1  | 0  | 4  | 2  | 18 | 2  | 0  | 8  | 1  | 2  | 3  | 8  | 85  | Aug 15 Thursday  |
| 229 | 3  | 2  | 0  | 3  | 2  | 0  | 2  | 2  | 1  | 16 | 6   | 15 | 13 | 11 | 5  | 6  | 8  | 11 | 5  | 12 | 7  | 8  | 8  | 9  | 155 | Aug 16 Friday    |
| 230 | 9  | 17 | 7  | 12 | 12 | 6  | 9  | 5  | 8  | 3  | 3   | 26 | 18 | 4  | 2  | 4  | 10 | 5  | 6  | 5  | 3  | 10 | 8  | 6  | 198 | Aug 17 Saturday  |
| 231 | 12 | 5  | 6  | 9  | 9  | 11 | 7  | 10 | 13 | 7  | 9   | 10 | 11 | 13 | 6  | 11 | 8  | 6  | 13 | 5  | 14 | 8  | 9  | 14 | 226 | Aug 18 Sunday    |
| 232 | 13 | 18 | 11 | 13 | 13 | 3  | 0  | 10 | 3  | 2  | 3   | 10 | 31 | 13 | 8  | 9  | 6  | 10 | 8  | 7  | 13 | 6  | 24 | 6  | 240 | Aug 19 Monday    |
| 233 | 17 | 18 | 8  | 15 | 13 | 14 | 6  | 7  | 5  | 7  | 8   | 6  | 23 | 10 | 3  | 5  | 8  | 9  | 0  | 3  | 6  | 15 | 10 | 10 | 226 | Aug 20 Tuesday   |
| 234 | 1  | 8  | 15 | 8  | 1  | 3  | 0  | 7  | 8  | 16 | 5   | 16 | 11 | 14 | 10 | 8  | 6  | 2  | 3  | 12 | 5  | 8  | 15 | 9  | 191 | Aug 21 Wednesday |
| 235 | 10 | 23 | 19 | 14 | 15 | 16 | 11 | 11 | 4  | 5  | 6   | 10 | 9  | 38 | 32 | 26 | 25 | 8  | 30 | 8  | 26 | 33 | 20 | 17 | 416 | Aug 22 Thursday  |
| 236 | 9  | 9  | 11 | 10 | 2  | 12 | 4  | 0  | 5  | 6  | 4   | 9  | 53 | 52 | 48 | 51 | 43 | 24 | 8  | 7  | 13 | 3  | 17 | 10 | 410 | Aug 23 Friday    |
| 237 | 9  | 6  | 19 | 7  | 11 | 12 | 3  | 12 | 10 | 9  | 8   | 9  | 35 | 36 | 46 | 31 | 66 | 82 | 66 | 58 | 21 | 8  | 10 | 8  | 582 | Aug 24 Saturday  |
| 238 | 8  | 9  | 13 | 10 | 11 | 15 | 7  | 8  | 4  | 6  | 4   | 3  | 5  | 10 | 7  | 4  | 6  | 10 | 7  | 4  | 6  | 5  | 13 | 14 | 189 | Aug 25 Sunday    |
| 239 | 6  | 4  | 10 | 5  | 8  | 1  | 7  | 2  | 0  | 2  | 7   | 9  | 6  | 4  | 2  | 2  | 2  | 6  | 1  | 0  | 3  | 8  | 5  | 6  | 106 | Aug 26 Monday    |
| 240 | 10 | 7  | 6  | 1  | 9  | 0  | 14 | 0  | 3  | 8  | 7   | 13 | 1  | 6  | 13 | 6  | 3  | 5  | 6  | 1  | 9  | 6  | 11 | 3  | 148 | Aug 27 Tuesday   |
| 241 | 2  | 6  | 13 | 7  | 4  | 0  | 6  | 10 | 10 | 17 | 15  | 13 | 28 | 15 | 16 | 12 | 16 | 18 | 18 | 12 | 12 | 7  | 22 | 16 | 295 | Aug 28 Wednesday |
| 242 | 20 | 13 | 10 | 22 | 24 | 12 | 7  | 4  | 3  | 11 | 8   | 5  | 5  | 6  | 15 | 20 | 4  | 8  | 6  | 8  | 9  | 12 | 9  | 22 | 263 | Aug 29 Thursday  |
| 243 | 11 | 21 | 12 | 10 | 2  | 2  | 8  | 3  | 7  | 42 | 8   | 20 | 17 | 30 | 22 | 26 | 23 | 22 | 15 | 27 | 20 | 19 | 15 | 29 | 411 | Aug 30 Friday    |
| 244 | 49 | 27 | 41 | 38 | 47 | 62 | 62 | 54 | 46 | 81 | 100 | 41 | 30 | 36 | 38 | 26 | 28 | 10 | 11 | 19 | 25 | 14 | 5  | 13 | 903 | Aug 31 Saturday  |
| 245 | 14 | 17 | 21 | 11 | 19 | 17 | 10 | 25 | 21 | 13 | 6   | 16 | 21 | 16 | 7  | 7  | 7  | 3  | 17 | 13 | 8  | 18 | 12 | 12 | 331 | Sep 01 Sunday    |
| 246 | 16 | 18 | 27 | 14 | 17 | 3  | 5  | 14 | 9  | 3  | 16  | 7  | 30 | 9  | 9  | 13 | 2  | 8  | 13 | 14 | 17 | 7  | 14 | 12 | 297 | Sep 02 Monday    |
| 247 | 20 | 16 | 16 | 19 | 9  | 5  | 2  | 3  | 8  | 4  | 16  | 4  | 9  | 8  | 9  | 4  | 14 | 7  | 7  | 5  | 12 | 9  | 10 | 14 | 230 | Sep 03 Tuesday   |
| 248 | 14 | 14 | 11 | 13 | 18 | 0  | 4  | 1  | 1  | 1  | 8   | 3  | 8  | 6  | 21 | 9  | 7  | 10 | 11 | 13 | 17 | 12 | 22 | 12 | 236 | Sep 04 Wednesday |
| 249 | 16 | 16 | 16 | 10 | 7  | 4  | 2  | 2  | 11 | 3  | 7   | 17 | 4  | 7  | 9  | 7  | 9  | 2  | 8  | 0  | 24 | 23 | 17 | 24 | 245 | Sep 05 Thursday  |
| 250 | 29 | 17 | 26 | 12 | 4  | 6  | 4  | 13 | 18 | 3  | 9   | 21 | 32 | 15 | 26 | 16 | 5  | 14 | 26 | 25 | 15 | 27 | 12 | 18 | 393 | Sep 06 Friday    |
| 251 | 23 | 11 | 22 | 21 | 30 | 16 | 9  | 4  | 11 | 9  | 16  | 18 | 29 | 8  | 5  | 9  | 11 | 17 | 13 | 7  | 17 | 19 | 19 | 13 | 357 | Sep 07 Saturday  |
| 252 | 20 | 21 | 24 | 19 | 19 | 20 | 18 | 15 | 20 | 17 | 15  | 20 | 21 | 9  | 11 | 16 | 18 | 23 | 15 | 18 | 19 | 13 | 18 | 20 | 429 | Sep 08 Sunday    |
| 253 | 40 | 37 | 29 | 31 | 44 | 19 | 11 | 11 | 16 | 21 | 16  | 20 | 20 | 17 | 17 | 11 | 20 | 17 | 14 | 22 | 15 | 22 | 32 | 32 | 534 | Sep 09 Monday    |
| 254 | 31 | 30 | 26 | 45 | 30 | 25 | 3  | 10 | 2  | 10 | 8   | 22 | 18 | 16 | 20 | 12 | 7  | 12 | 16 | 19 | 18 | 15 | 21 | 13 | 429 | Sep 10 Tuesday   |
| 255 | 16 | 15 | 21 | 36 | 22 | 5  | 2  | 4  | 7  | 7  | 17  | 12 | 15 | 20 | 10 | 7  | 8  | 9  | 10 | 9  | 19 | 22 | 20 | 29 | 342 | Sep 11 Wednesday |
| 256 | 23 | 26 | 19 | 33 | 22 | 8  | 9  | 14 | 16 | 9  | 12  | 12 | 11 | 19 | 14 | 17 | 13 | 9  | 15 | 14 | 13 | 19 | 12 | 17 | 376 | Sep 12 Thursday  |
| 257 | 23 | 10 | 20 | 28 | 22 | 8  | 5  | 9  | 17 | 11 | 13  | 23 | 25 | 34 | 23 | 16 | 13 | 10 | 15 | 17 | 20 | 27 | 17 | 21 | 540 | Sep 13 Friday    |
| 258 | 18 | 18 | 23 | 33 | 12 | 11 | 8  | 2  | 23 | 7  | 6   | 7  | 12 | 43 | 32 | 26 | 26 | 16 | 19 | 53 | 47 | 32 | 34 | 32 | 651 | Sep 14 Saturday  |
| 259 | 25 | 15 | 16 | 27 | 20 | 18 | 15 | 27 | 19 | 23 | 13  | 29 | 60 | 66 | 42 | 38 | 20 | 19 | 20 | 28 | 25 | 25 | 28 | 33 |     |                  |

Table 2.3.2. (Page 3 of 4)

## NB2 .DPX Hourly distribution of detections

| Day | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|-----------|----|-----|----|----|----|----|----|----|----|----|-----|------------------|
| 260 | 47   | 32   | 18   | 19   | 7    | 6    | 0    | 2    | 2    | 8    | 7    | 0    | 0     | 29        | 94 | 104 | 54 | 25 | 37 | 27 | 17 | 12 | 25 | 25 | 597 | Sep 16 Monday    |
| 261 | 5    | 10   | 11   | 6    | 1    | 0    | 1    | 0    | 0    | 7    | 0    | 0    | 8     | 20        | 0  | 8   | 1  | 0  | 5  | 12 | 42 | 39 | 49 | 53 | 278 | Sep 17 Tuesday   |
| 262 | 28   | 16   | 11   | 19   | 32   | 21   | 11   | 9    | 3    | 10   | 19   | 15   | 13    | 7         | 13 | 9   | 0  | 12 | 8  | 2  | 3  | 6  | 6  | 8  | 281 | Sep 18 Wednesday |
| 263 | 10   | 13   | 5    | 9    | 10   | 0    | 0    | 0    | 1    | 0    | 4    | 6    | 7     | 9         | 29 | 8   | 2  | 0  | 1  | 4  | 0  | 13 | 5  | 8  | 144 | Sep 19 Thursday  |
| 264 | 21   | 12   | 8    | 5    | 23   | 8    | 4    | 3    | 0    | 2    | 9    | 13   | 12    | 12        | 8  | 7   | 12 | 29 | 28 | 32 | 17 | 20 | 22 | 9  | 316 | Sep 20 Friday    |
| 265 | 17   | 24   | 11   | 23   | 9    | 11   | 0    | 4    | 11   | 2    | 7    | 4    | 10    | 6         | 5  | 6   | 15 | 9  | 11 | 12 | 14 | 20 | 15 | 18 | 264 | Sep 21 Saturday  |
| 266 | 18   | 11   | 12   | 7    | 5    | 10   | 7    | 3    | 11   | 14   | 12   | 4    | 7     | 4         | 9  | 0   | 5  | 3  | 2  | 4  | 15 | 7  | 10 | 12 | 192 | Sep 22 Sunday    |
| 267 | 17   | 7    | 17   | 4    | 6    | 1    | 3    | 3    | 2    | 11   | 7    | 13   | 2     | 3         | 1  | 3   | 5  | 6  | 4  | 9  | 16 | 16 | 8  | 14 | 178 | Sep 23 Monday    |
| 268 | 18   | 20   | 15   | 19   | 7    | 2    | 3    | 1    | 1    | 7    | 1    | 17   | 29    | 13        | 9  | 4   | 7  | 3  | 14 | 17 | 19 | 26 | 23 | 20 | 295 | Sep 24 Tuesday   |
| 269 | 22   | 13   | 24   | 23   | 9    | 4    | 1    | 11   | 8    | 9    | 13   | 8    | 13    | 9         | 15 | 17  | 7  | 10 | 11 | 12 | 15 | 10 | 16 | 18 | 298 | Sep 25 Wednesday |
| 270 | 18   | 24   | 16   | 20   | 15   | 6    | 1    | 4    | 5    | 16   | 12   | 2    | 12    | 4         | 4  | 12  | 12 | 11 | 7  | 7  | 20 | 15 | 12 | 10 | 265 | Sep 26 Thursday  |
| 271 | 16   | 8    | 17   | 18   | 31   | 9    | 10   | 6    | 1    | 7    | 8    | 15   | 16    | 8         | 19 | 5   | 8  | 13 | 11 | 6  | 14 | 11 | 9  | 20 | 286 | Sep 27 Friday    |
| 272 | 9    | 14   | 11   | 17   | 16   | 14   | 11   | 14   | 22   | 19   | 9    | 20   | 19    | 10        | 22 | 14  | 22 | 29 | 14 | 5  | 11 | 17 | 12 | 19 | 370 | Sep 28 Saturday  |
| 273 | 15   | 25   | 19   | 23   | 14   | 16   | 34   | 18   | 19   | 14   | 18   | 18   | 19    | 18        | 15 | 16  | 14 | 17 | 13 | 15 | 19 | 16 | 15 | 14 | 424 | Sep 29 Sunday    |
| 274 | 18   | 14   | 15   | 18   | 14   | 11   | 17   | 11   | 8    | 5    | 5    | 14   | 8     | 10        | 15 | 10  | 19 | 16 | 10 | 15 | 15 | 14 | 16 | 10 | 308 | Sep 30 Monday    |
| NB2 | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |     |                  |
| Sum | 2595 | 2551 | 1748 | 1471 | 1741 | 2126 | 2422 | 2296 | 2060 | 2093 | 2190 | 2451 |       |           |    |     |    |    |    |    |    |    |    |    |     |                  |
|     | 2690 | 2522 | 2290 | 1521 | 1627 | 1933 | 2425 | 2561 | 2095 | 2090 | 2173 | 2244 | 51915 | Total sum |    |     |    |    |    |    |    |    |    |    |     |                  |
| 183 | 15   | 14   | 14   | 14   | 13   | 10   | 8    | 8    | 9    | 10   | 11   | 12   | 13    | 13        | 14 | 13  | 11 | 11 | 11 | 11 | 12 | 12 | 12 | 13 | 284 | Total average    |
| 124 | 14   | 14   | 13   | 13   | 11   | 7    | 6    | 6    | 7    | 8    | 9    | 10   | 12    | 13        | 14 | 12  | 10 | 10 | 11 | 10 | 11 | 11 | 12 | 13 | 260 | Average workdays |
| 59  | 15   | 15   | 14   | 15   | 15   | 14   | 12   | 12   | 13   | 13   | 13   | 14   | 15    | 14        | 13 | 13  | 13 | 13 | 13 | 13 | 13 | 13 | 12 | 15 | 327 | Average weekends |

**Table 2.3.2.** Daily and hourly distribution of NORSAR detections. For each day is shown number of detections within each hour of the day and number of detections for that day. The end statistics give total number of detections distributed for each hour and the total sum of detections during the period. The averages show number of processed days, hourly distribution and average per processed day. (Page 4 of 4)

### 3 Operation of Regional Arrays

#### 3.1 Recording of NORESS data at NDPC, Kjeller

The average recording time was 89.67% as compared to 99.57% during the previous reporting period.

Table 3.1.1 lists the main outage times and reasons.

| Date   | Time        | Cause                                |
|--------|-------------|--------------------------------------|
| 07 May | 0702 - 1213 | Power break (announced)              |
| 09 May | 0701 - 1141 | Power break (announced)              |
| 14 May | 0710 - 0941 | Power break (announced)              |
| 14 May | 1958 - 2010 | Power failure due to thunderstorm    |
| 23 May | 0700 - 1153 | Power break (announced)              |
| 10 Jun | 0653 - 0749 | Power break                          |
| 18 Jun | 1624 -      | Hardware failure due to thunderstorm |
| 20 Jun | - 1127      |                                      |
| 12 Jul | 2100 -      | Hardware failure due to thunderstorm |
| 29 Jul | - 0100      |                                      |
| 16 Sep | 1018 - 1728 | Transmission line failure            |

**Table 3.1.1.** Interruptions in recording of NORESS data at NDPC, 1 April - 30 September 1996.

Monthly uptimes for the NORESS on-line data recording task, taking into account all factors (field installations, transmissions line, data center operation) affecting this task were as follows:

|           |   |       |
|-----------|---|-------|
| April 96  | : | 99.97 |
| May       | : | 97.64 |
| June      | : | 93.88 |
| July      | : | 47.89 |
| August    | : | 99.89 |
| September | : | 98.77 |

Fig. 3.1.1 shows the uptime for the data recording task, or equivalently, the availability of NORESS data in our tape archive, on a day-by-day basis, for the reporting period.

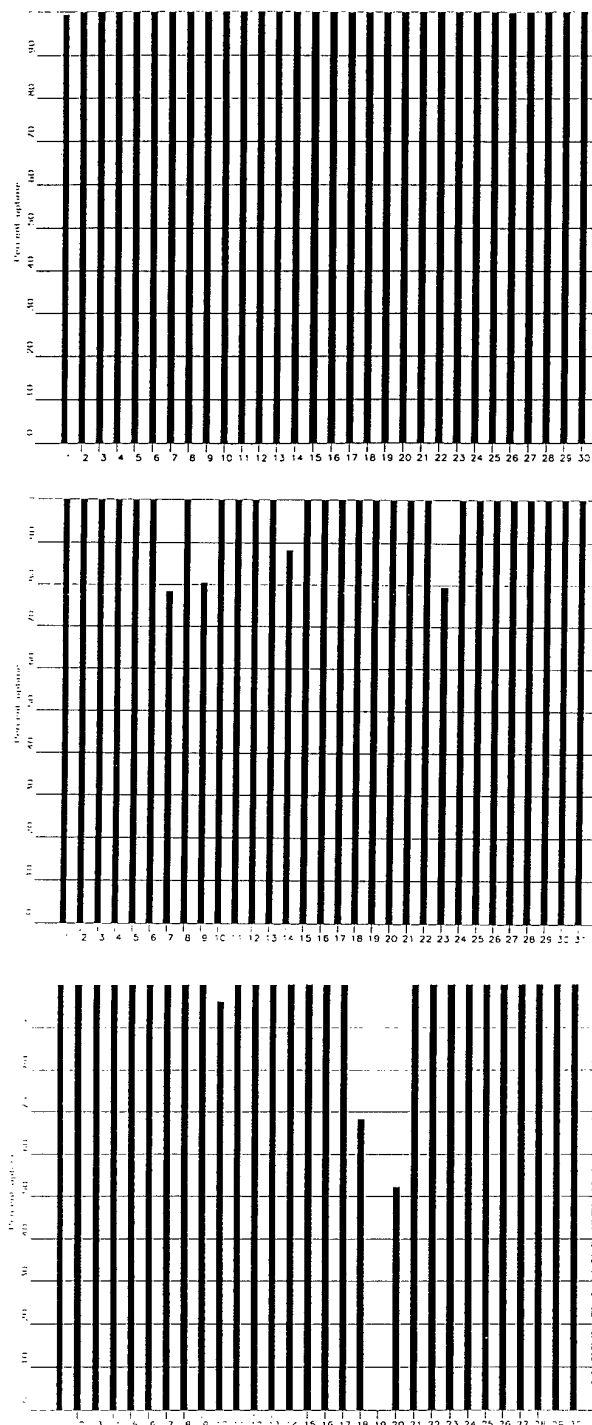


Fig. 3.1.1. NORESS data recording uptime for April (top), May (middle) and June (bottom) 1996.

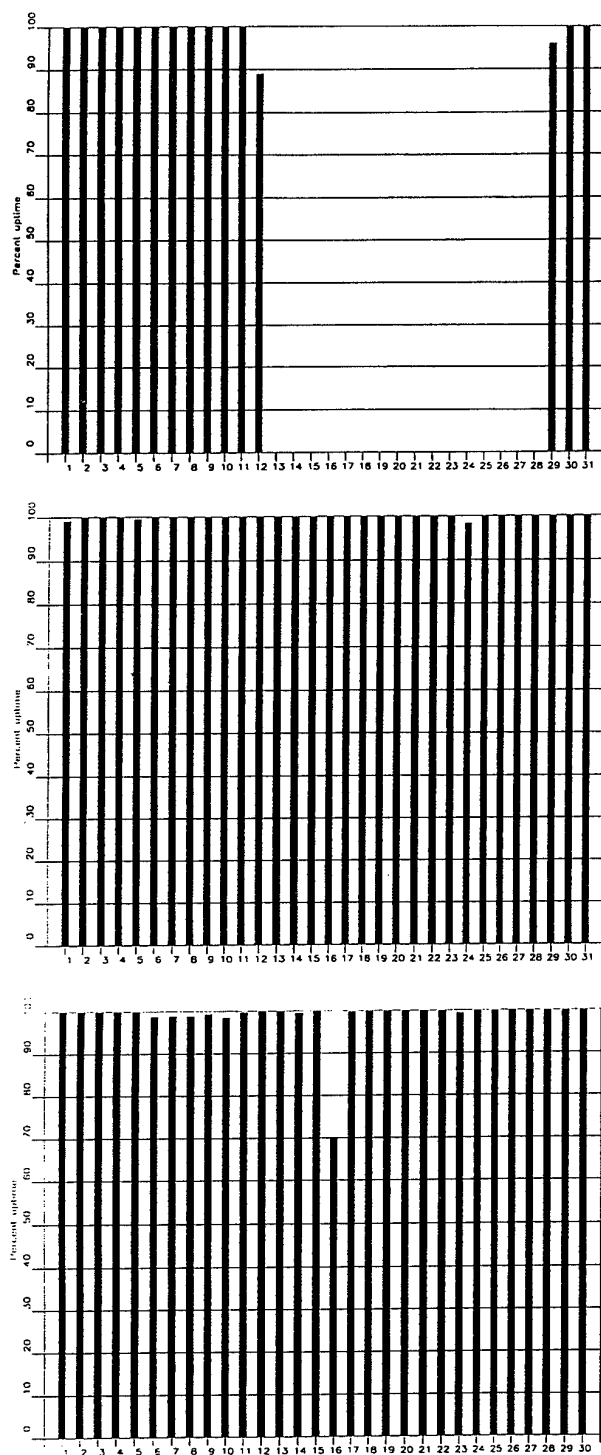


Fig. 3.1.1. (cont.) NORESS data recording uptime for July (top), August (middle) and September (bottom) 1996.

### 3.2 Recording of ARCESS data at NDPC, Kjeller

The average recording time was 98.42% as compared to 98.82% for the previous reporting period.

Table 3.2.1 lists the main outage times and reasons.

| Date   | Time        | Cause                                 |
|--------|-------------|---------------------------------------|
| 14 May | 1958 - 2130 | Power failure DPC due to thunderstorm |
| 10 Jun | 0653 - 0749 | Power failure DPC                     |
| 12 Jul | 0853 - 1655 | Power failure Hub                     |
| 19 Aug | 1000 - 1253 | Power failure Hub                     |
| 19 Aug | 1332 -      | Power failure Hub                     |
| 21 Aug | - 1741      |                                       |
| 03 Sep | 0735 - 1021 | Hardware maintenance DPC              |

**Table 3.2.1.** The main interruptions in recording of ARCESS data at NDPC, 1 April - 30 September 1996.

Monthly uptimes for the ARCESS on-line data recording task, taking into account all factors (field installations, transmissions line, data center operation) affecting this task were as follows:

|           |   |        |
|-----------|---|--------|
| April 96  | : | 99.99% |
| May       | : | 99.79% |
| June      | : | 99.86% |
| July      | : | 98.71% |
| August    | : | 92.57% |
| September | : | 99.59% |

Fig. 3.2.1. shows the uptime for the data recording task, or equivalently, the availability of ARCESS data in our tape archive, on a day-by-day basis, for the reporting period.

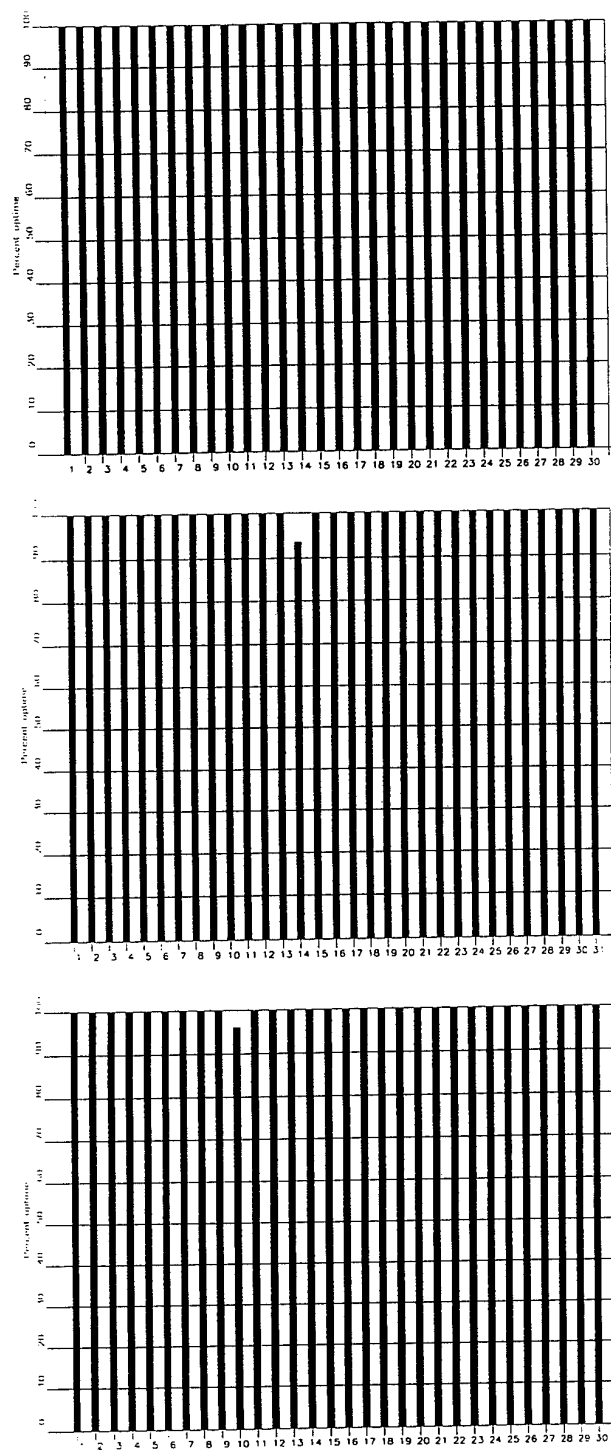


**Fig. 3.2.1.** ARCESS data recording uptime for April (top), May (middle) and June (bottom) 1996.

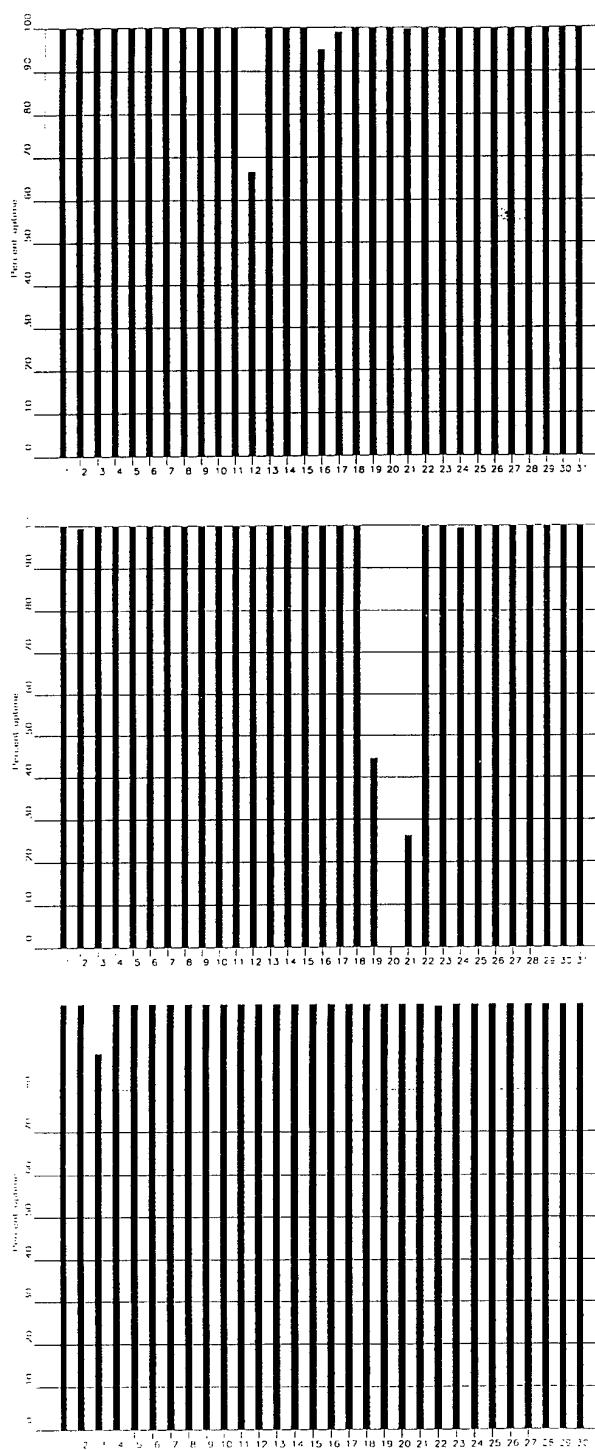


Fig. 3.2.1. ARCESS data recording uptime for July (top), August (middle) and September (bottom) 1996.

### 3.3 Recording of FINESS data at NDPC, Kjeller

The average recording time was 98.79% as compared to 99.08% for the previous reporting period.

| Date   | Time   | Cause                     |
|--------|--------|---------------------------|
| 09 Jun | 2330 - | Transmission line failure |
| 10 Jun | - 0556 |                           |
| 06 Jul | 1348 - | Transmission line failure |
| 08 Jul | - 1142 |                           |

**Table 3.3.1.** The main interruptions in recording of FINESS data at NDPC, 1 April - 30 September 1996.

Monthly uptimes for the FINESS on-line data recording task, taking into account all factors (field installations, transmission lines, data center operation) affecting this task were as follows:

|           |   |         |
|-----------|---|---------|
| April 96  | : | 100.00% |
| May       | : | 100.00% |
| June      | : | 99.10%  |
| July      | : | 93.65%  |
| August    | : | 100.00% |
| September | : | 99.97%  |

Fig. 3.3.1 shows the uptime for the data recording task, or equivalently, the availability of FINESS data in our tape archive, on a day-by-day basis, for the reporting period.

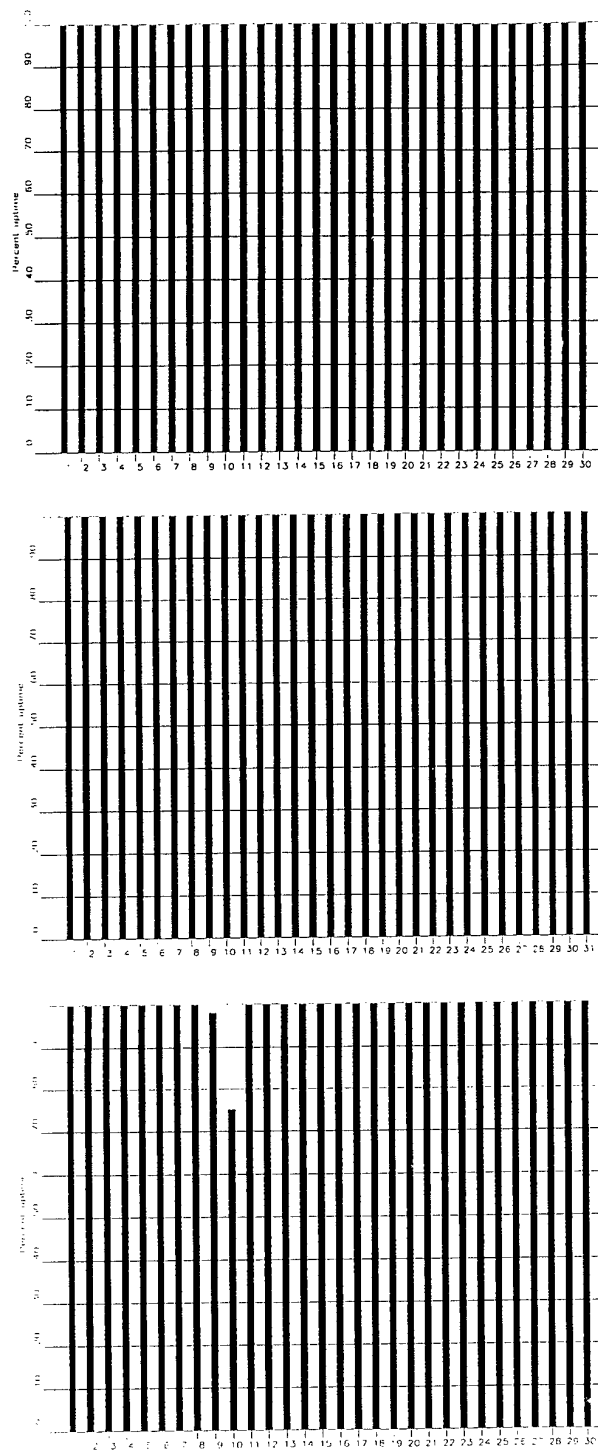


Fig. 3.3.1. FINES data recording uptime for April (top), May (middle) and June (bottom) 1996.

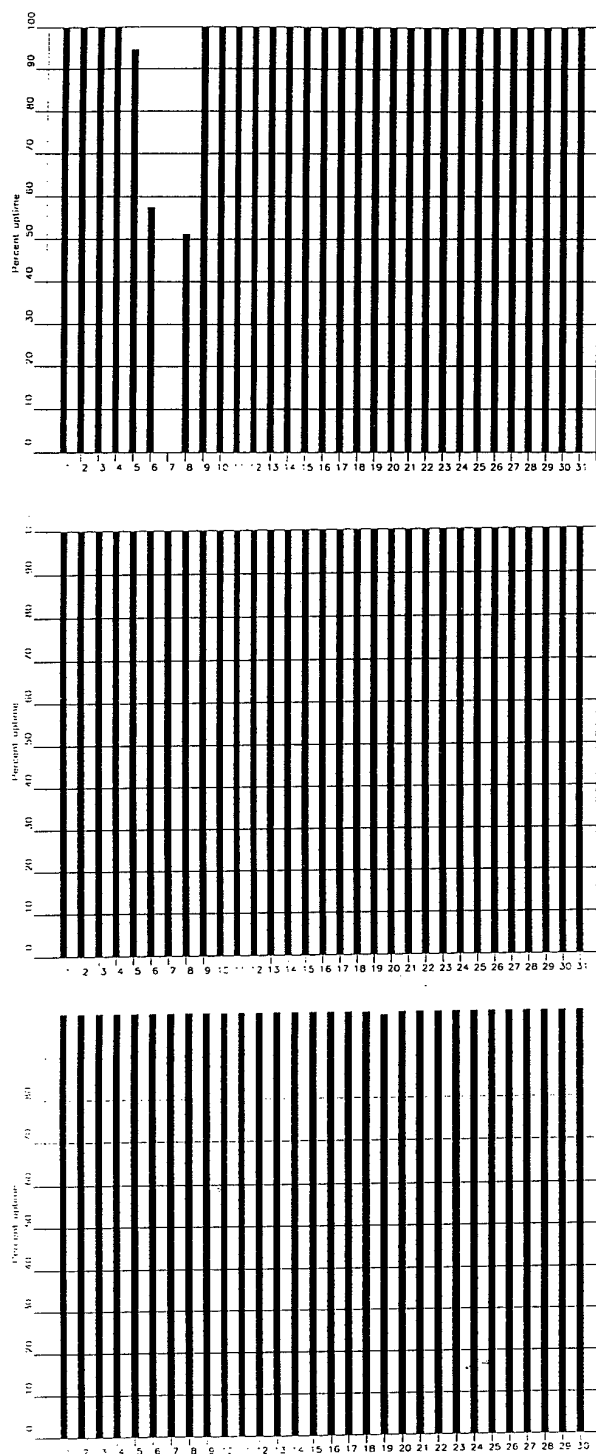


**Fig. 3.3.1. FINESS data recording uptime for July (top), August (middle) and September (bottom) 1996.**

### 3.4 Recording of Spitsbergen data at NDPC, Kjeller

The average recording time was 96.63% (from restart on 28 June), as compared to 81.75% for the previous reporting period. The power failure at the array site caused a break in recording between 10 March and 28 June 1996.

The main reasons for downtime follow:

| Date              | Time   | Cause                                      |
|-------------------|--------|--------------------------------------------|
| 01 Apr            | 0000 - | Power failure Spitsbergen from 10 March 96 |
| 28 Jun            | - 1306 |                                            |
| 06 Jul-<br>07 Aug | -      | Poor datalink caused numerous gaps         |
| 05 Sep-<br>06 Sep | -      | Poor datalink caused numerous gaps         |
| 19 Sep            | -      | Poor datalink caused numerous gaps         |

**Table 3.4.1.** The main interruptions in recording of Spitsbergen data at NDPC, 1 April - 30 September 1996.

Monthly uptimes for the Spitsbergen online data recording task, taking into account all factors (field installations, transmission line, data center operation) affecting this task were as follows:

|           |   |        |
|-----------|---|--------|
| April 96  | : | 0.00%  |
| May       | : | 0.00%  |
| June      | : | 8.18%  |
| July      | : | 93.89% |
| August    | : | 98.18% |
| September | : | 97.81% |

Fig. 3.4.1 shows the uptime for the data recording task, or equivalently, the availability of Spitsbergen data in our tape archive, on a day-by-day basis for the reporting period.

**J. Torstveit**

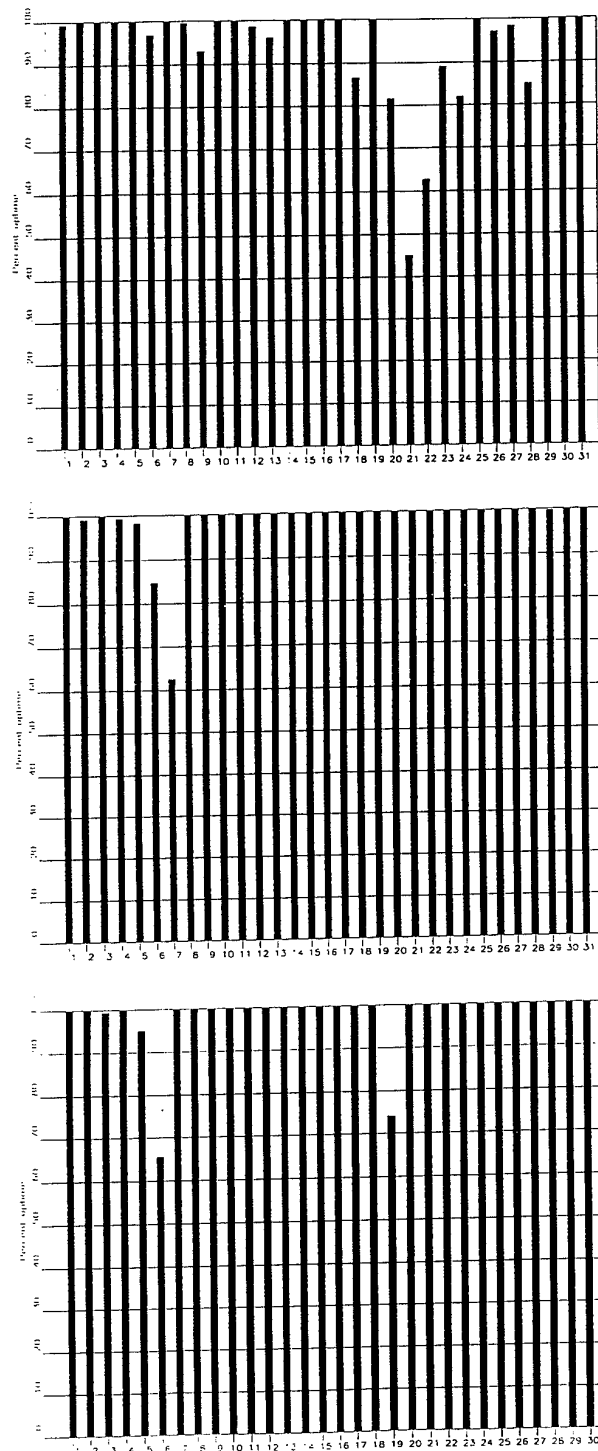


**Fig. 3.4.1.** Spitsbergen data recording uptime for July (top), August (middle) and September (bottom) 1996.

### 3.5 Event detection operation

This section reports results from one-array automatic processing using signal processing recipes and "ronapp" recipes for the ep program (NORSAR Sci. Rep. No 2-88/89).

Three systems are in parallel operation to associate detected phases and locate events:

1. The ep program with "ronapp" recipes is operated independently on each array to obtain simple one-array automatic solutions.
2. The Generalized Beamforming method (GBF) (see F. Ringdal and T. Kværna (1989), A multichannel processing approach to real time network detection, phase association and threshold monitoring, BSSA Vol 79, no 6, 1927-1940) processes the four arrays jointly and presents locations of regional events.
3. The RMS system (Regional Monitoring System; previously referred to as the IMS system (Intelligent Monitoring System) system) is operated on the same set of arrivals as ep and GBF and reports also teleseismic events in addition to regional ones.

RMS results are reported in section 3.6.

#### *NORESS detections*

The number of detections (phases) reported from day 092, 1996, through day 274, 1996, was 37,802, giving an average of 225 detections per processed day (168 days processed).

Table 3.5.1 shows daily and hourly distribution of detections for NORESS.

#### *Events automatically located by NORESS*

During days 092, 1996, through 274, 1996, 1939 local and regional events were located by NORESS, based on automatic association of P- and S-type arrivals. This gives an average of 11.5 events per processed day (168 days processed). 57% of these events are within 300 km, and 86% of these events are within 1000 km.

#### *ARCESS detections*

The number of detections (phases) reported during day 092, 1996, through day 274, 1996, was 93,800, giving an average of 515 detections per processed day (182 days processed).

Table 3.5.2 shows daily and hourly distribution of detections for ARCESS.

#### *Events automatically located by ARCESS*

During days 092, 1996, through 274, 1996, 5527 local and regional events were located by ARCESS, based on automatic association of P- and S-type arrivals. This gives an average of 30.4 events per processed day (182 days processed). 52% of these events are within 300 km, and 83% of these events are within 1000 km.

***FINESS detections***

The number of detections (phases) reported during day 092, 1996, through day 274, 1996, was 30,842, giving an average of 169 detections per processed day (182 days processed).

Table 3.5.3 shows daily and hourly distribution of detections for FINESS.

***Events automatically located by FINESS***

During days 092, 1996, through 274, 1996, 2619 local and regional events were located by FINESS, based on automatic association of P- and S-type arrivals. This gives an average of 14.4 events per processed day (182 days processed). 82% of these events are within 300 km, and 93% of these events are within 1000 km.

***GERESS detections***

The number of detections (phases) reported from day 092, 1996, through day 274, 1996, was 49,678, giving an average of 271 detections per processed day (183 days processed).

Table 3.5.4 shows daily and hourly distribution of detections for GERESS.

***Events automatically located by GERESS***

During days 092, 1996, through 274, 1996, 4863 local and regional events were located by GERESS, based on automatic association of P- and S-type arrivals. This gives an average of 26.6 events per processed day (183 days processed). 70% of these events are within 300 km, and 88% of these events are within 1000 km.

***Apatity array detections***

The number of detections (phases) reported from day 092, 1995, through day 274, 1999, was 74,252, giving an average of 406 detections per processed day (183 days processed).

As described in earlier reports, the data from the Apatity array are transferred by one-way (simplex) radio links to Apatity city. The transmission suffers from radio disturbances that occasionally result in a large number of small data gaps and spikes in the data. In order for the communication protocol to correct such errors by requesting retransmission of data, a two-way radio link would be needed (duplex radio). However, it should be noted that noise from cultural activities and from the nearby lakes cause most of the unwanted detections. These unwanted detections are "filtered" in the signal processing, as they give seismic velocities that are outside accepted limits for regional and teleseismic phase velocities.

Table 3.5.5 shows daily and hourly distribution of detections for the Apatity array.

***Events automatically located by the Apatity array***

During days 092, 1996, through 274, 1996, 801 local and regional events were located by the Apatity array, based on automatic association of P- and S-type arrivals. This gives an average of 4.4 events per processed day (183 days processed). 51% of these events are within 300 km, and 77% of these events are within 1000 km.

***Spitsbergen array detections***

The number of detections (phases) reported from day 092, 1996, through day 274, 1996, was 89,214, giving an average of 939 detections per processed day (95 days processed).

Table 3.5.6 shows daily and hourly distribution of detections for the Spitsbergen array.

***Events automatically located by the Spitsbergen array***

During days 092, 1996, through 274, 1996, 7870 local and regional events were located by the Spitsbergen array, based on automatic association of P- and S-type arrivals. This gives an average of 82.8 events per processed day (95 days processed). 49% of these events are within 300 km, and 74% of these events are within 1000 km.

***Hagfors array detections***

The number of detections (phases) reported from day 092, 1996, through day 274, 1996, was 49,399, giving an average of 270 detections per processed day (183 days processed).

Table 3.5.7 shows daily and hourly distribution of detections for the Hagfors array

***Events automatically located by the Hagfors array***

During days 092, 1996, through 274, 1996, 1897 local and regional events were located by the Hagfors array, based on automatic association of P- and S-type arrivals. This gives an average of 10.4 events per processed day (183 days processed). 38% of these events are within 300 km, and 79% of these events are within 1000 km

**U. Baadshaug**

## NRS .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03  | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19  | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|----|----|----|----|-----|------------------|
| 92  | 10 | 4  | 3  | 8   | 5  | 9  | 11 | 16 | 19 | 13 | 11 | 9  | 14 | 13 | 9  | 6  | 6  | 5  | 33 | 139 | 5  | 2  | 2  | 5  | 357 | Apr 01 Monday    |
| 93  | 3  | 3  | 17 | 9   | 1  | 3  | 5  | 14 | 15 | 1  | 5  | 7  | 12 | 2  | 22 | 5  | 6  | 8  | 1  | 27  | 4  | 3  | 0  | 2  | 175 | Apr 02 Tuesday   |
| 94  | 6  | 3  | 2  | 18  | 10 | 7  | 6  | 5  | 13 | 10 | 8  | 18 | 0  | 8  | 14 | 7  | 20 | 11 | 30 | 5   | 11 | 11 | 10 | 8  | 241 | Apr 03 Wednesday |
| 95  | 6  | 4  | 6  | 2   | 8  | 9  | 32 | 7  | 10 | 18 | 12 | 16 | 12 | 14 | 9  | 3  | 3  | 15 | 5  | 11  | 6  | 9  | 2  | 4  | 223 | Apr 04 Thursday  |
| 96  | 5  | 3  | 6  | 5   | 19 | 9  | 7  | 8  | 17 | 16 | 16 | 10 | 10 | 9  | 5  | 12 | 12 | 11 | 14 | 8   | 8  | 7  | 5  | 7  | 229 | Apr 05 Friday    |
| 97  | 5  | 6  | 4  | 6   | 20 | 12 | 10 | 9  | 37 | 13 | 5  | 9  | 12 | 7  | 7  | 6  | 8  | 7  | 3  | 4   | 4  | 9  | 4  | 9  | 216 | Apr 06 Saturday  |
| 98  | 15 | 6  | 8  | 3   | 9  | 3  | 15 | 2  | 9  | 8  | 4  | 4  | 8  | 7  | 13 | 9  | 9  | 4  | 1  | 12  | 7  | 0  | 5  | 6  | 167 | Apr 07 Sunday    |
| 99  | 8  | 2  | 11 | 8   | 6  | 4  | 21 | 7  | 24 | 11 | 17 | 37 | 4  | 1  | 4  | 5  | 4  | 12 | 5  | 3   | 6  | 6  | 5  | 1  | 212 | Apr 08 Monday    |
| 100 | 8  | 23 | 10 | 9   | 5  | 10 | 9  | 4  | 4  | 3  | 9  | 17 | 3  | 8  | 4  | 1  | 5  | 9  | 0  | 12  | 1  | 19 | 4  | 2  | 179 | Apr 09 Tuesday   |
| 101 | 7  | 5  | 7  | 6   | 3  | 8  | 2  | 1  | 6  | 16 | 2  | 7  | 11 | 12 | 9  | 34 | 5  | 9  | 4  | 3   | 16 | 5  | 17 | 3  | 198 | Apr 10 Wednesday |
| 102 | 12 | 5  | 14 | 11  | 12 | 8  | 3  | 6  | 10 | 9  | 6  | 8  | 13 | 6  | 9  | 16 | 7  | 10 | 1  | 16  | 7  | 17 | 19 | 20 | 245 | Apr 11 Thursday  |
| 103 | 14 | 20 | 19 | 19  | 10 | 8  | 9  | 29 | 25 | 19 | 33 | 12 | 27 | 19 | 8  | 19 | 12 | 12 | 1  | 29  | 6  | 7  | 12 | 5  | 374 | Apr 12 Friday    |
| 104 | 24 | 9  | 8  | 18  | 9  | 10 | 4  | 6  | 4  | 8  | 10 | 9  | 4  | 7  | 2  | 2  | 8  | 4  | 8  | 9   | 27 | 13 | 6  | 15 | 224 | Apr 13 Saturday  |
| 105 | 26 | 12 | 17 | 21  | 24 | 32 | 2  | 2  | 8  | 2  | 8  | 10 | 22 | 1  | 5  | 4  | 3  | 1  | 0  | 2   | 37 | 8  | 3  | 2  | 252 | Apr 14 Sunday    |
| 106 | 10 | 5  | 27 | 12  | 11 | 11 | 0  | 18 | 13 | 7  | 2  | 6  | 13 | 18 | 3  | 8  | 5  | 11 | 5  | 14  | 4  | 14 | 5  | 8  | 230 | Apr 15 Monday    |
| 107 | 18 | 19 | 21 | 42  | 15 | 5  | 4  | 0  | 5  | 5  | 17 | 8  | 10 | 16 | 15 | 11 | 17 | 4  | 8  | 19  | 6  | 22 | 13 | 7  | 307 | Apr 16 Tuesday   |
| 108 | 8  | 5  | 10 | 16  | 14 | 3  | 5  | 4  | 11 | 21 | 16 | 18 | 7  | 16 | 9  | 20 | 48 | 6  | 22 | 19  | 2  | 16 | 5  | 4  | 305 | Apr 17 Wednesday |
| 109 | 11 | 11 | 20 | 8   | 12 | 6  | 6  | 2  | 12 | 4  | 2  | 9  | 13 | 15 | 6  | 4  | 15 | 8  | 3  | 22  | 9  | 19 | 12 | 8  | 237 | Apr 18 Thursday  |
| 110 | 8  | 9  | 16 | 15  | 9  | 2  | 3  | 4  | 3  | 17 | 12 | 5  | 20 | 15 | 6  | 3  | 5  | 4  | 8  | 21  | 3  | 18 | 3  | 12 | 221 | Apr 19 Friday    |
| 111 | 2  | 4  | 3  | 1   | 11 | 6  | 4  | 5  | 9  | 10 | 6  | 5  | 13 | 24 | 23 | 1  | 6  | 3  | 8  | 4   | 12 | 4  | 8  | 8  | 180 | Apr 20 Saturday  |
| 112 | 5  | 8  | 7  | 3   | 6  | 8  | 7  | 1  | 2  | 3  | 9  | 6  | 4  | 4  | 5  | 4  | 7  | 2  | 0  | 17  | 5  | 3  | 3  | 6  | 125 | Apr 21 Sunday    |
| 113 | 4  | 3  | 4  | 0   | 7  | 3  | 3  | 7  | 0  | 8  | 6  | 15 | 10 | 10 | 12 | 11 | 6  | 7  | 3  | 7   | 4  | 11 | 3  | 5  | 149 | Apr 22 Monday    |
| 114 | 10 | 6  | 3  | 0   | 5  | 2  | 0  | 4  | 8  | 6  | 2  | 6  | 14 | 27 | 1  | 2  | 3  | 7  | 2  | 7   | 4  | 10 | 3  | 5  | 137 | Apr 23 Tuesday   |
| 115 | 5  | 9  | 8  | 7   | 4  | 3  | 1  | 4  | 3  | 12 | 4  | 14 | 10 | 23 | 3  | 9  | 20 | 22 | 7  | 19  | 1  | 12 | 2  | 2  | 204 | Apr 24 Wednesday |
| 116 | 14 | 5  | 9  | 13  | 5  | 3  | 7  | 5  | 4  | 8  | 14 | 12 | 18 | 17 | 20 | 4  | 0  | 0  | 5  | 9   | 9  | 13 | 19 | 22 | 235 | Apr 25 Thursday  |
| 117 | 21 | 17 | 24 | 28  | 18 | 3  | 3  | 11 | 4  | 3  | 10 | 6  | 14 | 4  | 8  | 8  | 7  | 7  | 6  | 23  | 6  | 15 | 16 | 8  | 270 | Apr 26 Friday    |
| 118 | 9  | 8  | 5  | 5   | 9  | 11 | 3  | 3  | 4  | 4  | 4  | 2  | 7  | 1  | 2  | 1  | 5  | 6  | 0  | 2   | 2  | 0  | 2  | 1  | 96  | Apr 27 Saturday  |
| 119 | 1  | 2  | 1  | 1   | 0  | 10 | 20 | 22 | 7  | 4  | 2  | 9  | 24 | 28 | 9  | 3  | 0  | 1  | 0  | 3   | 3  | 9  | 4  | 14 | 177 | Apr 28 Sunday    |
| 120 | 7  | 3  | 13 | 6   | 9  | 3  | 1  | 8  | 1  | 1  | 8  | 5  | 9  | 4  | 15 | 11 | 4  | 4  | 5  | 5   | 4  | 9  | 1  | 5  | 141 | Apr 29 Monday    |
| 121 | 3  | 4  | 5  | 4   | 2  | 9  | 1  | 1  | 3  | 9  | 9  | 21 | 3  | 14 | 3  | 10 | 4  | 3  | 2  | 15  | 4  | 12 | 10 | 3  | 154 | Apr 30 Tuesday   |
| 122 | 11 | 5  | 4  | 7   | 8  | 10 | 5  | 6  | 6  | 11 | 11 | 11 | 4  | 6  | 8  | 2  | 5  | 4  | 5  | 3   | 3  | 5  | 11 | 3  | 154 | May 01 Wednesday |
| 123 | 7  | 14 | 6  | 2   | 7  | 7  | 7  | 2  | 1  | 2  | 3  | 3  | 12 | 13 | 9  | 8  | 10 | 5  | 10 | 9   | 7  | 13 | 4  | 3  | 164 | May 02 Thursday  |
| 124 | 4  | 13 | 9  | 5   | 8  | 3  | 1  | 6  | 4  | 3  | 2  | 1  | 1  | 11 | 7  | 3  | 3  | 4  | 10 | 10  | 0  | 12 | 5  | 11 | 136 | May 03 Friday    |
| 125 | 2  | 5  | 6  | 7   | 7  | 8  | 4  | 9  | 1  | 10 | 11 | 13 | 10 | 10 | 10 | 2  | 3  | 7  | 6  | 2   | 1  | 2  | 2  | 4  | 142 | May 04 Saturday  |
| 126 | 6  | 3  | 4  | 1   | 21 | 24 | 0  | 0  | 3  | 4  | 5  | 6  | 12 | 20 | 8  | 19 | 20 | 7  | 4  | 9   | 3  | 1  | 8  | 15 | 203 | May 05 Sunday    |
| 127 | 10 | 2  | 8  | 2   | 0  | 1  | 2  | 1  | 3  | 2  | 9  | 9  | 8  | 5  | 1  | 3  | 2  | 3  | 21 | 14  | 10 | 0  | 0  | 3  | 119 | May 06 Monday    |
| 128 | 5  | 3  | 3  | 2   | 7  | 1  | 0  | 0  | 0  | 0  | 0  | 10 | 23 | 8  | 5  | 4  | 5  | 3  | 8  | 8   | 4  | 8  | 8  | 8  | 115 | May 07 Tuesday   |
| 129 | 6  | 15 | 24 | 4   | 4  | 2  | 2  | 4  | 7  | 5  | 5  | 25 | 42 | 22 | 13 | 1  | 4  | 5  | 4  | 9   | 12 | 13 | 97 | 47 | 372 | May 08 Wednesday |
| 130 | 8  | 8  | 9  | 10  | 6  | 1  | 1  | 0  | 0  | 0  | 0  | 2  | 14 | 10 | 13 | 8  | 4  | 8  | 5  | 8   | 9  | 8  | 3  | 6  | 141 | May 09 Thursday  |
| 131 | 5  | 3  | 9  | 10  | 4  | 2  | 3  | 4  | 3  | 5  | 6  | 7  | 9  | 6  | 2  | 7  | 7  | 0  | 0  | 16  | 1  | 3  | 3  | 3  | 118 | May 10 Friday    |
| 132 | 3  | 5  | 8  | 3   | 10 | 3  | 3  | 1  | 11 | 1  | 5  | 2  | 2  | 0  | 7  | 2  | 20 | 19 | 9  | 10  | 12 | 24 | 10 | 26 | 196 | May 11 Saturday  |
| 133 | 15 | 9  | 14 | 131 | 67 | 27 | 9  | 11 | 5  | 4  | 4  | 9  | 4  | 2  | 5  | 9  | 0  | 5  | 9  | 5   | 2  | 1  | 1  | 4  | 352 | May 12 Sunday    |
| 134 | 8  | 7  | 13 | 3   | 6  | 9  | 1  | 0  | 10 | 1  | 3  | 2  | 13 | 5  | 2  | 4  | 8  | 2  | 5  | 9   | 1  | 1  | 4  | 2  | 119 | May 13 Monday    |
| 135 | 9  | 5  | 15 | 10  | 18 | 8  | 4  | 0  | 0  | 3  | 7  | 14 | 25 | 10 | 1  | 8  | 9  | 5  | 3  | 9   | 2  | 3  | 4  | 8  | 180 | May 14 Tuesday   |
| 136 | 2  | 20 | 30 | 8   | 13 | 1  | 31 | 15 | 15 | 9  | 17 | 27 | 28 | 15 | 8  | 7  | 9  | 6  | 4  | 0   | 11 | 5  | 5  | 8  | 294 | May 15 Wednesday |
| 137 | 2  | 2  | 1  | 1   | 6  | 6  | 3  | 5  | 3  | 8  | 8  | 4  | 6  | 6  | 3  | 7  | 1  | 8  | 5  | 2   | 3  | 13 | 3  | 2  | 108 | May 16 Thursday  |
| 138 | 0  | 4  | 4  | 6   | 1  | 2  | 2  | 1  | 5  | 1  | 13 | 7  | 3  | 1  | 3  | 2  | 2  | 8  | 2  | 2   | 2  | 2  | 3  | 4  | 80  | May 17 Friday    |
| 139 | 3  | 5  | 6  | 4   | 1  | 7  | 1  | 5  | 4  | 4  | 13 | 5  | 5  | 5  | 5  | 3  | 0  | 3  | 2  | 6   | 4  | 7  | 2  | 1  | 101 | May 18 Saturday  |
| 140 | 2  | 5  | 5  | 14  | 4  | 4  | 8  | 4  | 5  | 7  | 3  | 6  | 2  | 4  | 8  | 7  | 9  | 2  | 3  | 3   | 4  | 9  | 4  | 8  | 130 | May 19 Sunday    |
| 141 | 4  | 19 | 1  | 6   | 2  | 1  | 3  | 4  | 8  | 4  | 4  | 11 | 6  | 4  | 5  | 5  | 6  | 5  | 1  | 10  | 3  | 20 | 5  | 2  | 139 | May 20 Monday    |
| 142 | 7  | 4  | 3  | 6   | 3  | 3  | 4  | 3  | 10 | 6  | 19 | 7  | 10 | 5  | 19 | 1  | 6  | 8  | 1  | 5   | 5  | 15 | 4  | 6  | 160 | May 21 Tuesday   |
| 143 | 14 | 21 | 2  | 4   | 0  | 1  | 4  | 2  | 4  | 9  | 10 | 12 | 9  | 10 | 19 | 7  | 13 | 4  | 16 | 5   | 7  | 6  | 1  | 5  | 185 | May 22 Wednesday |
| 144 | 2  | 24 | 10 | 13  | 19 | 10 | 14 | 0  | 0  | 0  | 0  | 0  | 11 | 11 | 12 | 6  | 3  | 8  | 10 | 8   | 15 | 11 | 21 | 22 | 230 | May 23 Thursday  |
| 145 | 19 | 13 | 21 | 16  | 14 | 9  | 8  | 20 | 9  | 10 | 7  | 1  | 12 | 9  | 5  | 6  | 7  | 8  | 2  | 6   | 11 | 8  | 14 | 9  | 244 | May 24 Friday    |
| 146 | 9  | 7  | 11 | 2   | 10 | 8  | 7  | 3  | 9  | 9  | 8  | 1  | 6  | 9  | 1  | 6  | 11 | 14 | 11 | 4   | 8  | 4  | 6  | 5  | 169 | May 25 Saturday  |
| 147 | 5  | 5  | 8  | 4   | 5  | 5  | 3  | 5  | 5  | 8  | 5  | 1  | 5  | 1  | 1  | 3  | 1  | 2  | 5  | 3   | 4  | 9  | 5  | 6  | 104 | May 26 Sunday    |

Table 3.5.1 (Page 1 of 4)

## NRS .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 148 | 6  | 6  | 7  | 6  | 6  | 9  | 8  | 7  | 4  | 9  | 5  | 13 | 2  | 5  | 14 | 9  | 5  | 7  | 16 | 10 | 10 | 12 | 13 | 11 | 200 | May 27 Monday    |
| 149 | 9  | 24 | 8  | 11 | 3  | 1  | 1  | 4  | 12 | 10 | 14 | 5  | 8  | 4  | 8  | 6  | 2  | 3  | 8  | 8  | 20 | 2  | 6  | 7  | 184 | May 28 Tuesday   |
| 150 | 6  | 9  | 12 | 3  | 8  | 13 | 5  | 3  | 6  | 8  | 6  | 8  | 5  | 12 | 5  | 7  | 3  | 8  | 2  | 9  | 8  | 1  | 2  | 6  | 155 | May 29 Wednesday |
| 151 | 0  | 15 | 4  | 11 | 4  | 0  | 1  | 5  | 10 | 3  | 16 | 11 | 12 | 10 | 4  | 17 | 6  | 3  | 10 | 9  | 7  | 10 | 3  | 5  | 176 | May 30 Thursday  |
| 152 | 5  | 21 | 13 | 4  | 5  | 6  | 5  | 3  | 24 | 17 | 11 | 11 | 7  | 5  | 0  | 5  | 3  | 7  | 3  | 6  | 15 | 1  | 3  | 3  | 183 | May 31 Friday    |
| 153 | 3  | 3  | 4  | 3  | 4  | 4  | 2  | 1  | 9  | 13 | 7  | 3  | 7  | 10 | 2  | 13 | 8  | 13 | 8  | 8  | 13 | 16 | 23 | 19 | 196 | Jun 01 Saturday  |
| 154 | 25 | 31 | 38 | 31 | 21 | 22 | 24 | 22 | 27 | 28 | 15 | 27 | 24 | 17 | 33 | 26 | 19 | 22 | 35 | 27 | 22 | 32 | 39 | 38 | 645 | Jun 02 Sunday    |
| 155 | 37 | 50 | 37 | 37 | 33 | 10 | 13 | 14 | 18 | 9  | 11 | 26 | 14 | 25 | 16 | 33 | 18 | 14 | 19 | 23 | 34 | 13 | 18 | 21 | 543 | Jun 03 Monday    |
| 156 | 30 | 24 | 34 | 26 | 19 | 3  | 2  | 6  | 16 | 4  | 3  | 10 | 9  | 9  | 4  | 6  | 10 | 10 | 12 | 7  | 8  | 6  | 1  | 6  | 265 | Jun 04 Tuesday   |
| 157 | 3  | 7  | 14 | 4  | 5  | 24 | 56 | 10 | 10 | 22 | 10 | 12 | 19 | 33 | 3  | 5  | 8  | 0  | 9  | 9  | 3  | 4  | 6  | 6  | 286 | Jun 05 Wednesday |
| 158 | 6  | 11 | 6  | 2  | 2  | 5  | 13 | 4  | 7  | 12 | 9  | 13 | 14 | 6  | 8  | 7  | 17 | 5  | 5  | 3  | 17 | 1  | 1  | 8  | 182 | Jun 06 Thursday  |
| 159 | 4  | 2  | 21 | 4  | 2  | 6  | 4  | 4  | 10 | 11 | 16 | 14 | 12 | 9  | 5  | 1  | 12 | 2  | 2  | 5  | 18 | 3  | 5  | 7  | 179 | Jun 07 Friday    |
| 160 | 20 | 11 | 7  | 11 | 7  | 17 | 26 | 12 | 7  | 4  | 3  | 3  | 4  | 1  | 1  | 0  | 9  | 3  | 2  | 2  | 72 | 5  | 0  | 8  | 235 | Jun 08 Saturday  |
| 161 | 1  | 8  | 4  | 7  | 4  | 5  | 2  | 2  | 7  | 10 | 9  | 0  | 4  | 5  | 2  | 2  | 5  | 0  | 4  | 23 | 16 | 3  | 14 | 29 | 166 | Jun 09 Sunday    |
| 162 | 19 | 39 | 24 | 27 | 35 | 21 | 10 | 2  | 19 | 21 | 11 | 18 | 10 | 21 | 18 | 23 | 7  | 18 | 20 | 11 | 6  | 1  | 4  | 5  | 390 | Jun 10 Monday    |
| 163 | 5  | 16 | 2  | 3  | 2  | 3  | 0  | 7  | 2  | 7  | 12 | 15 | 9  | 13 | 7  | 3  | 13 | 10 | 18 | 6  | 4  | 9  | 4  | 2  | 172 | Jun 11 Tuesday   |
| 164 | 5  | 2  | 17 | 11 | 6  | 2  | 2  | 3  | 3  | 9  | 6  | 10 | 16 | 19 | 22 | 9  | 3  | 4  | 4  | 4  | 4  | 8  | 5  | 2  | 176 | Jun 12 Wednesday |
| 165 | 12 | 4  | 11 | 3  | 0  | 10 | 4  | 6  | 5  | 0  | 8  | 14 | 21 | 12 | 13 | 6  | 3  | 9  | 16 | 4  | 6  | 3  | 2  | 6  | 178 | Jun 13 Thursday  |
| 166 | 5  | 7  | 8  | 3  | 2  | 4  | 3  | 3  | 8  | 8  | 8  | 6  | 0  | 11 | 7  | 55 | 72 | 4  | 3  | 7  | 14 | 2  | 6  | 6  | 252 | Jun 14 Friday    |
| 167 | 4  | 2  | 2  | 2  | 3  | 6  | 6  | 3  | 6  | 4  | 3  | 3  | 6  | 4  | 18 | 30 | 7  | 4  | 7  | 5  | 15 | 1  | 3  | 11 | 155 | Jun 15 Saturday  |
| 168 | 11 | 7  | 4  | 10 | 1  | 7  | 0  | 3  | 2  | 6  | 4  | 3  | 4  | 4  | 4  | 8  | 10 | 4  | 8  | 14 | 7  | 7  | 2  | 5  | 135 | Jun 16 Sunday    |
| 169 | 5  | 20 | 7  | 4  | 3  | 3  | 1  | 6  | 2  | 1  | 5  | 35 | 14 | 13 | 36 | 11 | 15 | 10 | 4  | 2  | 5  | 10 | 8  | 2  | 222 | Jun 17 Monday    |
| 170 | 1  | 13 | 9  | 0  | 1  | 1  | 0  | 6  | 7  | 6  | 7  | 1  | 22 | 12 | 16 | 3  | 4  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 109 | Jun 18 Tuesday   |
| 171 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jun 19 Wednesday |
| 172 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 15 | 22 | 17 | 11 | 8  | 10 | 8  | 9  | 10 | 12 | 14 | 14 | 13 | 163 | Jun 20 Thursday  |
| 173 | 17 | 21 | 20 | 9  | 6  | 2  | 1  | 7  | 4  | 10 | 4  | 16 | 6  | 18 | 19 | 9  | 17 | 8  | 15 | 24 | 17 | 17 | 20 | 15 | 302 | Jun 21 Friday    |
| 174 | 8  | 9  | 8  | 13 | 12 | 28 | 17 | 9  | 12 | 7  | 9  | 17 | 11 | 19 | 8  | 22 | 13 | 6  | 9  | 11 | 17 | 4  | 15 | 6  | 290 | Jun 22 Saturday  |
| 175 | 7  | 21 | 28 | 16 | 11 | 12 | 10 | 12 | 12 | 24 | 22 | 34 | 48 | 11 | 16 | 25 | 11 | 14 | 15 | 10 | 15 | 25 | 8  | 8  | 415 | Jun 23 Sunday    |
| 176 | 6  | 7  | 28 | 8  | 2  | 1  | 5  | 4  | 5  | 9  | 11 | 11 | 0  | 15 | 16 | 24 | 5  | 14 | 5  | 13 | 4  | 6  | 13 | 4  | 216 | Jun 24 Monday    |
| 177 | 9  | 21 | 9  | 12 | 2  | 5  | 2  | 7  | 9  | 5  | 10 | 10 | 11 | 10 | 16 | 4  | 6  | 2  | 11 | 15 | 7  | 10 | 2  | 8  | 203 | Jun 25 Tuesday   |
| 178 | 4  | 9  | 21 | 8  | 9  | 1  | 2  | 5  | 10 | 2  | 9  | 12 | 10 | 8  | 13 | 9  | 5  | 12 | 19 | 10 | 2  | 2  | 0  | 3  | 185 | Jun 26 Wednesday |
| 179 | 4  | 11 | 9  | 5  | 0  | 4  | 4  | 6  | 6  | 8  | 8  | 3  | 7  | 10 | 11 | 3  | 13 | 8  | 0  | 23 | 3  | 6  | 2  | 5  | 159 | Jun 27 Thursday  |
| 180 | 6  | 22 | 4  | 5  | 3  | 5  | 6  | 4  | 4  | 7  | 9  | 5  | 9  | 0  | 14 | 13 | 10 | 3  | 5  | 5  | 10 | 5  | 4  | 4  | 162 | Jun 28 Friday    |
| 181 | 20 | 25 | 5  | 4  | 4  | 6  | 0  | 7  | 14 | 1  | 2  | 2  | 2  | 3  | 7  | 7  | 1  | 0  | 2  | 21 | 9  | 5  | 9  | 3  | 159 | Jun 29 Saturday  |
| 182 | 7  | 9  | 3  | 11 | 17 | 6  | 3  | 12 | 13 | 11 | 11 | 6  | 5  | 6  | 2  | 1  | 0  | 3  | 2  | 1  | 7  | 1  | 0  | 6  | 143 | Jun 30 Sunday    |
| 183 | 4  | 21 | 4  | 4  | 5  | 1  | 3  | 2  | 6  | 3  | 11 | 9  | 15 | 6  | 12 | 4  | 5  | 4  | 2  | 12 | 0  | 8  | 8  | 8  | 157 | Jul 01 Monday    |
| 184 | 2  | 26 | 2  | 7  | 4  | 2  | 0  | 9  | 2  | 4  | 1  | 6  | 12 | 5  | 9  | 4  | 4  | 2  | 5  | 9  | 5  | 2  | 2  | 1  | 125 | Jul 02 Tuesday   |
| 185 | 2  | 15 | 2  | 3  | 4  | 7  | 5  | 7  | 10 | 0  | 10 | 15 | 9  | 7  | 13 | 8  | 12 | 5  | 1  | 16 | 5  | 0  | 2  | 5  | 163 | Jul 03 Wednesday |
| 186 | 5  | 6  | 12 | 7  | 14 | 4  | 3  | 9  | 7  | 10 | 6  | 7  | 10 | 12 | 8  | 5  | 7  | 14 | 15 | 14 | 21 | 20 | 22 | 19 | 257 | Jul 04 Thursday  |
| 187 | 17 | 15 | 18 | 16 | 13 | 6  | 3  | 3  | 6  | 4  | 20 | 18 | 15 | 4  | 17 | 7  | 9  | 6  | 28 | 69 | 11 | 5  | 7  | 10 | 327 | Jul 05 Friday    |
| 188 | 3  | 7  | 3  | 6  | 7  | 10 | 4  | 6  | 11 | 6  | 8  | 10 | 10 | 9  | 3  | 1  | 4  | 5  | 6  | 6  | 19 | 16 | 6  | 4  | 170 | Jul 06 Saturday  |
| 189 | 5  | 9  | 6  | 12 | 8  | 9  | 10 | 6  | 8  | 6  | 9  | 4  | 2  | 5  | 3  | 7  | 7  | 3  | 12 | 3  | 6  | 14 | 6  | 2  | 162 | Jul 07 Sunday    |
| 190 | 5  | 2  | 1  | 6  | 3  | 11 | 0  | 0  | 4  | 5  | 7  | 14 | 10 | 9  | 9  | 4  | 4  | 4  | 8  | 22 | 8  | 18 | 5  | 16 | 175 | Jul 08 Monday    |
| 191 | 12 | 10 | 9  | 15 | 14 | 5  | 5  | 7  | 3  | 6  | 7  | 7  | 16 | 20 | 8  | 10 | 15 | 18 | 16 | 38 | 15 | 5  | 3  | 4  | 268 | Jul 09 Tuesday   |
| 192 | 8  | 7  | 6  | 3  | 8  | 9  | 4  | 10 | 3  | 7  | 7  | 3  | 18 | 4  | 12 | 11 | 10 | 15 | 20 | 15 | 7  | 5  | 3  | 2  | 197 | Jul 10 Wednesday |
| 193 | 4  | 4  | 4  | 1  | 3  | 4  | 3  | 8  | 9  | 3  | 11 | 7  | 18 | 10 | 8  | 1  | 10 | 4  | 13 | 8  | 3  | 0  | 8  | 2  | 146 | Jul 11 Thursday  |
| 194 | 2  | 3  | 8  | 7  | 3  | 1  | 6  | 4  | 4  | 8  | 11 | 7  | 11 | 7  | 2  | 10 | 12 | 9  | 20 | 16 | 5  | 17 | 0  | 0  | 173 | Jul 12 Friday    |
| 195 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 13 Saturday  |
| 196 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 14 Sunday    |
| 197 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 15 Monday    |
| 198 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 16 Tuesday   |
| 199 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 17 Wednesday |
| 200 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 18 Thursday  |
| 201 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 19 Friday    |
| 202 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 20 Saturday  |
| 203 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Jul 21 Sunday    |

Table 3.5.1 (Page 2 of 4)

## NRS .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03  | 04  | 05  | 06  | 07  | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23                   | Sum                  | Date               |
|-----|----|----|----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----------------------|----------------------|--------------------|
| 204 | 0  | 0  | 0  | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0                    | Jul 22 Monday      |
| 205 | 0  | 0  | 0  | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0                    | Jul 23 Tuesday     |
| 206 | 0  | 0  | 0  | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0                    | Jul 24 Wednesday   |
| 207 | 0  | 0  | 0  | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 7  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0                    | 7 Jul 25 Thursday  |
| 208 | 0  | 20 | 5  | 14  | 4   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 11 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0                    | 54 Jul 26 Friday   |
| 209 | 0  | 9  | 10 | 6   | 2   | 14  | 3   | 5   | 9  | 9  | 11 | 5  | 11 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0                    | 94 Jul 27 Saturday |
| 210 | 0  | 2  | 9  | 19  | 5   | 8   | 13  | 15  | 20 | 21 | 10 | 12 | 12 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0                    | 146 Jul 28 Sunday  |
| 211 | 0  | 4  | 3  | 6   | 6   | 12  | 12  | 8   | 9  | 10 | 14 | 17 | 12 | 15 | 2  | 9  | 4  | 4  | 12 | 9  | 12 | 8  | 2  | 7                    | 197 Jul 29 Monday    |                    |
| 212 | 5  | 24 | 5  | 7   | 14  | 5   | 4   | 16  | 12 | 7  | 11 | 10 | 6  | 14 | 15 | 8  | 4  | 10 | 8  | 24 | 3  | 9  | 8  | 14                   | 243 Jul 30 Tuesday   |                    |
| 213 | 22 | 31 | 11 | 9   | 5   | 12  | 4   | 16  | 22 | 14 | 11 | 16 | 18 | 16 | 74 | 24 | 16 | 10 | 13 | 25 | 17 | 3  | 10 | 6                    | 405 Jul 31 Wednesday |                    |
| 214 | 13 | 16 | 16 | 15  | 10  | 11  | 9   | 19  | 10 | 6  | 14 | 15 | 18 | 8  | 10 | 4  | 18 | 10 | 6  | 19 | 15 | 9  | 11 | 7                    | 289 Aug 01 Thursday  |                    |
| 215 | 9  | 35 | 16 | 9   | 10  | 11  | 7   | 8   | 7  | 3  | 6  | 11 | 11 | 30 | 22 | 14 | 18 | 7  | 8  | 22 | 11 | 4  | 11 | 8                    | 298 Aug 02 Friday    |                    |
| 216 | 10 | 6  | 4  | 12  | 15  | 14  | 4   | 11  | 3  | 3  | 8  | 8  | 6  | 3  | 8  | 6  | 14 | 5  | 8  | 16 | 9  | 23 | 4  | 9                    | 209 Aug 03 Saturday  |                    |
| 217 | 5  | 3  | 3  | 8   | 14  | 11  | 8   | 7   | 4  | 1  | 9  | 3  | 8  | 15 | 12 | 4  | 9  | 9  | 19 | 64 | 18 | 4  | 8  | 7                    | 253 Aug 04 Sunday    |                    |
| 218 | 21 | 9  | 27 | 8   | 18  | 6   | 3   | 3   | 15 | 10 | 17 | 23 | 16 | 19 | 10 | 11 | 17 | 8  | 10 | 22 | 9  | 7  | 17 | 16                   | 322 Aug 05 Monday    |                    |
| 219 | 15 | 23 | 19 | 12  | 6   | 4   | 5   | 5   | 5  | 6  | 15 | 56 | 94 | 15 | 8  | 10 | 10 | 7  | 10 | 32 | 16 | 10 | 10 | 16                   | 409 Aug 06 Tuesday   |                    |
| 220 | 10 | 22 | 17 | 14  | 3   | 3   | 9   | 8   | 6  | 14 | 9  | 12 | 18 | 13 | 7  | 10 | 17 | 5  | 11 | 26 | 6  | 9  | 7  | 6                    | 262 Aug 07 Wednesday |                    |
| 221 | 8  | 13 | 31 | 5   | 2   | 3   | 8   | 6   | 5  | 6  | 13 | 20 | 27 | 17 | 13 | 11 | 7  | 9  | 31 | 16 | 7  | 6  | 8  | 14                   | 286 Aug 08 Thursday  |                    |
| 222 | 14 | 8  | 27 | 10  | 8   | 7   | 14  | 4   | 7  | 8  | 5  | 7  | 9  | 6  | 17 | 14 | 12 | 5  | 10 | 26 | 5  | 8  | 9  | 8                    | 248 Aug 09 Friday    |                    |
| 223 | 15 | 11 | 14 | 33  | 15  | 24  | 14  | 12  | 15 | 20 | 20 | 19 | 10 | 19 | 19 | 25 | 19 | 13 | 18 | 23 | 31 | 21 | 18 | 15                   | 443 Aug 10 Saturday  |                    |
| 224 | 34 | 19 | 20 | 22  | 18  | 38  | 22  | 16  | 13 | 14 | 11 | 18 | 9  | 4  | 11 | 10 | 11 | 11 | 12 | 4  | 7  | 15 | 11 | 11                   | 361 Aug 11 Sunday    |                    |
| 225 | 10 | 25 | 25 | 8   | 7   | 2   | 9   | 7   | 6  | 8  | 7  | 4  | 9  | 9  | 8  | 8  | 13 | 16 | 15 | 15 | 3  | 9  | 7  | 2                    | 232 Aug 12 Monday    |                    |
| 226 | 21 | 9  | 19 | 7   | 6   | 5   | 8   | 7   | 3  | 5  | 20 | 5  | 11 | 10 | 6  | 1  | 16 | 11 | 13 | 25 | 6  | 8  | 13 | 9                    | 244 Aug 13 Tuesday   |                    |
| 227 | 16 | 24 | 18 | 16  | 3   | 2   | 6   | 3   | 6  | 8  | 8  | 22 | 19 | 17 | 18 | 11 | 10 | 8  | 23 | 8  | 8  | 4  | 13 | 11                   | 282 Aug 14 Wednesday |                    |
| 228 | 22 | 18 | 16 | 11  | 2   | 14  | 5   | 12  | 11 | 9  | 2  | 7  | 12 | 7  | 5  | 9  | 26 | 15 | 7  | 39 | 8  | 3  | 7  | 18                   | 285 Aug 15 Thursday  |                    |
| 229 | 5  | 31 | 8  | 5   | 1   | 7   | 8   | 3   | 6  | 10 | 4  | 19 | 13 | 15 | 8  | 7  | 5  | 30 | 10 | 37 | 13 | 10 | 10 | 5                    | 270 Aug 16 Friday    |                    |
| 230 | 7  | 13 | 8  | 5   | 19  | 21  | 5   | 7   | 5  | 19 | 18 | 34 | 15 | 15 | 13 | 22 | 18 | 18 | 7  | 8  | 16 | 10 | 13 | 14                   | 330 Aug 17 Saturday  |                    |
| 231 | 12 | 10 | 11 | 6   | 15  | 11  | 13  | 12  | 8  | 14 | 20 | 5  | 15 | 8  | 9  | 8  | 6  | 4  | 10 | 8  | 8  | 11 | 19 | 251 Aug 18 Sunday    |                      |                    |
| 232 | 14 | 15 | 23 | 13  | 23  | 4   | 5   | 3   | 10 | 6  | 17 | 23 | 40 | 19 | 19 | 7  | 17 | 11 | 22 | 25 | 6  | 2  | 11 | 9                    | 344 Aug 19 Monday    |                    |
| 233 | 10 | 16 | 24 | 9   | 9   | 16  | 2   | 10  | 6  | 5  | 18 | 21 | 31 | 22 | 10 | 9  | 15 | 10 | 14 | 16 | 10 | 3  | 5  | 7                    | 298 Aug 20 Tuesday   |                    |
| 234 | 5  | 11 | 28 | 9   | 8   | 11  | 2   | 10  | 20 | 14 | 40 | 24 | 31 | 22 | 18 | 9  | 4  | 8  | 11 | 15 | 5  | 2  | 10 | 12                   | 329 Aug 21 Wednesday |                    |
| 235 | 9  | 23 | 16 | 9   | 10  | 24  | 5   | 15  | 27 | 23 | 13 | 21 | 17 | 28 | 27 | 11 | 24 | 3  | 22 | 7  | 4  | 7  | 8  | 2                    | 355 Aug 22 Thursday  |                    |
| 236 | 6  | 7  | 26 | 101 | 405 | 185 | 361 | 146 | 11 | 17 | 35 | 20 | 22 | 12 | 23 | 8  | 12 | 16 | 8  | 15 | 25 | 4  | 6  | 12                   | 1635 Aug 23 Friday   |                    |
| 237 | 10 | 9  | 7  | 20  | 8   | 35  | 28  | 10  | 13 | 18 | 19 | 11 | 5  | 7  | 11 | 14 | 42 | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 267 Aug 24 Saturday  |                    |
| 238 | 0  | 0  | 0  | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0 Aug 25 Sunday      |                    |
| 239 | 0  | 0  | 0  | 0   | 0   | 0   | 0   | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0                    | 0 Aug 26 Monday      |                    |
| 240 | 0  | 0  | 0  | 0   | 0   | 0   | 0   | 0   | 0  | 2  | 36 | 19 | 9  | 16 | 10 | 16 | 10 | 7  | 6  | 1  | 4  | 9  | 1  | 2                    | 148 Aug 27 Tuesday   |                    |
| 241 | 9  | 8  | 18 | 7   | 4   | 5   | 7   | 31  | 15 | 17 | 16 | 11 | 16 | 13 | 11 | 6  | 16 | 8  | 8  | 9  | 3  | 3  | 3  | 4                    | 248 Aug 28 Wednesday |                    |
| 242 | 8  | 5  | 22 | 6   | 6   | 8   | 10  | 7   | 8  | 7  | 8  | 5  | 11 | 12 | 8  | 12 | 19 | 4  | 6  | 13 | 0  | 5  | 1  | 4                    | 195 Aug 29 Thursday  |                    |
| 243 | 2  | 6  | 8  | 15  | 7   | 2   | 4   | 4   | 3  | 13 | 2  | 12 | 6  | 9  | 13 | 3  | 10 | 8  | 11 | 10 | 1  | 5  | 1  | 6                    | 161 Aug 30 Friday    |                    |
| 244 | 23 | 3  | 2  | 2   | 5   | 12  | 1   | 8   | 5  | 3  | 8  | 4  | 9  | 7  | 7  | 7  | 5  | 5  | 9  | 4  | 24 | 4  | 3  | 7                    | 167 Aug 31 Saturday  |                    |
| 245 | 5  | 3  | 7  | 3   | 9   | 3   | 4   | 13  | 10 | 8  | 9  | 4  | 7  | 2  | 6  | 3  | 12 | 8  | 10 | 1  | 2  | 8  | 0  | 10                   | 147 Sep 01 Sunday    |                    |
| 246 | 7  | 21 | 6  | 5   | 5   | 1   | 2   | 4   | 4  | 3  | 6  | 10 | 17 | 12 | 15 | 14 | 5  | 2  | 12 | 5  | 4  | 3  | 1  | 2                    | 166 Sep 02 Monday    |                    |
| 247 | 10 | 14 | 3  | 4   | 4   | 3   | 1   | 0   | 7  | 2  | 10 | 5  | 9  | 2  | 9  | 4  | 18 | 8  | 10 | 9  | 2  | 2  | 2  | 5                    | 143 Sep 03 Tuesday   |                    |
| 248 | 4  | 10 | 5  | 14  | 4   | 1   | 4   | 1   | 1  | 1  | 7  | 13 | 20 | 14 | 15 | 14 | 1  | 15 | 18 | 1  | 3  | 4  | 1  | 178 Sep 04 Wednesday |                      |                    |
| 249 | 4  | 13 | 7  | 6   | 4   | 2   | 5   | 4   | 11 | 5  | 9  | 21 | 3  | 15 | 12 | 11 | 10 | 3  | 12 | 8  | 10 | 10 | 6  | 11                   | 202 Sep 05 Thursday  |                    |
| 250 | 19 | 13 | 15 | 12  | 3   | 2   | 5   | 14  | 11 | 6  | 9  | 31 | 43 | 17 | 8  | 3  | 13 | 15 | 23 | 15 | 9  | 5  | 5  | 2                    | 298 Sep 06 Friday    |                    |
| 251 | 14 | 3  | 2  | 7   | 16  | 23  | 2   | 7   | 9  | 11 | 9  | 10 | 15 | 3  | 5  | 11 | 4  | 10 | 7  | 19 | 6  | 6  | 8  | 10                   | 217 Sep 07 Saturday  |                    |
| 252 | 4  | 5  | 3  | 2   | 8   | 7   | 20  | 0   | 7  | 4  | 2  | 12 | 13 | 14 | 8  | 5  | 4  | 7  | 5  | 6  | 8  | 2  | 0  | 6                    | 152 Sep 08 Sunday    |                    |
| 253 | 12 | 5  | 17 | 3   | 7   | 2   | 12  | 16  | 6  | 12 | 7  | 10 | 17 | 11 | 4  | 2  | 16 | 5  | 10 | 7  | 1  | 6  | 2  | 2                    | 192 Sep 09 Monday    |                    |
| 254 | 23 | 7  | 18 | 8   | 7   | 5   | 2   | 2   | 3  | 4  | 8  | 12 | 19 | 17 | 16 | 25 | 12 | 4  | 3  | 4  | 10 | 1  | 5  | 3                    | 218 Sep 10 Tuesday   |                    |
| 255 | 6  | 9  | 14 | 17  | 4   | 8   | 6   | 6   | 15 | 6  | 7  | 11 | 20 | 23 | 14 | 6  | 11 | 14 | 2  | 3  | 11 | 3  | 4  | 8                    | 228 Sep 11 Wednesday |                    |
| 256 | 4  | 15 | 6  | 4   | 10  | 7   | 8   | 6   | 8  | 16 | 9  | 21 | 20 | 25 | 10 | 15 | 6  | 2  | 14 | 9  | 4  | 2  | 2  | 225 Sep 12 Thursday  |                      |                    |
| 257 | 10 | 18 | 1  | 12  | 6   | 5   | 4   | 6   | 18 | 6  | 7  | 6  | 17 | 13 | 14 | 29 | 28 | 14 | 12 | 3  | 3  | 3  | 0  | 5                    | 240 Sep 13 Friday    |                    |
| 258 | 4  | 3  | 6  | 8   | 4   | 8   | 11  | 4   | 16 | 3  | 7  | 3  | 4  | 20 | 13 | 24 | 28 | 11 | 7  | 19 | 2  | 4  | 5  | 7                    | 221 Sep 14 Saturday  |                    |
| 259 | 2  | 2  | 7  | 7   | 2   | 4   | 10  | 8   | 11 | 5  | 32 | 41 | 19 | 13 | 22 | 15 | 17 | 10 | 6  | 1  | 9  | 11 | 11 | 9                    | 274 Sep 15 Sunday    |                    |

Table 3.5.1 (Page 3 of 4)

## NRS .FKX Hourly distribution of detections

| Day | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|-----------|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 260 | 7    | 19   | 13   | 10   | 4    | 6    | 4    | 2    | 4    | 4    | 3    | 0    | 0     | 0         | 0  | 0  | 0  | 8  | 60 | 38 | 5  | 7  | 8  | 4  | 206 | Sep 16 Monday    |
| 261 | 3    | 13   | 3    | 6    | 1    | 2    | 3    | 0    | 4    | 8    | 6    | 3    | 11    | 11        | 7  | 21 | 7  | 9  | 23 | 27 | 3  | 0  | 3  | 10 | 184 | Sep 17 Tuesday   |
| 262 | 6    | 13   | 13   | 9    | 8    | 11   | 2    | 4    | 25   | 8    | 15   | 17   | 11    | 11        | 9  | 5  | 5  | 11 | 16 | 1  | 4  | 2  | 3  | 4  | 213 | Sep 18 Wednesday |
| 263 | 4    | 19   | 6    | 5    | 11   | 1    | 3    | 4    | 10   | 6    | 2    | 10   | 13    | 10        | 15 | 7  | 19 | 1  | 13 | 4  | 3  | 8  | 1  | 39 | 214 | Sep 19 Thursday  |
| 264 | 10   | 5    | 3    | 2    | 16   | 8    | 10   | 14   | 6    | 9    | 16   | 24   | 25    | 9         | 10 | 4  | 22 | 14 | 13 | 23 | 11 | 9  | 8  | 8  | 279 | Sep 20 Friday    |
| 265 | 9    | 12   | 3    | 15   | 6    | 9    | 5    | 6    | 8    | 2    | 5    | 4    | 7     | 5         | 5  | 3  | 4  | 7  | 6  | 15 | 26 | 36 | 6  | 11 | 215 | Sep 21 Saturday  |
| 266 | 30   | 12   | 6    | 8    | 13   | 22   | 5    | 3    | 11   | 4    | 7    | 13   | 7     | 7         | 4  | 2  | 8  | 4  | 6  | 8  | 8  | 2  | 8  | 13 | 211 | Sep 22 Sunday    |
| 267 | 5    | 23   | 13   | 6    | 4    | 12   | 1    | 0    | 6    | 9    | 14   | 14   | 9     | 10        | 2  | 7  | 6  | 8  | 0  | 11 | 0  | 5  | 5  | 4  | 174 | Sep 23 Monday    |
| 268 | 6    | 6    | 6    | 6    | 7    | 3    | 12   | 4    | 6    | 7    | 4    | 26   | 22    | 16        | 11 | 5  | 8  | 3  | 13 | 15 | 10 | 4  | 10 | 9  | 219 | Sep 24 Tuesday   |
| 269 | 6    | 8    | 7    | 11   | 12   | 5    | 7    | 12   | 7    | 8    | 20   | 19   | 16    | 14        | 15 | 17 | 14 | 4  | 15 | 10 | 1  | 3  | 10 | 8  | 249 | Sep 25 Wednesday |
| 270 | 3    | 8    | 9    | 8    | 4    | 11   | 0    | 6    | 4    | 10   | 11   | 4    | 18    | 7         | 3  | 2  | 18 | 7  | 15 | 5  | 8  | 6  | 6  | 2  | 175 | Sep 26 Thursday  |
| 271 | 6    | 7    | 9    | 8    | 13   | 4    | 1    | 4    | 5    | 6    | 5    | 27   | 15    | 6         | 17 | 5  | 77 | 23 | 2  | 12 | 2  | 1  | 1  | 8  | 264 | Sep 27 Friday    |
| 272 | 5    | 4    | 4    | 6    | 11   | 12   | 2    | 8    | 9    | 7    | 3    | 16   | 6     | 7         | 13 | 10 | 17 | 6  | 12 | 5  | 3  | 4  | 3  | 10 | 183 | Sep 28 Saturday  |
| 273 | 3    | 5    | 8    | 23   | 9    | 6    | 26   | 2    | 8    | 2    | 17   | 5    | 20    | 3         | 7  | 3  | 4  | 6  | 5  | 3  | 1  | 4  | 2  | 11 | 183 | Sep 29 Sunday    |
| 274 | 13   | 9    | 2    | 3    | 1    | 4    | 5    | 2    | 2    | 4    | 3    | 15   | 6     | 9         | 21 | 7  | 3  | 7  | 3  | 11 | 4  | 7  | 4  | 4  | 149 | Sep 30 Monday    |
| NRS | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |     |                  |
| Sum | 1853 | 1591 | 1781 | 1222 | 1293 | 1938 | 1815 | 1469 | 1232 | 2134 | 1255 | 1304 |       |           |    |    |    |    |    |    |    |    |    |    |     |                  |
|     | 1446 | 1783 | 1498 | 1593 | 1381 | 1587 | 2129 | 1716 | 1729 | 1512 | 1390 | 1151 | 37802 | Total sum |    |    |    |    |    |    |    |    |    |    |     |                  |
| 168 | 9    | 11   | 11   | 9    | 9    | 11   | 9    | 7    | 8    | 8    | 9    | 12   | 13    | 11        | 10 | 9  | 10 | 7  | 9  | 13 | 8  | 7  | 7  | 8  | 225 | Total average    |
| 114 | 9    | 13   | 12   | 9    | 8    | 10   | 10   | 7    | 8    | 7    | 9    | 12   | 14    | 12        | 11 | 9  | 11 | 8  | 10 | 15 | 7  | 7  | 7  | 7  | 233 | Average workdays |
| 54  | 9    | 7    | 7    | 11   | 10   | 12   | 9    | 7    | 9    | 8    | 9    | 10   | 9     | 8         | 8  | 8  | 9  | 7  | 7  | 9  | 11 | 8  | 7  | 9  | 208 | Average weekends |

**Table 3.5.1.** (Page 4 of 4) Daily and hourly distribution of NORESS detections. For each day is shown number of detections within each hour of the day, and number of detections for that day. The end statistics give total number of detections distributed for each hour and the total sum of detections during the period. The averages show number of processed days, hourly distribution and average per processed day.

## ARC .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23  | Sum             | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----------------|------------------|
| 92  | 18 | 12 | 20 | 32 | 38 | 18 | 23 | 28 | 16 | 10 | 31 | 24 | 11 | 23 | 39 | 18 | 9  | 15 | 16 | 9  | 11 | 18 | 5  | 21  | 465             | Apr 01 Monday    |
| 93  | 16 | 6  | 8  | 11 | 10 | 11 | 15 | 8  | 22 | 24 | 38 | 12 | 26 | 14 | 12 | 26 | 16 | 20 | 21 | 25 | 15 | 16 | 12 | 19  | 403             | Apr 02 Tuesday   |
| 94  | 10 | 10 | 10 | 6  | 9  | 10 | 12 | 26 | 14 | 11 | 21 | 14 | 15 | 11 | 24 | 11 | 18 | 19 | 10 | 18 | 21 | 12 | 12 | 16  | 340             | Apr 03 Wednesday |
| 95  | 10 | 10 | 8  | 19 | 15 | 13 | 20 | 17 | 17 | 8  | 4  | 25 | 30 | 10 | 12 | 16 | 15 | 6  | 11 | 21 | 17 | 24 | 19 | 11  | 358             | Apr 04 Thursday  |
| 96  | 12 | 10 | 6  | 13 | 26 | 11 | 8  | 8  | 16 | 19 | 18 | 23 | 9  | 14 | 11 | 8  | 7  | 9  | 18 | 10 | 20 | 3  | 21 | 19  | 319             | Apr 05 Friday    |
| 97  | 13 | 4  | 3  | 6  | 17 | 9  | 19 | 7  | 11 | 23 | 8  | 23 | 19 | 10 | 11 | 17 | 8  | 11 | 13 | 5  | 15 | 23 | 16 | 28  | 319             | Apr 06 Saturday  |
| 98  | 18 | 11 | 8  | 11 | 11 | 12 | 29 | 25 | 8  | 6  | 8  | 9  | 13 | 22 | 17 | 12 | 20 | 9  | 7  | 18 | 18 | 7  | 14 | 19  | 332             | Apr 07 Sunday    |
| 99  | 13 | 15 | 17 | 15 | 10 | 11 | 13 | 14 | 15 | 15 | 17 | 16 | 9  | 8  | 19 | 28 | 17 | 15 | 15 | 29 | 15 | 20 | 15 | 15  | 376             | Apr 08 Monday    |
| 100 | 9  | 14 | 10 | 26 | 13 | 19 | 26 | 14 | 20 | 33 | 24 | 31 | 11 | 16 | 9  | 15 | 13 | 33 | 11 | 34 | 17 | 15 | 16 | 18  | 447             | Apr 09 Tuesday   |
| 101 | 12 | 5  | 17 | 16 | 10 | 16 | 18 | 13 | 22 | 28 | 29 | 27 | 23 | 34 | 15 | 23 | 25 | 45 | 22 | 12 | 11 | 15 | 27 | 15  | 480             | Apr 10 Wednesday |
| 102 | 18 | 23 | 18 | 18 | 14 | 26 | 26 | 32 | 36 | 23 | 31 | 24 | 31 | 37 | 25 | 24 | 14 | 15 | 20 | 19 | 24 | 13 | 16 | 21  | 548             | Apr 11 Thursday  |
| 103 | 17 | 10 | 15 | 20 | 12 | 14 | 6  | 9  | 19 | 31 | 27 | 30 | 18 | 13 | 9  | 28 | 15 | 16 | 16 | 21 | 19 | 10 | 19 | 34  | 428             | Apr 12 Friday    |
| 104 | 10 | 10 | 7  | 15 | 20 | 7  | 20 | 17 | 11 | 25 | 25 | 23 | 11 | 11 | 12 | 10 | 18 | 14 | 9  | 15 | 6  | 7  | 22 | 28  | 353             | Apr 13 Saturday  |
| 105 | 8  | 12 | 18 | 12 | 15 | 13 | 27 | 9  | 10 | 14 | 10 | 22 | 21 | 12 | 9  | 10 | 10 | 16 | 12 | 25 | 15 | 13 | 14 | 22  | 349             | Apr 14 Sunday    |
| 106 | 16 | 19 | 10 | 7  | 20 | 15 | 10 | 29 | 23 | 24 | 34 | 27 | 38 | 48 | 16 | 34 | 20 | 11 | 12 | 17 | 16 | 16 | 11 | 27  | 500             | Apr 15 Monday    |
| 107 | 37 | 34 | 47 | 38 | 44 | 44 | 45 | 35 | 45 | 19 | 30 | 28 | 22 | 29 | 14 | 24 | 11 | 5  | 9  | 17 | 10 | 21 | 38 | 14  | 660             | Apr 16 Tuesday   |
| 108 | 14 | 12 | 8  | 11 | 18 | 13 | 16 | 17 | 41 | 29 | 28 | 47 | 33 | 43 | 24 | 35 | 18 | 23 | 13 | 12 | 10 | 9  | 22 | 16  | 512             | Apr 17 Wednesday |
| 109 | 23 | 19 | 13 | 11 | 12 | 6  | 17 | 27 | 7  | 22 | 31 | 41 | 26 | 46 | 10 | 18 | 28 | 25 | 19 | 30 | 21 | 13 | 30 | 17  | 512             | Apr 18 Thursday  |
| 110 | 17 | 9  | 20 | 27 | 9  | 6  | 30 | 18 | 27 | 33 | 26 | 36 | 22 | 25 | 18 | 29 | 21 | 16 | 22 | 19 | 18 | 21 | 16 | 21  | 506             | Apr 19 Friday    |
| 111 | 7  | 5  | 10 | 11 | 11 | 16 | 10 | 10 | 14 | 11 | 24 | 24 | 20 | 15 | 26 | 8  | 16 | 18 | 25 | 14 | 17 | 24 | 19 | 35  | 390             | Apr 20 Saturday  |
| 112 | 12 | 8  | 10 | 4  | 9  | 20 | 20 | 19 | 16 | 11 | 10 | 18 | 14 | 17 | 19 | 24 | 29 | 16 | 16 | 14 | 23 | 20 | 20 | 23  | 392             | Apr 21 Sunday    |
| 113 | 11 | 24 | 14 | 9  | 12 | 10 | 17 | 12 | 18 | 23 | 26 | 26 | 21 | 16 | 16 | 32 | 8  | 7  | 26 | 4  | 4  | 26 | 18 | 15  | 395             | Apr 22 Monday    |
| 114 | 21 | 14 | 14 | 25 | 15 | 12 | 11 | 19 | 16 | 31 | 29 | 42 | 23 | 25 | 17 | 23 | 15 | 21 | 21 | 15 | 23 | 14 | 16 | 25  | 487             | Apr 23 Tuesday   |
| 115 | 17 | 11 | 11 | 13 | 14 | 24 | 42 | 21 | 15 | 20 | 25 | 33 | 35 | 14 | 11 | 20 | 12 | 29 | 20 | 27 | 19 | 9  | 25 | 13  | 480             | Apr 24 Wednesday |
| 116 | 13 | 12 | 14 | 18 | 34 | 21 | 26 | 19 | 31 | 31 | 25 | 32 | 18 | 23 | 31 | 11 | 32 | 20 | 26 | 32 | 24 | 22 | 24 | 25  | 564             | Apr 25 Thursday  |
| 117 | 28 | 23 | 17 | 11 | 13 | 21 | 7  | 27 | 30 | 19 | 26 | 35 | 35 | 18 | 12 | 16 | 15 | 17 | 26 | 23 | 38 | 23 | 25 | 23  | 528             | Apr 26 Friday    |
| 118 | 20 | 9  | 15 | 26 | 19 | 7  | 15 | 12 | 19 | 23 | 13 | 14 | 12 | 9  | 9  | 26 | 22 | 11 | 7  | 17 | 11 | 23 | 16 | 18  | 373             | Apr 27 Saturday  |
| 119 | 8  | 12 | 13 | 15 | 9  | 15 | 22 | 7  | 18 | 9  | 8  | 9  | 8  | 11 | 15 | 9  | 10 | 5  | 22 | 25 | 9  | 12 | 21 | 20  | 312             | Apr 28 Sunday    |
| 120 | 10 | 14 | 13 | 19 | 32 | 12 | 9  | 38 | 26 | 29 | 39 | 27 | 18 | 19 | 19 | 34 | 25 | 18 | 15 | 19 | 11 | 14 | 17 | 26  | 503             | Apr 29 Monday    |
| 121 | 11 | 11 | 28 | 16 | 5  | 20 | 15 | 20 | 25 | 16 | 25 | 38 | 15 | 22 | 21 | 21 | 7  | 6  | 24 | 13 | 15 | 24 | 26 | 23  | 447             | Apr 30 Tuesday   |
| 122 | 22 | 5  | 10 | 21 | 14 | 15 | 23 | 17 | 22 | 27 | 24 | 24 | 22 | 18 | 16 | 12 | 14 | 10 | 29 | 13 | 18 | 9  | 22 | 15  | 422             | May 01 Wednesday |
| 123 | 23 | 11 | 11 | 20 | 21 | 11 | 21 | 31 | 11 | 25 | 29 | 53 | 25 | 19 | 28 | 19 | 14 | 24 | 29 | 21 | 18 | 19 | 25 | 537 | May 02 Thursday |                  |
| 124 | 17 | 20 | 14 | 27 | 21 | 17 | 17 | 28 | 16 | 22 | 24 | 20 | 28 | 29 | 19 | 17 | 22 | 26 | 25 | 31 | 16 | 17 | 15 | 25  | 513             | May 03 Friday    |
| 125 | 21 | 14 | 5  | 10 | 27 | 15 | 12 | 22 | 19 | 15 | 21 | 25 | 16 | 18 | 9  | 5  | 24 | 22 | 7  | 21 | 23 | 15 | 33 | 24  | 423             | May 04 Saturday  |
| 126 | 15 | 10 | 10 | 11 | 11 | 20 | 12 | 11 | 17 | 14 | 31 | 13 | 14 | 20 | 20 | 12 | 16 | 10 | 14 | 13 | 15 | 14 | 11 | 12  | 346             | May 05 Sunday    |
| 127 | 6  | 15 | 23 | 4  | 10 | 6  | 14 | 9  | 19 | 14 | 17 | 15 | 29 | 12 | 24 | 25 | 15 | 8  | 21 | 9  | 13 | 17 | 22 | 18  | 365             | May 06 Monday    |
| 128 | 9  | 8  | 10 | 12 | 27 | 12 | 6  | 23 | 24 | 18 | 21 | 14 | 17 | 22 | 16 | 27 | 30 | 23 | 20 | 24 | 18 | 12 | 30 | 20  | 443             | May 07 Tuesday   |
| 129 | 15 | 15 | 13 | 11 | 12 | 11 | 20 | 23 | 23 | 31 | 31 | 46 | 34 | 24 | 25 | 15 | 18 | 16 | 16 | 10 | 14 | 11 | 24 | 29  | 487             | May 08 Wednesday |
| 130 | 4  | 7  | 6  | 9  | 26 | 19 | 17 | 27 | 17 | 25 | 17 | 15 | 38 | 21 | 29 | 41 | 26 | 16 | 26 | 25 | 26 | 10 | 14 | 14  | 475             | May 09 Thursday  |
| 131 | 12 | 18 | 17 | 21 | 15 | 23 | 23 | 24 | 16 | 23 | 40 | 30 | 25 | 49 | 30 | 28 | 26 | 11 | 16 | 13 | 26 | 16 | 26 | 30  | 558             | May 10 Friday    |
| 132 | 27 | 37 | 35 | 17 | 30 | 21 | 28 | 38 | 36 | 42 | 33 | 17 | 14 | 16 | 33 | 10 | 17 | 11 | 19 | 14 | 8  | 10 | 9  | 16  | 538             | May 11 Saturday  |
| 133 | 8  | 16 | 19 | 12 | 15 | 19 | 13 | 16 | 22 | 31 | 27 | 12 | 19 | 22 | 13 | 17 | 21 | 22 | 28 | 28 | 17 | 29 | 38 | 36  | 500             | May 12 Sunday    |
| 134 | 29 | 27 | 17 | 34 | 24 | 15 | 20 | 39 | 28 | 13 | 30 | 18 | 29 | 15 | 19 | 26 | 5  | 22 | 22 | 22 | 20 | 11 | 21 | 17  | 523             | May 13 Monday    |
| 135 | 24 | 14 | 12 | 19 | 14 | 8  | 6  | 12 | 17 | 23 | 28 | 34 | 38 | 11 | 16 | 24 | 12 | 17 | 16 | 36 | 0  | 9  | 29 | 44  | 463             | May 14 Tuesday   |
| 136 | 26 | 11 | 12 | 15 | 10 | 15 | 12 | 15 | 30 | 28 | 21 | 37 | 26 | 21 | 30 | 29 | 21 | 34 | 9  | 40 | 31 | 19 | 17 | 33  | 542             | May 15 Wednesday |
| 137 | 17 | 9  | 4  | 13 | 11 | 17 | 9  | 9  | 19 | 20 | 26 | 20 | 35 | 9  | 15 | 20 | 19 | 10 | 16 | 50 | 33 | 28 | 26 | 444 | May 16 Thursday |                  |
| 138 | 19 | 13 | 18 | 10 | 10 | 8  | 9  | 26 | 14 | 20 | 37 | 20 | 29 | 17 | 15 | 20 | 6  | 32 | 17 | 13 | 11 | 9  | 4  | 18  | 395             | May 17 Friday    |
| 139 | 6  | 5  | 10 | 23 | 8  | 12 | 10 | 9  | 17 | 11 | 16 | 19 | 15 | 20 | 8  | 17 | 21 | 6  | 10 | 15 | 19 | 22 | 6  | 8   | 313             | May 18 Saturday  |
| 140 | 20 | 11 | 13 | 22 | 13 | 13 | 16 | 7  | 5  | 19 | 20 | 17 | 5  | 27 | 13 | 15 | 21 | 13 | 13 | 17 | 15 | 23 | 10 | 23  | 371             | May 19 Sunday    |
| 141 | 7  | 27 | 13 | 20 | 14 | 19 | 17 | 16 | 19 | 13 | 23 | 22 | 22 | 27 | 22 | 19 | 16 | 18 | 20 | 25 | 15 | 13 | 30 | 22  | 459             | May 20 Monday    |
| 142 | 13 | 18 | 26 | 18 | 21 | 20 | 28 | 37 | 24 | 20 | 36 | 34 | 35 | 22 | 32 | 28 | 31 | 37 | 34 | 30 | 43 | 26 | 23 | 23  | 659             | May 21 Tuesday   |
| 143 | 25 | 14 | 15 | 13 | 12 | 24 | 6  | 15 | 14 | 30 | 31 | 11 | 13 | 12 | 22 | 21 | 6  | 11 | 20 | 20 | 13 | 16 | 18 | 25  | 407             | May 22 Wednesday |
| 144 | 13 | 22 | 21 | 10 | 15 | 7  | 13 | 23 | 34 | 27 | 34 | 18 | 24 | 33 | 18 | 20 | 24 | 25 | 20 | 23 | 19 | 13 | 22 | 25  | 503             | May 23 Thursday  |
| 145 | 10 | 17 | 6  | 12 | 17 | 11 | 28 | 34 | 55 | 35 | 54 | 44 | 32 | 20 | 14 | 29 | 15 | 14 | 27 | 24 | 26 | 11 | 14 | 27  | 576             | May 24 Friday    |
| 146 | 17 | 15 | 14 | 16 | 6  | 11 | 14 | 21 | 18 | 29 | 10 | 21 | 13 | 20 | 21 | 10 | 14 | 18 | 25 | 10 | 21 | 10 | 20 | 12  | 386             | May 25 Saturday  |
| 147 | 8  | 15 | 12 | 14 | 11 | 15 | 22 | 12 | 15 | 10 | 14 | 18 | 21 | 14 | 20 | 11 | 13 | 16 | 17 | 10 | 7  | 13 | 32 | 20  | 360             | May 26 Sunday    |

Table 3.5.2 (Page 1 of 4)

## ARC .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10  | 11 | 12  | 13 | 14 | 15  | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23  | Sum           | Date             |               |
|-----|----|----|----|----|----|----|----|----|----|----|-----|----|-----|----|----|-----|----|----|----|----|----|----|----|-----|---------------|------------------|---------------|
| 148 | 20 | 20 | 17 | 21 | 16 | 16 | 13 | 31 | 22 | 23 | 24  | 38 | 33  | 17 | 25 | 41  | 14 | 20 | 18 | 15 | 13 | 25 | 32 | 29  | 543           | May 27 Monday    |               |
| 149 | 10 | 10 | 14 | 11 | 10 | 9  | 8  | 19 | 16 | 26 | 29  | 17 | 15  | 29 | 20 | 33  | 23 | 10 | 23 | 25 | 17 | 32 | 13 | 21  | 440           | May 28 Tuesday   |               |
| 150 | 18 | 29 | 34 | 34 | 49 | 35 | 26 | 42 | 40 | 45 | 33  | 51 | 43  | 29 | 23 | 14  | 10 | 15 | 13 | 11 | 5  | 8  | 10 | 16  | 633           | May 29 Wednesday |               |
| 151 | 6  | 2  | 5  | 16 | 16 | 18 | 14 | 27 | 26 | 23 | 26  | 17 | 29  | 18 | 17 | 12  | 14 | 13 | 20 | 26 | 17 | 9  | 16 | 11  | 398           | May 30 Thursday  |               |
| 152 | 11 | 24 | 10 | 6  | 12 | 17 | 15 | 30 | 26 | 25 | 38  | 58 | 35  | 29 | 10 | 29  | 30 | 20 | 21 | 27 | 18 | 14 | 13 | 21  | 539           | May 31 Friday    |               |
| 153 | 7  | 9  | 7  | 8  | 9  | 2  | 10 | 7  | 6  | 14 | 17  | 29 | 14  | 8  | 6  | 11  | 20 | 15 | 27 | 10 | 15 | 19 | 24 | 16  | 310           | Jun 01 Saturday  |               |
| 154 | 12 | 19 | 13 | 11 | 19 | 10 | 13 | 14 | 17 | 26 | 27  | 34 | 27  | 33 | 15 | 28  | 16 | 21 | 28 | 23 | 27 | 12 | 15 | 17  | 477           | Jun 02 Sunday    |               |
| 155 | 6  | 13 | 11 | 9  | 17 | 12 | 39 | 57 | 49 | 20 | 41  | 65 | 41  | 30 | 13 | 24  | 23 | 15 | 10 | 20 | 22 | 13 | 9  | 17  | 576           | Jun 03 Monday    |               |
| 156 | 5  | 8  | 11 | 14 | 13 | 17 | 14 | 17 | 29 | 31 | 53  | 31 | 26  | 29 | 18 | 27  | 16 | 27 | 32 | 21 | 20 | 12 | 20 | 23  | 514           | Jun 04 Tuesday   |               |
| 157 | 14 | 15 | 4  | 1  | 19 | 35 | 26 | 32 | 55 | 29 | 49  | 49 | 32  | 52 | 53 | 56  | 20 | 9  | 26 | 17 | 15 | 7  | 7  | 15  | 637           | Jun 05 Wednesday |               |
| 158 | 4  | 7  | 8  | 13 | 5  | 14 | 20 | 28 | 29 | 12 | 71  | 18 | 20  | 24 | 39 | 45  | 38 | 14 | 19 | 16 | 15 | 8  | 10 | 12  | 489           | Jun 06 Thursday  |               |
| 159 | 12 | 3  | 11 | 5  | 9  | 21 | 19 | 25 | 27 | 31 | 17  | 26 | 20  | 19 | 11 | 12  | 23 | 11 | 15 | 22 | 21 | 25 | 16 | 413 | Jun 07 Friday |                  |               |
| 160 | 17 | 14 | 31 | 13 | 23 | 14 | 30 | 13 | 17 | 26 | 26  | 18 | 8   | 19 | 11 | 6   | 8  | 21 | 15 | 10 | 3  | 15 | 23 | 21  | 402           | Jun 08 Saturday  |               |
| 161 | 17 | 16 | 9  | 12 | 12 | 20 | 32 | 55 | 62 | 76 | 100 | 70 | 56  | 85 | 61 | 49  | 29 | 31 | 18 | 14 | 18 | 12 | 17 | 20  | 891           | Jun 09 Sunday    |               |
| 162 | 8  | 16 | 23 | 12 | 58 | 37 | 35 | 5  | 32 | 26 | 23  | 28 | 16  | 21 | 28 | 40  | 16 | 43 | 20 | 29 | 15 | 15 | 21 | 16  | 583           | Jun 10 Monday    |               |
| 163 | 9  | 6  | 14 | 10 | 15 | 18 | 25 | 31 | 33 | 30 | 49  | 26 | 29  | 12 | 10 | 30  | 14 | 35 | 23 | 10 | 23 | 14 | 15 | 16  | 487           | Jun 11 Tuesday   |               |
| 164 | 21 | 15 | 8  | 13 | 17 | 13 | 23 | 32 | 44 | 26 | 26  | 23 | 34  | 21 | 37 | 16  | 14 | 20 | 21 | 12 | 19 | 13 | 17 | 15  | 500           | Jun 12 Wednesday |               |
| 165 | 17 | 7  | 11 | 2  | 4  | 7  | 10 | 17 | 12 | 23 | 14  | 12 | 16  | 12 | 9  | 20  | 10 | 20 | 20 | 21 | 11 | 9  | 15 | 16  | 315           | Jun 13 Thursday  |               |
| 166 | 10 | 4  | 9  | 11 | 11 | 11 | 20 | 25 | 30 | 35 | 61  | 46 | 35  | 41 | 20 | 33  | 13 | 11 | 16 | 24 | 16 | 13 | 33 | 17  | 545           | Jun 14 Friday    |               |
| 167 | 11 | 12 | 11 | 17 | 15 | 29 | 18 | 26 | 37 | 17 | 26  | 40 | 29  | 30 | 14 | 9   | 16 | 7  | 18 | 13 | 15 | 12 | 18 | 28  | 468           | Jun 15 Saturday  |               |
| 168 | 14 | 13 | 14 | 17 | 4  | 12 | 15 | 22 | 26 | 34 | 21  | 32 | 24  | 19 | 17 | 18  | 18 | 5  | 20 | 17 | 14 | 13 | 12 | 15  | 416           | Jun 16 Sunday    |               |
| 169 | 7  | 15 | 13 | 14 | 16 | 12 | 10 | 24 | 30 | 23 | 19  | 51 | 30  | 17 | 5  | 24  | 27 | 42 | 18 | 25 | 9  | 15 | 27 | 24  | 497           | Jun 17 Monday    |               |
| 170 | 4  | 12 | 5  | 8  | 12 | 15 | 27 | 17 | 32 | 27 | 30  | 47 | 30  | 34 | 16 | 23  | 20 | 14 | 21 | 17 | 19 | 9  | 13 | 19  | 471           | Jun 18 Tuesday   |               |
| 171 | 18 | 13 | 6  | 11 | 18 | 17 | 22 | 40 | 31 | 20 | 29  | 55 | 35  | 31 | 30 | 29  | 16 | 14 | 27 | 14 | 14 | 16 | 12 | 26  | 544           | Jun 19 Wednesday |               |
| 172 | 8  | 22 | 17 | 11 | 18 | 12 | 16 | 19 | 29 | 35 | 35  | 37 | 25  | 8  | 20 | 12  | 16 | 16 | 21 | 18 | 15 | 7  | 13 | 15  | 445           | Jun 20 Thursday  |               |
| 173 | 19 | 9  | 5  | 11 | 13 | 23 | 24 | 31 | 39 | 36 | 34  | 44 | 33  | 25 | 26 | 21  | 16 | 28 | 30 | 33 | 22 | 34 | 33 | 34  | 623           | Jun 21 Friday    |               |
| 174 | 24 | 24 | 8  | 17 | 15 | 16 | 19 | 21 | 36 | 37 | 38  | 34 | 25  | 23 | 25 | 21  | 28 | 17 | 19 | 13 | 12 | 23 | 20 | 21  | 536           | Jun 22 Saturday  |               |
| 175 | 9  | 22 | 31 | 18 | 6  | 11 | 16 | 11 | 31 | 26 | 15  | 36 | 32  | 38 | 29 | 23  | 9  | 9  | 21 | 11 | 16 | 27 | 9  | 23  | 479           | Jun 23 Sunday    |               |
| 176 | 16 | 16 | 10 | 25 | 12 | 12 | 22 | 19 | 26 | 36 | 32  | 35 | 34  | 29 | 21 | 39  | 13 | 18 | 14 | 15 | 14 | 25 | 25 | 24  | 532           | Jun 24 Monday    |               |
| 177 | 15 | 10 | 13 | 14 | 29 | 8  | 26 | 33 | 59 | 37 | 36  | 43 | 55  | 27 | 21 | 29  | 20 | 31 | 33 | 19 | 19 | 31 | 17 | 18  | 643           | Jun 25 Tuesday   |               |
| 178 | 17 | 9  | 19 | 16 | 17 | 8  | 18 | 22 | 18 | 27 | 34  | 47 | 37  | 34 | 22 | 25  | 13 | 27 | 44 | 26 | 17 | 21 | 23 | 20  | 561           | Jun 26 Wednesday |               |
| 179 | 29 | 11 | 20 | 18 | 22 | 8  | 39 | 27 | 36 | 26 | 56  | 54 | 73  | 70 | 42 | 75  | 47 | 29 | 26 | 21 | 15 | 16 | 22 | 26  | 808           | Jun 27 Thursday  |               |
| 180 | 16 | 7  | 15 | 27 | 10 | 10 | 22 | 26 | 26 | 36 | 38  | 44 | 42  | 7  | 19 | 19  | 21 | 11 | 30 | 12 | 15 | 15 | 35 | 18  | 521           | Jun 28 Friday    |               |
| 181 | 7  | 13 | 13 | 17 | 17 | 13 | 26 | 10 | 22 | 30 | 21  | 20 | 27  | 20 | 22 | 19  | 13 | 10 | 23 | 12 | 24 | 13 | 16 | 19  | 427           | Jun 29 Saturday  |               |
| 182 | 25 | 15 | 12 | 26 | 20 | 15 | 20 | 23 | 24 | 19 | 33  | 37 | 33  | 25 | 15 | 17  | 22 | 20 | 25 | 12 | 25 | 17 | 12 | 26  | 518           | Jun 30 Sunday    |               |
| 183 | 12 | 21 | 8  | 18 | 20 | 21 | 18 | 57 | 71 | 32 | 78  | 63 | 46  | 37 | 30 | 20  | 23 | 27 | 27 | 21 | 12 | 11 | 29 | 15  | 717           | Jul 01 Monday    |               |
| 184 | 9  | 9  | 19 | 16 | 17 | 15 | 18 | 13 | 55 | 39 | 22  | 33 | 26  | 26 | 24 | 18  | 21 | 12 | 22 | 20 | 25 | 22 | 10 | 15  | 506           | Jul 02 Tuesday   |               |
| 185 | 17 | 13 | 8  | 15 | 9  | 11 | 24 | 25 | 26 | 34 | 50  | 51 | 47  | 25 | 29 | 19  | 13 | 17 | 24 | 13 | 24 | 8  | 11 | 19  | 532           | Jul 03 Wednesday |               |
| 186 | 7  | 10 | 8  | 22 | 18 | 12 | 26 | 21 | 24 | 28 | 33  | 48 | 34  | 41 | 48 | 46  | 27 | 10 | 18 | 16 | 28 | 12 | 18 | 32  | 587           | Jul 04 Thursday  |               |
| 187 | 8  | 13 | 14 | 12 | 16 | 14 | 31 | 27 | 51 | 41 | 59  | 40 | 31  | 27 | 26 | 15  | 20 | 17 | 32 | 18 | 6  | 19 | 9  | 18  | 564           | Jul 05 Friday    |               |
| 188 | 11 | 9  | 6  | 9  | 21 | 19 | 20 | 21 | 25 | 29 | 21  | 26 | 44  | 36 | 21 | 18  | 17 | 20 | 11 | 19 | 11 | 21 | 16 | 16  | 468           | Jul 06 Saturday  |               |
| 189 | 13 | 10 | 8  | 7  | 17 | 12 | 20 | 21 | 24 | 24 | 27  | 27 | 18  | 29 | 19 | 14  | 19 | 7  | 17 | 10 | 11 | 13 | 13 | 13  | 393           | Jul 07 Sunday    |               |
| 190 | 15 | 9  | 7  | 14 | 11 | 14 | 19 | 23 | 34 | 35 | 46  | 50 | 26  | 38 | 30 | 33  | 29 | 22 | 38 | 26 | 35 | 11 | 11 | 22  | 598           | Jul 08 Monday    |               |
| 191 | 21 | 11 | 20 | 19 | 21 | 15 | 31 | 27 | 59 | 37 | 57  | 60 | 44  | 27 | 22 | 14  | 29 | 30 | 32 | 28 | 22 | 17 | 16 | 16  | 675           | Jul 09 Tuesday   |               |
| 192 | 8  | 18 | 9  | 15 | 23 | 17 | 15 | 66 | 43 | 28 | 45  | 49 | 33  | 16 | 16 | 13  | 10 | 26 | 28 | 23 | 28 | 25 | 16 | 26  | 596           | Jul 10 Wednesday |               |
| 193 | 12 | 4  | 22 | 15 | 22 | 12 | 20 | 21 | 34 | 28 | 36  | 28 | 42  | 40 | 39 | 29  | 14 | 37 | 36 | 22 | 29 | 23 | 19 | 21  | 605           | Jul 11 Thursday  |               |
| 194 | 9  | 11 | 19 | 14 | 18 | 12 | 20 | 18 | 28 | 0  | 0   | 0  | 0   | 0  | 0  | 0   | 0  | 6  | 62 | 62 | 22 | 14 | 9  | 16  | 25            | 365              | Jul 12 Friday |
| 195 | 15 | 15 | 25 | 29 | 27 | 23 | 73 | 55 | 47 | 62 | 51  | 30 | 108 | 62 | 14 | 25  | 19 | 44 | 48 | 19 | 11 | 20 | 27 | 20  | 869           | Jul 13 Saturday  |               |
| 196 | 14 | 13 | 15 | 16 | 21 | 20 | 12 | 19 | 15 | 29 | 31  | 31 | 17  | 26 | 16 | 14  | 17 | 23 | 18 | 17 | 20 | 13 | 29 | 20  | 466           | Jul 14 Sunday    |               |
| 197 | 18 | 16 | 21 | 16 | 18 | 13 | 22 | 40 | 30 | 30 | 28  | 27 | 30  | 22 | 37 | 29  | 38 | 39 | 44 | 42 | 26 | 40 | 22 | 27  | 675           | Jul 15 Monday    |               |
| 198 | 19 | 14 | 28 | 34 | 17 | 17 | 21 | 17 | 30 | 28 | 37  | 31 | 10  | 18 | 20 | 26  | 16 | 15 | 20 | 15 | 11 | 15 | 2  | 22  | 483           | Jul 16 Tuesday   |               |
| 199 | 20 | 18 | 14 | 19 | 29 | 31 | 22 | 32 | 22 | 39 | 54  | 55 | 35  | 26 | 42 | 20  | 27 | 23 | 32 | 23 | 19 | 26 | 33 | 16  | 677           | Jul 17 Wednesday |               |
| 200 | 19 | 20 | 9  | 14 | 14 | 23 | 22 | 42 | 38 | 52 | 56  | 43 | 26  | 31 | 40 | 21  | 17 | 31 | 20 | 14 | 11 | 21 | 19 | 28  | 631           | Jul 18 Thursday  |               |
| 201 | 9  | 3  | 25 | 10 | 12 | 14 | 26 | 32 | 38 | 49 | 48  | 64 | 40  | 28 | 37 | 106 | 87 | 62 | 26 | 29 | 22 | 18 | 20 | 21  | 826           | Jul 19 Friday    |               |
| 202 | 20 | 23 | 16 | 18 | 28 | 16 | 26 | 51 | 79 | 52 | 29  | 49 | 48  | 42 | 16 | 26  | 22 | 16 | 22 | 27 | 18 | 8  | 14 | 26  | 692           | Jul 20 Saturday  |               |
| 203 | 45 | 10 | 1  | 14 | 17 | 11 | 19 | 17 | 20 | 42 | 42  | 42 | 29  | 18 | 19 | 24  | 15 | 7  | 23 | 9  | 25 | 21 | 20 | 32  | 522           | Jul 21 Sunday    |               |

Table 3.5.2 (Page 2 of 4)

## ARC .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 204 | 12 | 10 | 8  | 10 | 9  | 31 | 20 | 20 | 38 | 37 | 39 | 36 | 37 | 20 | 59 | 38 | 35 | 19 | 26 | 21 | 14 | 25 | 18 | 14 | 596 | Jul 22 Monday    |
| 205 | 30 | 15 | 11 | 24 | 18 | 24 | 19 | 48 | 48 | 36 | 43 | 39 | 36 | 35 | 34 | 28 | 31 | 17 | 21 | 12 | 19 | 21 | 33 | 23 | 665 | Jul 23 Tuesday   |
| 206 | 15 | 25 | 20 | 18 | 26 | 30 | 34 | 36 | 47 | 30 | 62 | 55 | 42 | 40 | 52 | 37 | 28 | 29 | 25 | 30 | 10 | 24 | 16 | 22 | 753 | Jul 24 Wednesday |
| 207 | 22 | 15 | 9  | 23 | 29 | 20 | 22 | 22 | 27 | 28 | 27 | 33 | 30 | 24 | 26 | 32 | 25 | 35 | 30 | 15 | 19 | 11 | 21 | 11 | 556 | Jul 25 Thursday  |
| 208 | 15 | 11 | 15 | 21 | 20 | 5  | 25 | 16 | 22 | 47 | 33 | 49 | 22 | 28 | 20 | 24 | 16 | 12 | 31 | 23 | 15 | 24 | 23 | 17 | 534 | Jul 26 Friday    |
| 209 | 17 | 12 | 10 | 18 | 18 | 14 | 16 | 11 | 32 | 35 | 36 | 40 | 42 | 34 | 24 | 13 | 17 | 15 | 14 | 23 | 17 | 16 | 23 | 30 | 527 | Jul 27 Saturday  |
| 210 | 19 | 15 | 11 | 15 | 24 | 13 | 28 | 17 | 38 | 33 | 44 | 52 | 35 | 19 | 26 | 25 | 21 | 17 | 28 | 20 | 30 | 17 | 32 | 16 | 595 | Jul 28 Sunday    |
| 211 | 9  | 15 | 17 | 12 | 26 | 9  | 24 | 23 | 40 | 28 | 44 | 34 | 29 | 22 | 31 | 23 | 8  | 14 | 23 | 23 | 26 | 8  | 14 | 18 | 520 | Jul 29 Monday    |
| 212 | 15 | 24 | 18 | 23 | 20 | 17 | 25 | 26 | 23 | 24 | 27 | 36 | 22 | 35 | 35 | 23 | 16 | 24 | 18 | 14 | 24 | 20 | 21 | 24 | 554 | Jul 30 Tuesday   |
| 213 | 15 | 10 | 12 | 8  | 12 | 15 | 20 | 20 | 33 | 27 | 30 | 42 | 31 | 28 | 37 | 23 | 19 | 19 | 28 | 19 | 8  | 8  | 27 | 21 | 512 | Jul 31 Wednesday |
| 214 | 3  | 14 | 9  | 20 | 24 | 12 | 19 | 24 | 43 | 32 | 42 | 31 | 31 | 22 | 24 | 21 | 20 | 28 | 23 | 60 | 33 | 21 | 21 | 16 | 593 | Aug 01 Thursday  |
| 215 | 11 | 4  | 7  | 14 | 23 | 26 | 31 | 32 | 24 | 35 | 43 | 45 | 24 | 29 | 47 | 29 | 11 | 72 | 35 | 40 | 39 | 16 | 27 | 23 | 787 | Aug 02 Friday    |
| 216 | 15 | 22 | 17 | 24 | 25 | 25 | 13 | 23 | 20 | 24 | 34 | 39 | 40 | 34 | 20 | 13 | 17 | 24 | 15 | 14 | 20 | 14 | 15 | 25 | 532 | Aug 03 Saturday  |
| 217 | 4  | 3  | 12 | 7  | 16 | 15 | 12 | 12 | 14 | 20 | 33 | 47 | 21 | 29 | 17 | 15 | 16 | 12 | 20 | 7  | 23 | 6  | 28 | 26 | 415 | Aug 04 Sunday    |
| 218 | 21 | 5  | 17 | 18 | 18 | 8  | 31 | 26 | 41 | 44 | 49 | 47 | 27 | 28 | 18 | 25 | 13 | 28 | 19 | 38 | 36 | 15 | 29 | 28 | 629 | Aug 05 Monday    |
| 219 | 15 | 16 | 9  | 15 | 15 | 7  | 10 | 54 | 53 | 24 | 30 | 42 | 35 | 17 | 22 | 22 | 18 | 28 | 17 | 20 | 35 | 21 | 12 | 16 | 553 | Aug 06 Tuesday   |
| 220 | 12 | 9  | 11 | 8  | 8  | 19 | 13 | 28 | 48 | 24 | 55 | 48 | 30 | 26 | 12 | 29 | 42 | 41 | 15 | 21 | 15 | 19 | 20 | 20 | 573 | Aug 07 Wednesday |
| 221 | 7  | 11 | 8  | 15 | 11 | 17 | 26 | 19 | 34 | 32 | 22 | 49 | 29 | 27 | 31 | 27 | 14 | 46 | 20 | 24 | 12 | 11 | 37 | 24 | 553 | Aug 08 Thursday  |
| 222 | 28 | 25 | 21 | 26 | 19 | 13 | 33 | 32 | 29 | 35 | 33 | 64 | 40 | 12 | 12 | 30 | 13 | 15 | 28 | 15 | 22 | 15 | 17 | 20 | 597 | Aug 09 Friday    |
| 223 | 10 | 20 | 14 | 7  | 18 | 7  | 12 | 28 | 23 | 34 | 32 | 36 | 50 | 30 | 12 | 26 | 26 | 38 | 52 | 21 | 14 | 18 | 28 | 28 | 584 | Aug 10 Saturday  |
| 224 | 17 | 11 | 24 | 22 | 12 | 10 | 10 | 11 | 20 | 31 | 14 | 37 | 23 | 35 | 23 | 20 | 28 | 23 | 21 | 26 | 41 | 15 | 19 | 30 | 523 | Aug 11 Sunday    |
| 225 | 11 | 21 | 20 | 28 | 10 | 23 | 16 | 10 | 24 | 39 | 42 | 28 | 27 | 27 | 25 | 18 | 30 | 43 | 25 | 18 | 17 | 25 | 26 | 19 | 572 | Aug 12 Monday    |
| 226 | 14 | 20 | 7  | 15 | 14 | 15 | 24 | 30 | 29 | 35 | 51 | 41 | 28 | 35 | 21 | 35 | 20 | 22 | 25 | 23 | 16 | 19 | 24 | 17 | 580 | Aug 13 Tuesday   |
| 227 | 12 | 9  | 31 | 27 | 22 | 15 | 9  | 26 | 20 | 23 | 47 | 36 | 64 | 38 | 26 | 25 | 23 | 39 | 21 | 21 | 15 | 20 | 16 | 18 | 603 | Aug 14 Wednesday |
| 228 | 24 | 9  | 23 | 14 | 18 | 10 | 18 | 35 | 34 | 38 | 31 | 21 | 36 | 33 | 17 | 7  | 28 | 16 | 24 | 19 | 12 | 15 | 20 | 35 | 537 | Aug 15 Thursday  |
| 229 | 9  | 7  | 16 | 25 | 23 | 9  | 27 | 18 | 37 | 49 | 29 | 33 | 37 | 27 | 21 | 17 | 21 | 29 | 35 | 27 | 25 | 18 | 16 | 26 | 581 | Aug 16 Friday    |
| 230 | 11 | 17 | 13 | 20 | 32 | 23 | 13 | 9  | 27 | 31 | 21 | 37 | 27 | 39 | 10 | 15 | 16 | 5  | 30 | 28 | 20 | 7  | 17 | 18 | 486 | Aug 17 Saturday  |
| 231 | 28 | 11 | 19 | 10 | 14 | 16 | 20 | 10 | 18 | 30 | 56 | 62 | 39 | 26 | 37 | 40 | 45 | 55 | 31 | 29 | 25 | 16 | 23 | 34 | 694 | Aug 18 Sunday    |
| 232 | 9  | 16 | 24 | 34 | 37 | 26 | 16 | 36 | 28 | 29 | 0  | 2  | 24 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 281 | Aug 19 Monday    |
| 233 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | Aug 20 Tuesday   |
| 234 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 13 | 37 | 19 | 10 | 15 | 20 | 20 | 134 | Aug 21 Wednesday |
| 235 | 23 | 12 | 20 | 18 | 29 | 17 | 25 | 16 | 24 | 9  | 23 | 23 | 19 | 20 | 33 | 30 | 24 | 42 | 34 | 32 | 28 | 21 | 6  | 22 | 550 | Aug 22 Thursday  |
| 236 | 14 | 20 | 6  | 28 | 25 | 23 | 16 | 21 | 35 | 45 | 38 | 37 | 29 | 38 | 34 | 48 | 31 | 48 | 53 | 26 | 14 | 18 | 35 | 26 | 708 | Aug 23 Friday    |
| 237 | 7  | 9  | 21 | 10 | 15 | 14 | 15 | 22 | 32 | 37 | 11 | 33 | 20 | 32 | 15 | 28 | 29 | 24 | 14 | 19 | 16 | 27 | 12 | 12 | 474 | Aug 24 Saturday  |
| 238 | 16 | 11 | 11 | 18 | 8  | 18 | 14 | 19 | 17 | 39 | 19 | 34 | 24 | 37 | 16 | 16 | 36 | 33 | 43 | 27 | 40 | 30 | 23 | 15 | 564 | Aug 25 Sunday    |
| 239 | 17 | 22 | 14 | 13 | 18 | 13 | 22 | 44 | 43 | 29 | 27 | 23 | 26 | 27 | 38 | 44 | 35 | 41 | 35 | 33 | 26 | 10 | 18 | 23 | 641 | Aug 26 Monday    |
| 240 | 27 | 15 | 8  | 11 | 13 | 20 | 28 | 34 | 21 | 38 | 31 | 24 | 19 | 40 | 43 | 45 | 36 | 31 | 28 | 6  | 19 | 18 | 20 | 15 | 590 | Aug 27 Tuesday   |
| 241 | 6  | 18 | 26 | 17 | 9  | 31 | 19 | 39 | 21 | 18 | 28 | 45 | 30 | 33 | 31 | 28 | 29 | 30 | 34 | 12 | 17 | 22 | 21 | 17 | 581 | Aug 28 Wednesday |
| 242 | 6  | 7  | 14 | 8  | 23 | 13 | 22 | 29 | 30 | 23 | 25 | 34 | 53 | 33 | 32 | 35 | 35 | 30 | 22 | 17 | 22 | 14 | 20 | 17 | 564 | Aug 29 Thursday  |
| 243 | 12 | 13 | 21 | 20 | 31 | 14 | 24 | 32 | 35 | 44 | 14 | 54 | 25 | 21 | 9  | 24 | 27 | 36 | 28 | 24 | 11 | 15 | 19 | 11 | 564 | Aug 30 Friday    |
| 244 | 6  | 8  | 7  | 4  | 6  | 13 | 15 | 16 | 11 | 16 | 32 | 27 | 34 | 12 | 28 | 20 | 23 | 17 | 27 | 20 | 16 | 14 | 24 | 26 | 422 | Aug 31 Saturday  |
| 245 | 6  | 11 | 19 | 12 | 22 | 22 | 32 | 13 | 4  | 21 | 15 | 12 | 11 | 10 | 21 | 1  | 16 | 10 | 19 | 18 | 16 | 20 | 11 | 13 | 355 | Sep 01 Sunday    |
| 246 | 5  | 6  | 19 | 24 | 18 | 11 | 15 | 26 | 44 | 27 | 20 | 36 | 26 | 17 | 21 | 31 | 22 | 15 | 27 | 32 | 18 | 18 | 20 | 11 | 509 | Sep 02 Monday    |
| 247 | 9  | 5  | 12 | 7  | 13 | 17 | 26 | 14 | 0  | 0  | 18 | 32 | 37 | 23 | 27 | 26 | 14 | 33 | 28 | 18 | 14 | 9  | 16 | 23 | 421 | Sep 03 Tuesday   |
| 248 | 3  | 13 | 6  | 9  | 18 | 9  | 17 | 11 | 17 | 23 | 31 | 34 | 34 | 26 | 13 | 27 | 22 | 19 | 20 | 24 | 16 | 20 | 29 | 42 | 483 | Sep 04 Wednesday |
| 249 | 32 | 17 | 23 | 26 | 18 | 16 | 17 | 18 | 26 | 25 | 24 | 16 | 18 | 8  | 26 | 18 | 28 | 20 | 11 | 11 | 22 | 22 | 18 | 19 | 479 | Sep 05 Thursday  |
| 250 | 24 | 13 | 16 | 10 | 17 | 15 | 31 | 23 | 39 | 45 | 49 | 30 | 57 | 27 | 28 | 28 | 25 | 37 | 33 | 19 | 37 | 8  | 9  | 22 | 642 | Sep 06 Friday    |
| 251 | 18 | 11 | 32 | 22 | 20 | 21 | 12 | 23 | 23 | 33 | 18 | 24 | 23 | 23 | 28 | 18 | 18 | 18 | 12 | 14 | 14 | 15 | 22 | 16 | 478 | Sep 07 Saturday  |
| 252 | 2  | 12 | 16 | 14 | 7  | 19 | 16 | 14 | 15 | 18 | 28 | 33 | 23 | 30 | 18 | 9  | 31 | 27 | 24 | 18 | 29 | 12 | 16 | 20 | 451 | Sep 08 Sunday    |
| 253 | 14 | 4  | 13 | 20 | 18 | 10 | 14 | 25 | 14 | 26 | 26 | 14 | 21 | 26 | 15 | 23 | 17 | 17 | 25 | 23 | 16 | 14 | 22 | 17 | 434 | Sep 09 Monday    |
| 254 | 9  | 19 | 19 | 19 | 15 | 15 | 14 | 22 | 26 | 20 | 30 | 27 | 37 | 30 | 33 | 20 | 29 | 16 | 19 | 26 | 16 | 9  | 18 | 19 | 507 | Sep 10 Tuesday   |
| 255 | 21 | 21 | 16 | 17 | 34 | 27 | 27 | 29 | 23 | 31 | 50 | 41 | 30 | 37 | 28 | 39 | 24 | 16 | 29 | 13 | 11 | 7  | 29 | 36 | 636 | Sep 11 Wednesday |
| 256 | 16 | 14 | 22 | 7  | 29 | 13 | 16 | 24 | 36 | 31 | 30 | 39 | 36 | 28 | 21 | 31 | 16 | 27 | 27 | 7  | 25 | 14 | 9  | 15 | 533 | Sep 12 Thursday  |
| 257 | 10 | 14 | 12 | 11 | 10 | 14 | 14 | 22 | 22 | 26 | 27 | 25 | 26 | 22 | 17 | 35 | 14 | 18 | 24 | 5  | 11 | 14 | 19 | 17 | 429 | Sep 13 Friday    |
| 258 | 7  | 15 | 13 | 19 | 19 | 5  | 8  | 25 | 48 | 5  | 22 | 31 | 9  | 24 | 35 | 15 | 9  | 6  | 14 | 18 | 21 | 12 | 22 | 20 | 422 | Sep 14 Saturday  |
| 259 | 13 | 6  | 20 | 17 | 23 | 14 | 16 | 27 | 17 | 20 | 20 | 13 | 23 | 17 | 13 | 12 | 19 | 14 | 20 | 12 | 12 | 17 | 23 | 19 | 407 | Sep 15 Sunday    |

Table 3.5.2 (Page 3 of 4)

## ARC .FKX Hourly distribution of detections

| Day | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|-----------|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 260 | 13   | 10   | 10   | 16   | 19   | 21   | 24   | 32   | 33   | 30   | 27   | 21   | 23    | 28        | 23 | 31 | 29 | 31 | 26 | 18 | 15 | 34 | 18 | 21 | 553 | Sep 16 Monday    |
| 261 | 10   | 4    | 9    | 10   | 36   | 14   | 27   | 27   | 19   | 39   | 24   | 20   | 22    | 32        | 32 | 24 | 15 | 11 | 26 | 15 | 20 | 16 | 16 | 51 | 519 | Sep 17 Tuesday   |
| 262 | 13   | 16   | 23   | 26   | 32   | 25   | 39   | 28   | 19   | 24   | 43   | 32   | 21    | 21        | 20 | 19 | 9  | 19 | 14 | 3  | 11 | 21 | 11 | 12 | 501 | Sep 18 Wednesday |
| 263 | 11   | 17   | 17   | 18   | 23   | 21   | 26   | 21   | 19   | 28   | 40   | 36   | 37    | 15        | 32 | 42 | 26 | 20 | 28 | 16 | 21 | 18 | 23 | 15 | 570 | Sep 19 Thursday  |
| 264 | 14   | 9    | 8    | 17   | 27   | 27   | 34   | 41   | 42   | 31   | 37   | 53   | 30    | 36        | 17 | 40 | 34 | 49 | 58 | 29 | 27 | 35 | 39 | 32 | 766 | Sep 20 Friday    |
| 265 | 10   | 25   | 14   | 30   | 29   | 26   | 21   | 29   | 30   | 39   | 20   | 38   | 27    | 29        | 24 | 20 | 35 | 46 | 23 | 22 | 16 | 19 | 26 | 40 | 638 | Sep 21 Saturday  |
| 266 | 11   | 11   | 15   | 12   | 13   | 21   | 18   | 16   | 23   | 17   | 18   | 32   | 17    | 19        | 19 | 20 | 29 | 26 | 12 | 18 | 20 | 8  | 33 | 31 | 459 | Sep 22 Sunday    |
| 267 | 28   | 16   | 20   | 15   | 20   | 14   | 30   | 26   | 42   | 36   | 51   | 27   | 45    | 37        | 50 | 29 | 31 | 22 | 27 | 8  | 11 | 14 | 27 | 18 | 644 | Sep 23 Monday    |
| 268 | 17   | 11   | 8    | 10   | 15   | 9    | 25   | 35   | 23   | 40   | 30   | 35   | 22    | 35        | 20 | 32 | 18 | 30 | 9  | 23 | 7  | 15 | 12 | 28 | 509 | Sep 24 Tuesday   |
| 269 | 17   | 11   | 10   | 13   | 11   | 34   | 42   | 43   | 31   | 48   | 53   | 36   | 47    | 58        | 29 | 39 | 31 | 39 | 28 | 26 | 16 | 27 | 10 | 21 | 720 | Sep 25 Wednesday |
| 270 | 7    | 19   | 23   | 20   | 20   | 12   | 26   | 33   | 39   | 35   | 39   | 61   | 29    | 19        | 28 | 27 | 24 | 31 | 36 | 29 | 14 | 10 | 27 | 25 | 633 | Sep 26 Thursday  |
| 271 | 25   | 11   | 25   | 19   | 10   | 9    | 14   | 26   | 23   | 12   | 26   | 46   | 24    | 16        | 22 | 38 | 13 | 20 | 26 | 22 | 17 | 10 | 25 | 21 | 500 | Sep 27 Friday    |
| 272 | 16   | 13   | 10   | 25   | 7    | 12   | 26   | 17   | 31   | 28   | 27   | 25   | 23    | 25        | 33 | 23 | 24 | 18 | 17 | 14 | 14 | 12 | 16 | 23 | 479 | Sep 28 Saturday  |
| 273 | 10   | 9    | 5    | 9    | 13   | 9    | 26   | 13   | 5    | 11   | 17   | 14   | 25    | 37        | 24 | 9  | 17 | 12 | 15 | 17 | 14 | 25 | 20 | 17 | 373 | Sep 29 Sunday    |
| 274 | 15   | 10   | 16   | 22   | 12   | 30   | 24   | 29   | 49   | 26   | 29   | 31   | 12    | 23        | 25 | 24 | 26 | 27 | 15 | 25 | 22 | 13 | 21 | 8  | 534 | Sep 30 Monday    |
| ARC | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |     |                  |
| Sum | 2433 | 2907 | 2895 | 4331 | 4993 | 5980 | 4687 | 4327 | 3977 | 3594 | 2994 | 3857 |       |           |    |    |    |    |    |    |    |    |    |    |     |                  |
|     | 2625 | 2607 | 3195 | 3692 | 4987 | 5626 | 5105 | 4101 | 3821 | 4157 | 3329 | 3580 | 93800 | Total sum |    |    |    |    |    |    |    |    |    |    |     |                  |
| 182 | 14   | 13   | 14   | 16   | 18   | 16   | 20   | 24   | 27   | 27   | 31   | 33   | 28    | 26        | 23 | 24 | 21 | 22 | 23 | 20 | 18 | 16 | 20 | 21 | 515 | Total average    |
| 123 | 14   | 13   | 15   | 16   | 18   | 16   | 21   | 26   | 30   | 28   | 34   | 35   | 30    | 26        | 24 | 27 | 22 | 24 | 24 | 21 | 18 | 17 | 20 | 21 | 540 | Average workdays |
| 59  | 14   | 13   | 14   | 15   | 16   | 15   | 19   | 19   | 22   | 25   | 25   | 28   | 25    | 24        | 19 | 18 | 19 | 18 | 20 | 17 | 18 | 16 | 20 | 22 | 460 | Average weekends |

**Table 3.5.2.**(Page 4 of 4) Daily and hourly distribution of ARCESS detections. For each day is shown number of detections within each hour of the day, and number of detections for that day. The end statistics give total number of detections distributed for each hour and the total sum of detections during the period. The averages show number of processed days, hourly distribution and average per processed day.

## FIN .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23  | Sum           | Date             |               |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|------------------|---------------|
| 92  | 10 | 7  | 1  | 6  | 1  | 2  | 2  | 2  | 12 | 7  | 12 | 11 | 10 | 10 | 9  | 4  | 9  | 2  | 3  | 5  | 7  | 6  | 7  | 3   | 148           | Apr 01 Monday    |               |
| 93  | 2  | 9  | 3  | 4  | 3  | 3  | 1  | 5  | 15 | 13 | 6  | 13 | 15 | 10 | 7  | 16 | 3  | 7  | 0  | 7  | 9  | 4  | 4  | 4   | 163           | Apr 02 Tuesday   |               |
| 94  | 3  | 5  | 4  | 1  | 4  | 3  | 3  | 7  | 4  | 21 | 9  | 30 | 18 | 9  | 8  | 7  | 12 | 15 | 1  | 9  | 9  | 9  | 9  | 8   | 208           | Apr 03 Wednesday |               |
| 95  | 11 | 10 | 8  | 7  | 8  | 7  | 5  | 11 | 19 | 15 | 23 | 19 | 19 | 18 | 12 | 6  | 5  | 13 | 8  | 12 | 3  | 9  | 8  | 6   | 262           | Apr 04 Thursday  |               |
| 96  | 9  | 5  | 7  | 3  | 7  | 4  | 3  | 2  | 14 | 7  | 11 | 12 | 11 | 7  | 2  | 4  | 2  | 6  | 6  | 2  | 8  | 4  | 8  | 6   | 150           | Apr 05 Friday    |               |
| 97  | 4  | 7  | 3  | 7  | 14 | 7  | 4  | 4  | 10 | 8  | 8  | 9  | 14 | 4  | 9  | 3  | 3  | 12 | 4  | 3  | 7  | 4  | 5  | 3   | 156           | Apr 06 Saturday  |               |
| 98  | 8  | 11 | 9  | 2  | 5  | 4  | 8  | 1  | 8  | 7  | 2  | 6  | 6  | 8  | 10 | 3  | 10 | 5  | 2  | 12 | 3  | 2  | 8  | 7   | 147           | Apr 07 Sunday    |               |
| 99  | 4  | 4  | 6  | 2  | 4  | 3  | 3  | 4  | 15 | 5  | 13 | 12 | 5  | 6  | 5  | 6  | 7  | 15 | 8  | 10 | 9  | 12 | 7  | 10  | 175           | Apr 08 Monday    |               |
| 100 | 7  | 9  | 9  | 4  | 4  | 2  | 5  | 9  | 7  | 9  | 7  | 18 | 5  | 8  | 8  | 14 | 14 | 18 | 9  | 7  | 3  | 13 | 7  | 6   | 202           | Apr 09 Tuesday   |               |
| 101 | 8  | 8  | 13 | 4  | 2  | 1  | 4  | 4  | 3  | 12 | 5  | 19 | 16 | 10 | 7  | 6  | 13 | 5  | 5  | 5  | 6  | 8  | 3  | 13  | 180           | Apr 10 Wednesday |               |
| 102 | 13 | 14 | 22 | 18 | 1  | 7  | 4  | 6  | 8  | 9  | 12 | 16 | 11 | 4  | 9  | 12 | 7  | 6  | 10 | 24 | 18 | 17 | 30 | 47  | 325           | Apr 11 Thursday  |               |
| 103 | 44 | 39 | 41 | 17 | 5  | 6  | 4  | 10 | 14 | 20 | 19 | 24 | 20 | 7  | 5  | 14 | 11 | 5  | 5  | 8  | 29 | 49 | 58 | 49  | 503           | Apr 12 Friday    |               |
| 104 | 58 | 66 | 42 | 23 | 8  | 3  | 4  | 4  | 5  | 10 | 12 | 8  | 2  | 7  | 0  | 1  | 2  | 9  | 3  | 5  | 3  | 5  | 20 | 43  | 343           | Apr 13 Saturday  |               |
| 105 | 87 | 97 | 84 | 42 | 3  | 1  | 4  | 4  | 7  | 2  | 7  | 4  | 9  | 7  | 8  | 3  | 12 | 4  | 14 | 7  | 9  | 9  | 8  | 7   | 439           | Apr 14 Sunday    |               |
| 106 | 7  | 10 | 18 | 5  | 4  | 1  | 3  | 3  | 9  | 9  | 6  | 9  | 9  | 8  | 13 | 6  | 11 | 8  | 10 | 8  | 4  | 9  | 9  | 14  | 1             | 185              | Apr 15 Monday |
| 107 | 13 | 14 | 5  | 8  | 2  | 3  | 3  | 4  | 11 | 9  | 20 | 15 | 10 | 11 | 2  | 7  | 11 | 12 | 5  | 2  | 9  | 8  | 5  | 7   | 196           | Apr 16 Tuesday   |               |
| 108 | 9  | 6  | 9  | 5  | 4  | 6  | 2  | 6  | 6  | 13 | 17 | 13 | 7  | 16 | 8  | 4  | 7  | 5  | 4  | 5  | 0  | 5  | 9  | 5   | 171           | Apr 17 Wednesday |               |
| 109 | 10 | 11 | 4  | 2  | 4  | 0  | 7  | 3  | 19 | 19 | 8  | 23 | 17 | 5  | 6  | 9  | 2  | 10 | 1  | 2  | 9  | 11 | 12 | 4   | 198           | Apr 18 Thursday  |               |
| 110 | 13 | 7  | 7  | 5  | 2  | 2  | 4  | 11 | 1  | 16 | 18 | 21 | 5  | 12 | 3  | 5  | 3  | 5  | 4  | 6  | 8  | 4  | 12 | 4   | 178           | Apr 19 Friday    |               |
| 111 | 7  | 2  | 6  | 4  | 6  | 7  | 3  | 7  | 3  | 4  | 6  | 1  | 5  | 6  | 1  | 4  | 8  | 5  | 7  | 5  | 6  | 4  | 3  | 8   | 118           | Apr 20 Saturday  |               |
| 112 | 4  | 3  | 4  | 4  | 3  | 7  | 6  | 6  | 7  | 5  | 6  | 9  | 5  | 12 | 5  | 4  | 6  | 8  | 10 | 6  | 15 | 11 | 7  | 7   | 160           | Apr 21 Sunday    |               |
| 113 | 5  | 8  | 3  | 2  | 3  | 4  | 7  | 6  | 4  | 11 | 10 | 19 | 8  | 7  | 6  | 22 | 6  | 4  | 10 | 9  | 5  | 2  | 10 | 5   | 176           | Apr 22 Monday    |               |
| 114 | 15 | 5  | 5  | 0  | 5  | 4  | 1  | 6  | 10 | 5  | 11 | 23 | 10 | 7  | 11 | 12 | 3  | 11 | 10 | 8  | 7  | 7  | 14 | 9   | 199           | Apr 23 Tuesday   |               |
| 115 | 5  | 11 | 7  | 8  | 3  | 9  | 6  | 14 | 7  | 27 | 16 | 12 | 3  | 12 | 9  | 8  | 7  | 15 | 21 | 9  | 5  | 11 | 4  | 2   | 231           | Apr 24 Wednesday |               |
| 116 | 7  | 3  | 7  | 5  | 5  | 8  | 10 | 5  | 4  | 16 | 14 | 16 | 9  | 8  | 15 | 1  | 10 | 2  | 9  | 7  | 10 | 4  | 6  | 6   | 187           | Apr 25 Thursday  |               |
| 117 | 4  | 9  | 8  | 4  | 3  | 2  | 2  | 11 | 9  | 21 | 18 | 11 | 17 | 13 | 2  | 7  | 6  | 9  | 14 | 6  | 7  | 9  | 5  | 3   | 200           | Apr 26 Friday    |               |
| 118 | 13 | 9  | 11 | 12 | 13 | 5  | 6  | 6  | 4  | 5  | 2  | 7  | 4  | 4  | 2  | 4  | 3  | 5  | 9  | 2  | 4  | 6  | 5  | 2   | 143           | Apr 27 Saturday  |               |
| 119 | 2  | 3  | 4  | 3  | 3  | 7  | 4  | 8  | 7  | 5  | 3  | 3  | 4  | 4  | 4  | 5  | 3  | 3  | 6  | 11 | 9  | 6  | 5  | 2   | 114           | Apr 28 Sunday    |               |
| 120 | 4  | 9  | 5  | 5  | 1  | 2  | 3  | 4  | 1  | 4  | 17 | 24 | 8  | 3  | 11 | 27 | 22 | 22 | 8  | 5  | 6  | 8  | 7  | 7   | 213           | Apr 29 Monday    |               |
| 121 | 5  | 14 | 10 | 7  | 1  | 3  | 4  | 5  | 11 | 11 | 17 | 10 | 17 | 5  | 6  | 2  | 8  | 6  | 8  | 8  | 8  | 3  | 13 | 11  | 196           | Apr 30 Tuesday   |               |
| 122 | 5  | 6  | 3  | 12 | 2  | 6  | 5  | 6  | 1  | 11 | 15 | 11 | 13 | 7  | 10 | 3  | 6  | 17 | 16 | 6  | 8  | 11 | 7  | 9   | 196           | May 01 Wednesday |               |
| 123 | 10 | 1  | 10 | 4  | 8  | 9  | 5  | 4  | 3  | 8  | 7  | 11 | 16 | 21 | 17 | 13 | 9  | 10 | 7  | 7  | 8  | 10 | 14 | 2   | 214           | May 02 Thursday  |               |
| 124 | 3  | 4  | 6  | 10 | 8  | 4  | 1  | 8  | 3  | 11 | 15 | 14 | 8  | 5  | 3  | 4  | 4  | 7  | 8  | 5  | 8  | 7  | 7  | 8   | 161           | May 03 Friday    |               |
| 125 | 8  | 4  | 3  | 7  | 8  | 4  | 6  | 6  | 8  | 6  | 11 | 14 | 9  | 11 | 17 | 14 | 18 | 8  | 7  | 3  | 4  | 6  | 9  | 5   | 196           | May 04 Saturday  |               |
| 126 | 4  | 6  | 4  | 3  | 3  | 4  | 2  | 12 | 6  | 8  | 8  | 10 | 4  | 9  | 7  | 4  | 6  | 10 | 3  | 7  | 6  | 4  | 5  | 3   | 138           | May 05 Sunday    |               |
| 127 | 5  | 7  | 5  | 4  | 3  | 1  | 7  | 4  | 7  | 7  | 12 | 10 | 22 | 6  | 1  | 9  | 3  | 4  | 19 | 10 | 11 | 4  | 5  | 7   | 173           | May 06 Monday    |               |
| 128 | 3  | 6  | 4  | 2  | 4  | 1  | 5  | 5  | 7  | 7  | 11 | 19 | 8  | 16 | 4  | 4  | 9  | 6  | 7  | 3  | 6  | 3  | 12 | 7   | 159           | May 07 Tuesday   |               |
| 129 | 9  | 3  | 6  | 4  | 2  | 1  | 1  | 8  | 6  | 11 | 9  | 20 | 27 | 17 | 1  | 1  | 13 | 4  | 14 | 9  | 7  | 6  | 7  | 8   | 194           | May 08 Wednesday |               |
| 130 | 2  | 5  | 3  | 0  | 4  | 3  | 1  | 10 | 6  | 7  | 15 | 8  | 5  | 8  | 3  | 6  | 10 | 3  | 7  | 9  | 9  | 2  | 7  | 4   | 137           | May 09 Thursday  |               |
| 131 | 4  | 6  | 9  | 6  | 5  | 2  | 4  | 3  | 9  | 17 | 10 | 5  | 3  | 5  | 4  | 6  | 0  | 1  | 2  | 3  | 3  | 5  | 1  | 115 | May 10 Friday |                  |               |
| 132 | 4  | 5  | 5  | 3  | 9  | 1  | 0  | 3  | 1  | 2  | 2  | 0  | 7  | 2  | 4  | 5  | 5  | 2  | 3  | 3  | 1  | 3  | 2  | 5   | 77            | May 11 Saturday  |               |
| 133 | 0  | 5  | 4  | 4  | 0  | 4  | 3  | 5  | 7  | 24 | 28 | 24 | 9  | 12 | 13 | 8  | 7  | 8  | 4  | 8  | 3  | 6  | 7  | 200 | May 12 Sunday |                  |               |
| 134 | 6  | 5  | 11 | 4  | 4  | 5  | 2  | 3  | 15 | 14 | 19 | 24 | 10 | 16 | 6  | 17 | 6  | 15 | 7  | 23 | 12 | 8  | 13 | 15  | 260           | May 13 Monday    |               |
| 135 | 10 | 10 | 4  | 4  | 2  | 2  | 1  | 8  | 19 | 12 | 14 | 19 | 26 | 15 | 3  | 16 | 34 | 5  | 6  | 7  | 2  | 3  | 6  | 4   | 232           | May 14 Tuesday   |               |
| 136 | 5  | 4  | 1  | 5  | 2  | 8  | 5  | 12 | 9  | 11 | 18 | 11 | 9  | 8  | 11 | 6  | 7  | 3  | 2  | 2  | 0  | 1  | 1  | 3   | 144           | May 15 Wednesday |               |
| 137 | 2  | 5  | 2  | 3  | 11 | 6  | 2  | 9  | 3  | 12 | 9  | 13 | 11 | 9  | 13 | 6  | 2  | 8  | 3  | 6  | 8  | 6  | 2  | 1   | 152           | May 16 Thursday  |               |
| 138 | 4  | 4  | 0  | 4  | 0  | 4  | 8  | 10 | 8  | 13 | 21 | 20 | 7  | 4  | 6  | 5  | 2  | 8  | 6  | 2  | 3  | 3  | 1  | 146 | May 17 Friday |                  |               |
| 139 | 3  | 3  | 5  | 8  | 16 | 49 | 13 | 14 | 11 | 3  | 7  | 2  | 8  | 4  | 3  | 1  | 2  | 2  | 2  | 4  | 4  | 5  | 4  | 0   | 173           | May 18 Saturday  |               |
| 140 | 5  | 3  | 2  | 9  | 7  | 2  | 5  | 2  | 1  | 2  | 3  | 10 | 7  | 8  | 10 | 3  | 5  | 3  | 8  | 7  | 2  | 5  | 3  | 10  | 122           | May 19 Sunday    |               |
| 141 | 3  | 7  | 3  | 3  | 4  | 2  | 3  | 5  | 11 | 15 | 15 | 10 | 14 | 20 | 9  | 8  | 9  | 9  | 9  | 5  | 2  | 6  | 10 | 2   | 184           | May 20 Monday    |               |
| 142 | 9  | 5  | 9  | 18 | 7  | 8  | 2  | 7  | 12 | 8  | 11 | 14 | 10 | 7  | 14 | 10 | 7  | 3  | 9  | 5  | 8  | 8  | 13 | 9   | 213           | May 21 Tuesday   |               |
| 143 | 18 | 10 | 4  | 3  | 1  | 1  | 3  | 14 | 8  | 17 | 5  | 10 | 12 | 16 | 3  | 14 | 8  | 6  | 6  | 8  | 14 | 8  | 4  | 11  | 204           | May 22 Wednesday |               |
| 144 | 8  | 12 | 11 | 3  | 2  | 7  | 2  | 13 | 10 | 10 | 15 | 5  | 14 | 2  | 3  | 7  | 3  | 6  | 1  | 8  | 5  | 2  | 8  | 2   | 159           | May 23 Thursday  |               |
| 145 | 8  | 5  | 2  | 1  | 1  | 0  | 14 | 13 | 6  | 9  | 7  | 4  | 11 | 3  | 1  | 7  | 4  | 5  | 4  | 3  | 0  | 2  | 3  | 3   | 116           | May 24 Friday    |               |
| 146 | 3  | 5  | 1  | 3  | 2  | 0  | 0  | 1  | 10 | 4  | 7  | 1  | 4  | 3  | 0  | 3  | 5  | 6  | 2  | 1  | 7  | 7  | 3  | 1   | 79            | May 25 Saturday  |               |
| 147 | 2  | 5  | 9  | 3  | 3  | 2  | 5  | 8  | 4  | 6  | 9  | 3  | 4  | 2  | 7  | 7  | 5  | 3  | 3  | 6  | 6  | 5  | 4  | 7   | 118           | May 26 Sunday    |               |

Table 3.5.3 (Page 1 of 4)

## FIN .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23  | Sum           | Date             |                |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|------------------|----------------|
| 148 | 5  | 8  | 4  | 7  | 4  | 6  | 6  | 3  | 9  | 12 | 8  | 11 | 1  | 6  | 11 | 10 | 4  | 2  | 8  | 6  | 2  | 1  | 3  | 1   | 138           | May 27 Monday    |                |
| 149 | 2  | 8  | 6  | 9  | 3  | 1  | 6  | 0  | 13 | 4  | 14 | 12 | 8  | 8  | 6  | 4  | 9  | 1  | 2  | 2  | 1  | 2  | 6  | 5   | 132           | May 28 Tuesday   |                |
| 150 | 1  | 6  | 3  | 3  | 5  | 2  | 4  | 3  | 9  | 7  | 15 | 10 | 5  | 8  | 6  | 9  | 6  | 6  | 1  | 3  | 0  | 1  | 0  | 1   | 114           | May 29 Wednesday |                |
| 151 | 5  | 2  | 1  | 6  | 4  | 0  | 3  | 7  | 11 | 6  | 10 | 13 | 5  | 7  | 11 | 2  | 3  | 3  | 3  | 7  | 6  | 8  | 7  | 4   | 134           | May 30 Thursday  |                |
| 152 | 5  | 6  | 6  | 5  | 2  | 1  | 4  | 3  | 8  | 14 | 9  | 13 | 10 | 3  | 4  | 1  | 3  | 5  | 2  | 4  | 4  | 2  | 2  | 2   | 118           | May 31 Friday    |                |
| 153 | 3  | 5  | 3  | 2  | 1  | 0  | 3  | 3  | 3  | 6  | 1  | 1  | 5  | 4  | 5  | 1  | 3  | 4  | 6  | 7  | 3  | 2  | 1  | 3   | 75            | Jun 01 Saturday  |                |
| 154 | 4  | 3  | 4  | 3  | 6  | 2  | 2  | 6  | 5  | 4  | 1  | 10 | 6  | 7  | 3  | 8  | 3  | 2  | 3  | 4  | 3  | 8  | 3  | 102 | Jun 02 Sunday |                  |                |
| 155 | 5  | 9  | 3  | 4  | 6  | 1  | 4  | 7  | 6  | 4  | 8  | 16 | 19 | 7  | 8  | 12 | 18 | 4  | 4  | 9  | 7  | 4  | 2  | 4   | 171           | Jun 03 Monday    |                |
| 156 | 6  | 7  | 7  | 7  | 4  | 11 | 3  | 7  | 6  | 11 | 13 | 23 | 24 | 4  | 8  | 5  | 8  | 3  | 5  | 5  | 6  | 4  | 5  | 6   | 8             | 189              | Jun 04 Tuesday |
| 157 | 10 | 8  | 3  | 3  | 4  | 3  | 1  | 5  | 6  | 19 | 9  | 13 | 18 | 19 | 22 | 6  | 1  | 0  | 4  | 6  | 3  | 1  | 4  | 6   | 174           | Jun 05 Wednesday |                |
| 158 | 6  | 5  | 2  | 31 | 10 | 3  | 6  | 1  | 7  | 4  | 10 | 12 | 15 | 7  | 7  | 5  | 8  | 0  | 0  | 0  | 4  | 1  | 2  | 2   | 148           | Jun 06 Thursday  |                |
| 159 | 2  | 3  | 15 | 3  | 0  | 7  | 2  | 5  | 14 | 20 | 9  | 12 | 4  | 3  | 3  | 3  | 2  | 1  | 3  | 5  | 0  | 3  | 1  | 5   | 125           | Jun 07 Friday    |                |
| 160 | 5  | 11 | 3  | 6  | 1  | 5  | 10 | 8  | 9  | 10 | 3  | 8  | 17 | 14 | 3  | 3  | 6  | 4  | 3  | 3  | 3  | 4  | 1  | 8   | 148           | Jun 08 Saturday  |                |
| 161 | 4  | 12 | 6  | 11 | 6  | 5  | 7  | 1  | 6  | 14 | 12 | 0  | 2  | 3  | 7  | 9  | 3  | 2  | 6  | 7  | 5  | 9  | 2  | 2   | 141           | Jun 09 Sunday    |                |
| 162 | 0  | 0  | 0  | 0  | 0  | 7  | 13 | 10 | 15 | 20 | 18 | 9  | 19 | 13 | 13 | 19 | 9  | 22 | 14 | 14 | 14 | 11 | 10 | 10  | 260           | Jun 10 Monday    |                |
| 163 | 10 | 5  | 16 | 7  | 6  | 3  | 5  | 11 | 13 | 12 | 28 | 25 | 12 | 17 | 27 | 7  | 7  | 6  | 20 | 8  | 5  | 9  | 8  | 4   | 271           | Jun 11 Tuesday   |                |
| 164 | 10 | 9  | 8  | 7  | 10 | 6  | 35 | 29 | 29 | 19 | 19 | 24 | 21 | 27 | 33 | 13 | 18 | 4  | 4  | 5  | 8  | 4  | 9  | 6   | 357           | Jun 12 Wednesday |                |
| 165 | 7  | 10 | 5  | 4  | 11 | 8  | 2  | 9  | 4  | 9  | 19 | 15 | 13 | 23 | 11 | 13 | 6  | 2  | 9  | 2  | 5  | 3  | 1  | 2   | 193           | Jun 13 Thursday  |                |
| 166 | 10 | 3  | 1  | 0  | 8  | 12 | 11 | 4  | 13 | 8  | 6  | 20 | 1  | 5  | 5  | 15 | 6  | 3  | 3  | 6  | 3  | 1  | 4  | 5   | 153           | Jun 14 Friday    |                |
| 167 | 1  | 3  | 2  | 16 | 4  | 12 | 6  | 2  | 6  | 1  | 1  | 7  | 5  | 5  | 2  | 4  | 5  | 3  | 4  | 4  | 1  | 1  | 1  | 4   | 100           | Jun 15 Saturday  |                |
| 168 | 5  | 16 | 6  | 8  | 0  | 6  | 1  | 2  | 5  | 4  | 0  | 2  | 7  | 7  | 4  | 6  | 5  | 9  | 0  | 7  | 5  | 2  | 2  | 3   | 112           | Jun 16 Sunday    |                |
| 169 | 2  | 3  | 8  | 8  | 0  | 0  | 1  | 6  | 5  | 11 | 7  | 27 | 17 | 10 | 4  | 13 | 10 | 9  | 7  | 5  | 5  | 3  | 6  | 2   | 169           | Jun 17 Monday    |                |
| 170 | 7  | 6  | 1  | 1  | 2  | 3  | 3  | 9  | 11 | 10 | 8  | 15 | 7  | 4  | 15 | 5  | 13 | 7  | 3  | 4  | 6  | 1  | 2  | 5   | 148           | Jun 18 Tuesday   |                |
| 171 | 7  | 2  | 3  | 2  | 0  | 3  | 1  | 4  | 11 | 14 | 14 | 14 | 13 | 18 | 7  | 9  | 2  | 8  | 2  | 8  | 4  | 2  | 3  | 3   | 154           | Jun 19 Wednesday |                |
| 172 | 3  | 7  | 4  | 6  | 2  | 2  | 4  | 4  | 11 | 9  | 23 | 19 | 11 | 7  | 10 | 7  | 6  | 5  | 6  | 6  | 4  | 5  | 7  | 5   | 173           | Jun 20 Thursday  |                |
| 173 | 5  | 2  | 4  | 4  | 2  | 18 | 10 | 12 | 6  | 10 | 2  | 32 | 9  | 8  | 11 | 6  | 4  | 4  | 5  | 5  | 11 | 11 | 1  | 8   | 190           | Jun 21 Friday    |                |
| 174 | 8  | 7  | 3  | 6  | 7  | 4  | 4  | 1  | 1  | 2  | 3  | 7  | 3  | 3  | 4  | 15 | 6  | 5  | 6  | 3  | 0  | 3  | 1  | 5   | 107           | Jun 22 Saturday  |                |
| 175 | 2  | 14 | 13 | 9  | 2  | 3  | 2  | 5  | 7  | 1  | 3  | 11 | 11 | 7  | 7  | 5  | 16 | 6  | 5  | 5  | 4  | 16 | 9  | 4   | 9             | 169              | Jun 23 Sunday  |
| 176 | 5  | 18 | 8  | 4  | 3  | 2  | 8  | 3  | 0  | 6  | 5  | 5  | 7  | 5  | 11 | 5  | 4  | 10 | 3  | 3  | 5  | 3  | 6  | 1   | 130           | Jun 24 Monday    |                |
| 177 | 10 | 6  | 4  | 9  | 6  | 4  | 4  | 8  | 8  | 10 | 13 | 8  | 8  | 12 | 7  | 6  | 4  | 3  | 3  | 2  | 9  | 14 | 3  | 1   | 162           | Jun 25 Tuesday   |                |
| 178 | 6  | 10 | 7  | 12 | 9  | 1  | 2  | 6  | 3  | 9  | 12 | 18 | 4  | 12 | 12 | 6  | 10 | 16 | 16 | 11 | 9  | 7  | 4  | 2   | 204           | Jun 26 Wednesday |                |
| 179 | 13 | 3  | 2  | 6  | 11 | 4  | 4  | 7  | 4  | 11 | 10 | 17 | 17 | 3  | 4  | 9  | 6  | 6  | 15 | 6  | 6  | 6  | 11 | 5   | 186           | Jun 27 Thursday  |                |
| 180 | 8  | 7  | 15 | 11 | 6  | 8  | 11 | 2  | 18 | 14 | 21 | 13 | 12 | 7  | 3  | 4  | 11 | 5  | 2  | 11 | 6  | 5  | 9  | 3   | 212           | Jun 28 Friday    |                |
| 181 | 4  | 9  | 4  | 1  | 4  | 5  | 4  | 5  | 4  | 3  | 6  | 3  | 7  | 3  | 7  | 8  | 7  | 4  | 2  | 3  | 0  | 0  | 4  | 3   | 100           | Jun 29 Saturday  |                |
| 182 | 4  | 6  | 3  | 6  | 4  | 2  | 9  | 10 | 6  | 6  | 5  | 12 | 11 | 2  | 5  | 1  | 3  | 13 | 7  | 11 | 7  | 7  | 8  | 10  | 158           | Jun 30 Sunday    |                |
| 183 | 3  | 8  | 8  | 2  | 9  | 6  | 7  | 6  | 15 | 6  | 21 | 12 | 8  | 5  | 3  | 7  | 2  | 5  | 6  | 9  | 4  | 5  | 4  | 1   | 162           | Jul 01 Monday    |                |
| 184 | 4  | 4  | 6  | 6  | 8  | 4  | 1  | 10 | 14 | 6  | 2  | 10 | 7  | 5  | 11 | 7  | 10 | 1  | 3  | 3  | 4  | 5  | 7  | 5   | 143           | Jul 02 Tuesday   |                |
| 185 | 4  | 8  | 3  | 5  | 1  | 2  | 10 | 5  | 9  | 7  | 14 | 9  | 14 | 5  | 4  | 10 | 5  | 9  | 7  | 3  | 5  | 6  | 9  | 9   | 163           | Jul 03 Wednesday |                |
| 186 | 7  | 1  | 6  | 5  | 2  | 1  | 1  | 8  | 7  | 9  | 10 | 10 | 14 | 8  | 6  | 10 | 6  | 1  | 4  | 3  | 9  | 0  | 9  | 8   | 145           | Jul 04 Thursday  |                |
| 187 | 9  | 22 | 9  | 1  | 5  | 2  | 17 | 8  | 11 | 3  | 20 | 21 | 16 | 6  | 7  | 6  | 4  | 7  | 6  | 2  | 2  | 4  | 1  | 1   | 190           | Jul 05 Friday    |                |
| 188 | 2  | 5  | 4  | 3  | 1  | 5  | 3  | 3  | 11 | 10 | 7  | 6  | 8  | 5  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | 73            | Jul 06 Saturday  |                |
| 189 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | 0             | Jul 07 Sunday    |                |
| 190 | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 3  | 8  | 3  | 5  | 12 | 3  | 4  | 8  | 4  | 4  | 6   | 8             | 74               | Jul 08 Monday  |
| 191 | 12 | 6  | 9  | 5  | 4  | 4  | 2  | 3  | 5  | 7  | 21 | 17 | 27 | 11 | 27 | 4  | 5  | 6  | 6  | 38 | 3  | 3  | 7  | 4   | 236           | Jul 09 Tuesday   |                |
| 192 | 6  | 12 | 5  | 4  | 4  | 8  | 8  | 7  | 11 | 8  | 4  | 23 | 6  | 7  | 8  | 5  | 5  | 4  | 4  | 4  | 3  | 3  | 2  | 6   | 157           | Jul 10 Wednesday |                |
| 193 | 7  | 4  | 5  | 6  | 4  | 1  | 3  | 5  | 9  | 12 | 9  | 12 | 13 | 10 | 9  | 4  | 2  | 5  | 6  | 7  | 8  | 5  | 9  | 3   | 158           | Jul 11 Thursday  |                |
| 194 | 7  | 8  | 10 | 7  | 1  | 0  | 2  | 6  | 4  | 9  | 13 | 14 | 20 | 14 | 10 | 10 | 2  | 6  | 3  | 8  | 6  | 7  | 1  | 6   | 174           | Jul 12 Friday    |                |
| 195 | 3  | 7  | 3  | 5  | 5  | 3  | 5  | 4  | 9  | 4  | 6  | 4  | 6  | 3  | 10 | 3  | 3  | 0  | 2  | 8  | 3  | 0  | 7  | 3   | 106           | Jul 13 Saturday  |                |
| 196 | 6  | 8  | 1  | 2  | 2  | 5  | 0  | 5  | 0  | 3  | 1  | 2  | 0  | 6  | 1  | 4  | 1  | 3  | 4  | 5  | 6  | 1  | 2  | 4   | 72            | Jul 14 Sunday    |                |
| 197 | 6  | 5  | 6  | 2  | 6  | 5  | 3  | 5  | 4  | 5  | 6  | 7  | 17 | 6  | 9  | 6  | 4  | 14 | 3  | 3  | 2  | 9  | 6  | 4   | 143           | Jul 15 Monday    |                |
| 198 | 5  | 4  | 7  | 13 | 8  | 7  | 6  | 5  | 9  | 10 | 12 | 12 | 11 | 9  | 4  | 2  | 5  | 14 | 4  | 3  | 8  | 0  | 7  | 3   | 168           | Jul 16 Tuesday   |                |
| 199 | 3  | 9  | 9  | 10 | 9  | 17 | 4  | 10 | 15 | 8  | 19 | 15 | 16 | 11 | 4  | 14 | 7  | 8  | 11 | 5  | 1  | 5  | 7  | 1   | 218           | Jul 17 Wednesday |                |
| 200 | 8  | 7  | 2  | 1  | 2  | 1  | 5  | 4  | 6  | 10 | 11 | 11 | 9  | 11 | 3  | 6  | 2  | 5  | 10 | 6  | 3  | 4  | 3  | 10  | 140           | Jul 18 Thursday  |                |
| 201 | 5  | 7  | 11 | 4  | 2  | 5  | 5  | 0  | 6  | 12 | 16 | 12 | 5  | 4  | 0  | 7  | 8  | 4  | 3  | 13 | 4  | 6  | 2  | 1   | 142           | Jul 19 Friday    |                |
| 202 | 14 | 14 | 2  | 5  | 10 | 8  | 6  | 12 | 5  | 15 | 3  | 4  | 4  | 0  | 3  | 1  | 2  | 9  | 9  | 7  | 4  | 14 | 4  | 9   | 164           | Jul 20 Saturday  |                |
| 203 | 8  | 4  | 1  | 6  | 7  | 3  | 4  | 3  | 3  | 12 | 12 | 10 | 3  | 10 | 6  | 8  | 4  | 12 | 6  | 8  | 11 | 8  | 4  | 9   | 162           | Jul 21 Sunday    |                |

Table 3.5.3 (Page 2 of 4)

## FIN .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 204 | 7  | 8  | 4  | 4  | 5  | 6  | 4  | 5  | 6  | 9  | 12 | 13 | 7  | 5  | 9  | 10 | 13 | 4  | 3  | 9  | 7  | 9  | 7  | 2  | 168 | Jul 22 Monday    |
| 205 | 7  | 12 | 4  | 9  | 1  | 5  | 7  | 6  | 6  | 11 | 25 | 13 | 17 | 6  | 5  | 10 | 1  | 5  | 9  | 1  | 4  | 6  | 11 | 7  | 188 | Jul 23 Tuesday   |
| 206 | 12 | 6  | 7  | 11 | 9  | 1  | 8  | 5  | 10 | 14 | 11 | 20 | 14 | 6  | 7  | 6  | 6  | 5  | 3  | 12 | 7  | 11 | 8  | 3  | 202 | Jul 24 Wednesday |
| 207 | 9  | 9  | 5  | 6  | 8  | 4  | 5  | 7  | 6  | 10 | 9  | 8  | 13 | 9  | 3  | 6  | 6  | 5  | 5  | 4  | 8  | 7  | 8  | 3  | 163 | Jul 25 Thursday  |
| 208 | 4  | 3  | 5  | 0  | 2  | 3  | 7  | 12 | 5  | 10 | 13 | 16 | 8  | 8  | 2  | 5  | 0  | 0  | 6  | 4  | 2  | 5  | 7  | 2  | 129 | Jul 26 Friday    |
| 209 | 4  | 6  | 3  | 4  | 1  | 2  | 3  | 4  | 13 | 1  | 5  | 9  | 5  | 1  | 7  | 3  | 7  | 4  | 0  | 5  | 1  | 2  | 13 | 3  | 106 | Jul 27 Saturday  |
| 210 | 1  | 5  | 5  | 2  | 14 | 1  | 3  | 5  | 5  | 6  | 2  | 6  | 4  | 0  | 2  | 5  | 4  | 4  | 4  | 6  | 2  | 2  | 6  | 4  | 95  | Jul 28 Sunday    |
| 211 | 5  | 3  | 4  | 1  | 3  | 2  | 4  | 3  | 3  | 2  | 14 | 15 | 6  | 3  | 7  | 2  | 1  | 11 | 1  | 4  | 5  | 5  | 5  | 5  | 114 | Jul 29 Monday    |
| 212 | 6  | 13 | 3  | 3  | 2  | 1  | 7  | 3  | 4  | 8  | 10 | 7  | 5  | 13 | 16 | 6  | 1  | 5  | 3  | 1  | 6  | 3  | 6  | 1  | 133 | Jul 30 Tuesday   |
| 213 | 6  | 4  | 4  | 2  | 4  | 7  | 6  | 6  | 26 | 14 | 18 | 19 | 14 | 10 | 20 | 0  | 3  | 10 | 10 | 7  | 6  | 11 | 6  | 5  | 218 | Jul 31 Wednesday |
| 214 | 7  | 12 | 12 | 7  | 6  | 7  | 6  | 4  | 9  | 15 | 11 | 13 | 10 | 6  | 9  | 10 | 5  | 8  | 2  | 11 | 5  | 4  | 6  | 6  | 191 | Aug 01 Thursday  |
| 215 | 12 | 5  | 4  | 7  | 5  | 4  | 7  | 6  | 4  | 11 | 10 | 15 | 14 | 17 | 8  | 3  | 8  | 4  | 5  | 3  | 3  | 1  | 5  | 4  | 165 | Aug 02 Friday    |
| 216 | 6  | 1  | 3  | 11 | 5  | 8  | 5  | 4  | 4  | 4  | 7  | 5  | 6  | 4  | 4  | 5  | 1  | 0  | 2  | 2  | 0  | 3  | 3  | 2  | 95  | Aug 03 Saturday  |
| 217 | 0  | 2  | 3  | 1  | 5  | 5  | 3  | 2  | 10 | 2  | 8  | 5  | 1  | 4  | 2  | 2  | 6  | 6  | 5  | 7  | 9  | 4  | 6  | 2  | 100 | Aug 04 Sunday    |
| 218 | 12 | 10 | 5  | 0  | 2  | 2  | 2  | 3  | 4  | 14 | 15 | 10 | 6  | 9  | 2  | 3  | 3  | 7  | 5  | 6  | 7  | 7  | 22 | 17 | 173 | Aug 05 Monday    |
| 219 | 10 | 3  | 9  | 5  | 3  | 8  | 7  | 5  | 2  | 10 | 19 | 16 | 18 | 15 | 5  | 7  | 7  | 7  | 7  | 9  | 8  | 5  | 1  | 7  | 193 | Aug 06 Tuesday   |
| 220 | 3  | 15 | 6  | 3  | 2  | 4  | 2  | 6  | 10 | 12 | 19 | 9  | 10 | 7  | 4  | 8  | 12 | 5  | 6  | 12 | 9  | 2  | 7  | 3  | 176 | Aug 07 Wednesday |
| 221 | 8  | 3  | 5  | 4  | 9  | 12 | 6  | 6  | 7  | 13 | 15 | 18 | 16 | 20 | 6  | 5  | 5  | 17 | 9  | 8  | 2  | 6  | 4  | 13 | 217 | Aug 08 Thursday  |
| 222 | 14 | 7  | 6  | 8  | 5  | 4  | 2  | 7  | 11 | 15 | 17 | 18 | 6  | 5  | 2  | 8  | 5  | 4  | 9  | 12 | 5  | 5  | 6  | 9  | 190 | Aug 09 Friday    |
| 223 | 1  | 4  | 2  | 1  | 3  | 6  | 10 | 1  | 0  | 2  | 5  | 9  | 5  | 3  | 3  | 12 | 3  | 6  | 14 | 8  | 8  | 3  | 9  | 11 | 129 | Aug 10 Saturday  |
| 224 | 4  | 12 | 10 | 6  | 4  | 4  | 7  | 3  | 6  | 3  | 5  | 6  | 5  | 9  | 6  | 3  | 7  | 10 | 10 | 2  | 4  | 7  | 15 | 5  | 153 | Aug 11 Sunday    |
| 225 | 5  | 10 | 6  | 5  | 3  | 1  | 2  | 5  | 8  | 1  | 18 | 9  | 44 | 9  | 3  | 9  | 3  | 6  | 9  | 11 | 5  | 6  | 8  | 6  | 192 | Aug 12 Monday    |
| 226 | 12 | 11 | 12 | 3  | 12 | 4  | 6  | 3  | 11 | 16 | 23 | 10 | 8  | 13 | 3  | 5  | 7  | 4  | 11 | 13 | 6  | 1  | 7  | 8  | 209 | Aug 13 Tuesday   |
| 227 | 3  | 12 | 18 | 15 | 7  | 2  | 4  | 6  | 6  | 5  | 11 | 26 | 24 | 14 | 15 | 14 | 8  | 11 | 8  | 12 | 6  | 7  | 3  | 7  | 244 | Aug 14 Wednesday |
| 228 | 12 | 5  | 10 | 6  | 7  | 4  | 5  | 8  | 7  | 9  | 12 | 15 | 6  | 11 | 4  | 15 | 14 | 6  | 5  | 5  | 4  | 4  | 6  | 3  | 183 | Aug 15 Thursday  |
| 229 | 5  | 8  | 2  | 3  | 6  | 3  | 5  | 10 | 10 | 20 | 15 | 13 | 6  | 12 | 4  | 3  | 6  | 10 | 4  | 16 | 5  | 7  | 4  | 6  | 183 | Aug 16 Friday    |
| 230 | 4  | 10 | 7  | 9  | 15 | 21 | 22 | 6  | 8  | 10 | 17 | 13 | 8  | 2  | 3  | 6  | 4  | 3  | 1  | 4  | 2  | 1  | 3  | 2  | 181 | Aug 17 Saturday  |
| 231 | 3  | 5  | 13 | 4  | 6  | 11 | 6  | 7  | 5  | 6  | 4  | 3  | 2  | 3  | 0  | 5  | 0  | 0  | 5  | 3  | 3  | 4  | 4  | 7  | 109 | Aug 18 Sunday    |
| 232 | 6  | 7  | 5  | 5  | 9  | 3  | 3  | 10 | 3  | 9  | 15 | 11 | 27 | 10 | 2  | 8  | 10 | 8  | 6  | 4  | 6  | 0  | 8  | 8  | 183 | Aug 19 Monday    |
| 233 | 10 | 4  | 2  | 8  | 2  | 2  | 3  | 8  | 8  | 15 | 16 | 17 | 8  | 9  | 0  | 5  | 5  | 12 | 5  | 2  | 7  | 4  | 4  | 8  | 164 | Aug 20 Tuesday   |
| 234 | 1  | 5  | 15 | 7  | 1  | 0  | 1  | 1  | 12 | 15 | 13 | 11 | 5  | 4  | 13 | 5  | 5  | 12 | 5  | 5  | 4  | 5  | 6  | 11 | 162 | Aug 21 Wednesday |
| 235 | 5  | 6  | 5  | 6  | 6  | 13 | 2  | 6  | 3  | 1  | 9  | 15 | 7  | 3  | 4  | 7  | 4  | 8  | 3  | 10 | 7  | 8  | 9  | 5  | 152 | Aug 22 Thursday  |
| 236 | 5  | 4  | 6  | 2  | 2  | 4  | 1  | 3  | 5  | 9  | 14 | 11 | 13 | 2  | 2  | 5  | 2  | 5  | 4  | 4  | 2  | 4  | 6  | 0  | 115 | Aug 23 Friday    |
| 237 | 3  | 2  | 7  | 3  | 3  | 2  | 4  | 4  | 5  | 7  | 1  | 2  | 2  | 2  | 6  | 2  | 2  | 2  | 3  | 0  | 7  | 3  | 2  | 2  | 76  | Aug 24 Saturday  |
| 238 | 11 | 0  | 2  | 2  | 3  | 4  | 6  | 4  | 3  | 8  | 1  | 4  | 5  | 4  | 2  | 0  | 2  | 6  | 6  | 10 | 4  | 10 | 7  | 3  | 107 | Aug 25 Sunday    |
| 239 | 0  | 5  | 5  | 1  | 4  | 7  | 5  | 7  | 5  | 2  | 17 | 12 | 10 | 11 | 3  | 6  | 8  | 3  | 4  | 2  | 7  | 5  | 2  | 3  | 134 | Aug 26 Monday    |
| 240 | 5  | 15 | 5  | 6  | 3  | 5  | 21 | 6  | 22 | 21 | 25 | 14 | 9  | 6  | 10 | 9  | 5  | 6  | 4  | 6  | 8  | 2  | 7  | 6  | 226 | Aug 27 Tuesday   |
| 241 | 5  | 8  | 8  | 0  | 2  | 3  | 6  | 9  | 10 | 10 | 21 | 11 | 22 | 6  | 5  | 6  | 7  | 7  | 6  | 0  | 8  | 5  | 6  | 9  | 180 | Aug 28 Wednesday |
| 242 | 8  | 10 | 5  | 4  | 4  | 4  | 6  | 5  | 8  | 16 | 15 | 4  | 19 | 9  | 11 | 4  | 9  | 3  | 10 | 5  | 9  | 4  | 3  | 3  | 178 | Aug 29 Thursday  |
| 243 | 2  | 11 | 12 | 9  | 4  | 2  | 3  | 9  | 11 | 20 | 6  | 15 | 5  | 9  | 7  | 3  | 5  | 5  | 4  | 5  | 1  | 5  | 4  | 7  | 164 | Aug 30 Friday    |
| 244 | 2  | 8  | 6  | 6  | 6  | 7  | 4  | 13 | 6  | 2  | 5  | 3  | 9  | 1  | 3  | 4  | 8  | 0  | 8  | 4  | 9  | 5  | 3  | 2  | 124 | Aug 31 Saturday  |
| 245 | 3  | 5  | 4  | 2  | 4  | 1  | 1  | 7  | 2  | 8  | 2  | 7  | 6  | 3  | 8  | 6  | 1  | 4  | 9  | 5  | 3  | 3  | 3  | 3  | 100 | Sep 01 Sunday    |
| 246 | 3  | 6  | 8  | 7  | 0  | 0  | 1  | 5  | 8  | 5  | 14 | 15 | 22 | 4  | 8  | 12 | 1  | 6  | 5  | 4  | 5  | 6  | 5  | 3  | 153 | Sep 02 Monday    |
| 247 | 4  | 3  | 10 | 4  | 6  | 3  | 3  | 5  | 11 | 6  | 16 | 11 | 6  | 7  | 2  | 4  | 12 | 3  | 5  | 3  | 3  | 8  | 1  | 3  | 139 | Sep 03 Tuesday   |
| 248 | 8  | 5  | 4  | 2  | 7  | 3  | 3  | 6  | 15 | 7  | 20 | 15 | 9  | 9  | 13 | 9  | 3  | 4  | 5  | 6  | 3  | 1  | 5  | 2  | 164 | Sep 04 Wednesday |
| 249 | 8  | 2  | 4  | 6  | 2  | 0  | 2  | 4  | 16 | 16 | 20 | 33 | 33 | 16 | 7  | 16 | 2  | 3  | 3  | 6  | 7  | 4  | 8  | 6  | 224 | Sep 05 Thursday  |
| 250 | 8  | 9  | 7  | 5  | 1  | 0  | 4  | 7  | 11 | 8  | 12 | 19 | 11 | 7  | 6  | 4  | 3  | 5  | 2  | 5  | 6  | 3  | 1  | 0  | 144 | Sep 06 Friday    |
| 251 | 8  | 1  | 6  | 7  | 10 | 5  | 1  | 3  | 6  | 9  | 7  | 11 | 10 | 2  | 2  | 5  | 3  | 4  | 4  | 5  | 2  | 5  | 0  | 2  | 118 | Sep 07 Saturday  |
| 252 | 1  | 3  | 6  | 3  | 1  | 5  | 1  | 2  | 10 | 3  | 2  | 11 | 4  | 2  | 2  | 0  | 0  | 5  | 2  | 8  | 6  | 3  | 1  | 8  | 89  | Sep 08 Sunday    |
| 253 | 5  | 3  | 3  | 4  | 6  | 2  | 3  | 3  | 7  | 16 | 10 | 18 | 22 | 21 | 17 | 4  | 9  | 3  | 9  | 4  | 0  | 0  | 3  | 3  | 175 | Sep 09 Monday    |
| 254 | 5  | 4  | 3  | 7  | 3  | 4  | 1  | 9  | 11 | 8  | 22 | 12 | 11 | 13 | 5  | 9  | 1  | 0  | 1  | 5  | 1  | 3  | 1  | 2  | 141 | Sep 10 Tuesday   |
| 255 | 4  | 3  | 7  | 7  | 2  | 9  | 7  | 6  | 14 | 10 | 7  | 12 | 16 | 11 | 4  | 5  | 3  | 10 | 5  | 2  | 4  | 3  | 5  | 2  | 158 | Sep 11 Wednesday |
| 256 | 3  | 2  | 3  | 3  | 1  | 4  | 1  | 7  | 8  | 11 | 5  | 11 | 20 | 17 | 3  | 4  | 3  | 1  | 8  | 6  | 5  | 4  | 9  | 1  | 140 | Sep 12 Thursday  |
| 257 | 9  | 5  | 4  | 11 | 10 | 7  | 6  | 6  | 17 | 37 | 30 | 12 | 6  | 11 | 7  | 8  | 6  | 10 | 5  | 6  | 8  | 13 | 0  | 0  | 234 | Sep 13 Friday    |
| 258 | 1  | 1  | 10 | 6  | 2  | 4  | 3  | 0  | 7  | 2  | 4  | 3  | 1  | 13 | 2  | 1  | 7  | 3  | 2  | 5  | 1  | 2  | 3  | 1  | 84  | Sep 14 Saturday  |
| 259 | 4  | 1  | 6  | 9  | 2  | 3  | 2  | 9  | 13 | 5  | 7  | 0  | 4  | 6  | 4  | 2  | 3  | 4  | 4  | 3  | 4  | 4  | 3  | 0  | 102 | Sep 15 Sunday    |

Table 3.5.3 (Page 3 of 4)

## FIN .FKX Hourly distribution of detections

| Day | 00   | 01   | 02  | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|------|------|-----|------|------|------|------|------|------|------|------|------|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 260 | 5    | 3    | 6   | 1    | 1    | 5    | 4    | 4    | 4    | 7    | 4    | 8    | 8  | 6  | 17 | 8  | 5  | 4  | 4  | 5  | 3  | 5  | 3  | 3  | 123 | Sep 16 Monday    |
| 261 | 0    | 6    | 4   | 2    | 3    | 0    | 3    | 0    | 5    | 8    | 4    | 5    | 10 | 4  | 4  | 6  | 2  | 8  | 16 | 6  | 6  | 5  | 5  | 8  | 120 | Sep 17 Tuesday   |
| 262 | 8    | 5    | 9   | 6    | 12   | 5    | 8    | 5    | 16   | 13   | 13   | 14   | 12 | 11 | 7  | 11 | 3  | 7  | 4  | 3  | 2  | 2  | 6  | 9  | 191 | Sep 18 Wednesday |
| 263 | 4    | 5    | 1   | 2    | 8    | 2    | 1    | 12   | 7    | 12   | 12   | 11   | 27 | 15 | 7  | 3  | 3  | 3  | 2  | 5  | 6  | 9  | 1  | 1  | 159 | Sep 19 Thursday  |
| 264 | 9    | 4    | 3   | 4    | 11   | 8    | 7    | 17   | 8    | 2    | 9    | 18   | 22 | 20 | 11 | 10 | 6  | 18 | 20 | 20 | 12 | 13 | 14 | 9  | 275 | Sep 20 Friday    |
| 265 | 4    | 15   | 11  | 20   | 7    | 5    | 0    | 9    | 3    | 4    | 4    | 6    | 11 | 6  | 3  | 11 | 10 | 15 | 2  | 3  | 6  | 5  | 5  | 7  | 172 | Sep 21 Saturday  |
| 266 | 5    | 5    | 6   | 1    | 4    | 11   | 4    | 6    | 6    | 9    | 14   | 6    | 9  | 3  | 8  | 5  | 1  | 4  | 3  | 5  | 11 | 1  | 7  | 11 | 145 | Sep 22 Sunday    |
| 267 | 11   | 4    | 8   | 3    | 1    | 7    | 2    | 4    | 8    | 10   | 3    | 13   | 15 | 6  | 6  | 13 | 4  | 1  | 0  | 4  | 6  | 3  | 2  | 2  | 136 | Sep 23 Monday    |
| 268 | 6    | 5    | 3   | 5    | 2    | 6    | 4    | 3    | 9    | 10   | 11   | 14   | 26 | 17 | 18 | 7  | 6  | 6  | 7  | 13 | 2  | 8  | 7  | 1  | 196 | Sep 24 Tuesday   |
| 269 | 6    | 3    | 8   | 7    | 4    | 4    | 9    | 12   | 8    | 12   | 15   | 24   | 26 | 14 | 10 | 8  | 4  | 8  | 5  | 11 | 4  | 11 | 4  | 3  | 220 | Sep 25 Wednesday |
| 270 | 8    | 7    | 6   | 5    | 2    | 4    | 3    | 11   | 14   | 12   | 20   | 23   | 15 | 1  | 6  | 2  | 7  | 6  | 6  | 6  | 3  | 5  | 5  | 6  | 183 | Sep 26 Thursday  |
| 271 | 7    | 1    | 5   | 2    | 6    | 2    | 3    | 5    | 10   | 15   | 7    | 17   | 16 | 4  | 9  | 5  | 5  | 4  | 0  | 5  | 9  | 2  | 5  | 5  | 149 | Sep 27 Friday    |
| 272 | 7    | 0    | 3   | 6    | 1    | 3    | 3    | 9    | 6    | 11   | 4    | 13   | 8  | 5  | 12 | 6  | 8  | 9  | 6  | 5  | 7  | 6  | 1  | 6  | 145 | Sep 28 Saturday  |
| 273 | 2    | 3    | 5   | 7    | 0    | 1    | 13   | 5    | 0    | 4    | 6    | 2    | 12 | 4  | 4  | 1  | 5  | 4  | 4  | 4  | 3  | 7  | 0  | 3  | 99  | Sep 29 Sunday    |
| 274 | 7    | 7    | 4   | 3    | 0    | 13   | 3    | 11   | 10   | 12   | 11   | 17   | 12 | 9  | 4  | 4  | 4  | 1  | 1  | 6  | 1  | 2  | 2  | 6  | 150 | Sep 30 Monday    |
| FIN | 00   | 01   | 02  | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |     |                  |
| Sum | 1366 | 1049 | 840 | 1133 | 1738 | 2269 | 1535 | 1266 | 1151 | 1145 | 998  | 1028 |    |    |    |    |    |    |    |    |    |    |    |    |     |                  |
|     | 1265 | 1219 | 826 | 879  | 1495 | 2061 | 1999 | 1270 | 1087 | 1071 | 1032 | 1120 |    |    |    |    |    |    |    |    |    |    |    |    |     | 30842 Total sum  |
| 182 | 7    | 8    | 7   | 6    | 5    | 5    | 5    | 6    | 8    | 10   | 11   | 12   | 11 | 8  | 7  | 7  | 6  | 6  | 6  | 6  | 6  | 5  | 6  | 6  | 169 | Total average    |
| 124 | 7    | 7    | 7   | 5    | 4    | 4    | 5    | 6    | 9    | 11   | 13   | 15   | 13 | 10 | 8  | 8  | 6  | 6  | 6  | 7  | 6  | 6  | 7  | 6  | 180 | Average workdays |
| 58  | 7    | 8    | 7   | 7    | 5    | 6    | 5    | 5    | 6    | 6    | 7    | 7    | 7  | 5  | 5  | 5  | 5  | 6  | 5  | 5  | 5  | 5  | 5  | 5  | 139 | Average weekends |

**Table 3.5.3.** (Page 4 of 4) Daily and hourly distribution of FINESSE detections. For each day is shown number of detections within each hour of the day, and number of detections for that day. The end statistics give total number of detections distributed for each hour and the total sum of detections during the period. The averages show number of processed days, hourly distribution and average per processed day.

## GER .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23  | Sum             | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----------------|------------------|
| 92  | 11 | 1  | 7  | 9  | 5  | 5  | 7  | 4  | 12 | 14 | 23 | 13 | 13 | 6  | 14 | 15 | 7  | 4  | 6  | 6  | 3  | 3  | 6  | 7   | 201             | Apr 01 Monday    |
| 93  | 8  | 3  | 8  | 13 | 9  | 1  | 7  | 11 | 10 | 17 | 16 | 22 | 4  | 3  | 6  | 14 | 9  | 14 | 6  | 6  | 7  | 5  | 1  | 6   | 206             | Apr 02 Tuesday   |
| 94  | 6  | 5  | 7  | 4  | 4  | 0  | 5  | 6  | 23 | 18 | 17 | 18 | 16 | 9  | 8  | 7  | 5  | 14 | 6  | 6  | 8  | 7  | 7  | 8   | 214             | Apr 03 Wednesday |
| 95  | 9  | 10 | 6  | 12 | 12 | 0  | 8  | 10 | 17 | 25 | 23 | 38 | 14 | 10 | 3  | 16 | 7  | 1  | 3  | 7  | 6  | 6  | 6  | 1   | 250             | Apr 04 Thursday  |
| 96  | 2  | 1  | 2  | 2  | 13 | 2  | 2  | 4  | 5  | 24 | 7  | 12 | 13 | 9  | 0  | 11 | 2  | 5  | 10 | 3  | 5  | 5  | 2  | 2   | 143             | Apr 05 Friday    |
| 97  | 3  | 1  | 7  | 4  | 14 | 11 | 6  | 6  | 6  | 6  | 16 | 9  | 6  | 4  | 11 | 6  | 18 | 6  | 1  | 2  | 5  | 6  | 7  | 167 | Apr 06 Saturday |                  |
| 98  | 5  | 2  | 5  | 1  | 3  | 2  | 11 | 9  | 1  | 0  | 8  | 4  | 1  | 1  | 4  | 9  | 4  | 2  | 0  | 4  | 5  | 2  | 1  | 1   | 85              | Apr 07 Sunday    |
| 99  | 3  | 2  | 8  | 5  | 3  | 0  | 8  | 4  | 3  | 6  | 5  | 10 | 3  | 4  | 5  | 4  | 6  | 11 | 14 | 2  | 8  | 12 | 10 | 10  | 146             | Apr 08 Monday    |
| 100 | 7  | 11 | 13 | 9  | 3  | 7  | 12 | 14 | 18 | 21 | 25 | 11 | 14 | 11 | 12 | 21 | 12 | 12 | 7  | 9  | 4  | 6  | 13 | 4   | 276             | Apr 09 Tuesday   |
| 101 | 9  | 9  | 14 | 6  | 10 | 2  | 2  | 15 | 21 | 24 | 34 | 27 | 12 | 23 | 23 | 10 | 9  | 15 | 14 | 15 | 4  | 9  | 12 | 9   | 328             | Apr 10 Wednesday |
| 102 | 11 | 15 | 8  | 10 | 6  | 8  | 5  | 12 | 18 | 20 | 34 | 31 | 7  | 13 | 15 | 21 | 16 | 14 | 12 | 16 | 12 | 4  | 7  | 12  | 327             | Apr 11 Thursday  |
| 103 | 10 | 11 | 4  | 6  | 2  | 7  | 3  | 8  | 14 | 14 | 40 | 22 | 14 | 13 | 8  | 25 | 15 | 9  | 11 | 8  | 10 | 2  | 10 | 3   | 269             | Apr 12 Friday    |
| 104 | 9  | 2  | 5  | 12 | 12 | 7  | 17 | 6  | 2  | 12 | 11 | 2  | 5  | 16 | 4  | 9  | 12 | 15 | 7  | 5  | 5  | 3  | 5  | 12  | 195             | Apr 13 Saturday  |
| 105 | 9  | 0  | 12 | 1  | 7  | 4  | 4  | 10 | 7  | 1  | 9  | 7  | 5  | 2  | 6  | 10 | 4  | 4  | 2  | 3  | 13 | 19 | 8  | 8   | 155             | Apr 14 Sunday    |
| 106 | 14 | 15 | 4  | 1  | 2  | 5  | 6  | 18 | 12 | 20 | 18 | 17 | 17 | 14 | 10 | 23 | 8  | 5  | 4  | 14 | 13 | 11 | 4  | 5   | 260             | Apr 15 Monday    |
| 107 | 10 | 15 | 14 | 9  | 5  | 4  | 2  | 8  | 12 | 15 | 27 | 29 | 25 | 10 | 12 | 12 | 10 | 13 | 10 | 7  | 4  | 15 | 6  | 286 | Apr 16 Tuesday  |                  |
| 108 | 11 | 6  | 10 | 6  | 8  | 11 | 5  | 14 | 19 | 13 | 31 | 22 | 22 | 4  | 12 | 11 | 17 | 16 | 8  | 16 | 6  | 3  | 5  | 8   | 284             | Apr 17 Wednesday |
| 109 | 11 | 11 | 5  | 8  | 5  | 6  | 10 | 6  | 27 | 18 | 33 | 19 | 14 | 23 | 13 | 9  | 10 | 9  | 8  | 7  | 18 | 11 | 13 | 3   | 297             | Apr 18 Thursday  |
| 110 | 12 | 5  | 12 | 13 | 10 | 1  | 8  | 9  | 13 | 30 | 29 | 13 | 20 | 9  | 11 | 5  | 25 | 6  | 11 | 9  | 5  | 9  | 15 | 5   | 285             | Apr 19 Friday    |
| 111 | 12 | 7  | 14 | 16 | 11 | 15 | 16 | 4  | 8  | 13 | 2  | 9  | 3  | 5  | 8  | 3  | 14 | 10 | 9  | 13 | 5  | 3  | 6  | 8   | 214             | Apr 20 Saturday  |
| 112 | 8  | 3  | 6  | 1  | 1  | 3  | 8  | 3  | 3  | 8  | 7  | 10 | 4  | 3  | 7  | 5  | 3  | 7  | 0  | 2  | 4  | 17 | 10 | 5   | 128             | Apr 21 Sunday    |
| 113 | 5  | 7  | 11 | 10 | 7  | 13 | 9  | 6  | 15 | 23 | 32 | 26 | 11 | 8  | 18 | 14 | 11 | 6  | 23 | 4  | 5  | 5  | 8  | 4   | 281             | Apr 22 Monday    |
| 114 | 8  | 8  | 7  | 6  | 11 | 8  | 8  | 20 | 11 | 20 | 30 | 30 | 14 | 6  | 18 | 15 | 11 | 17 | 10 | 13 | 6  | 9  | 1  | 1   | 288             | Apr 23 Tuesday   |
| 115 | 9  | 7  | 3  | 0  | 9  | 8  | 6  | 12 | 18 | 20 | 31 | 28 | 23 | 16 | 10 | 11 | 15 | 12 | 11 | 8  | 5  | 9  | 5  | 7   | 283             | Apr 24 Wednesday |
| 116 | 3  | 12 | 10 | 2  | 6  | 15 | 12 | 17 | 35 | 35 | 25 | 24 | 23 | 11 | 26 | 16 | 16 | 10 | 20 | 9  | 18 | 4  | 2  | 2   | 353             | Apr 25 Thursday  |
| 117 | 4  | 14 | 4  | 10 | 5  | 18 | 21 | 24 | 16 | 28 | 40 | 35 | 24 | 21 | 17 | 22 | 18 | 12 | 10 | 7  | 7  | 4  | 5  | 4   | 370             | Apr 26 Friday    |
| 118 | 10 | 20 | 14 | 27 | 10 | 21 | 15 | 16 | 21 | 15 | 15 | 21 | 4  | 8  | 8  | 12 | 4  | 5  | 1  | 7  | 1  | 0  | 0  | 1   | 256             | Apr 27 Saturday  |
| 119 | 2  | 0  | 2  | 6  | 1  | 12 | 4  | 15 | 15 | 3  | 10 | 15 | 11 | 4  | 5  | 9  | 2  | 4  | 6  | 8  | 12 | 9  | 7  | 10  | 172             | Apr 28 Sunday    |
| 120 | 7  | 11 | 10 | 7  | 8  | 6  | 21 | 11 | 14 | 25 | 24 | 24 | 32 | 15 | 22 | 15 | 13 | 7  | 5  | 18 | 9  | 21 | 5  | 15  | 345             | Apr 29 Monday    |
| 121 | 6  | 8  | 7  | 8  | 8  | 11 | 17 | 14 | 35 | 32 | 34 | 19 | 20 | 14 | 14 | 24 | 38 | 11 | 8  | 8  | 8  | 3  | 3  | 0   | 350             | Apr 30 Tuesday   |
| 122 | 1  | 4  | 5  | 15 | 5  | 1  | 3  | 10 | 2  | 10 | 6  | 5  | 4  | 10 | 13 | 5  | 6  | 4  | 7  | 3  | 10 | 14 | 13 | 16  | 172             | May 01 Wednesday |
| 123 | 13 | 7  | 15 | 7  | 14 | 14 | 11 | 17 | 8  | 23 | 31 | 23 | 11 | 17 | 10 | 19 | 10 | 11 | 16 | 10 | 10 | 3  | 9  | 15  | 324             | May 02 Thursday  |
| 124 | 12 | 5  | 10 | 15 | 13 | 2  | 7  | 9  | 19 | 13 | 30 | 24 | 9  | 7  | 15 | 18 | 10 | 22 | 6  | 9  | 2  | 3  | 7  | 10  | 277             | May 03 Friday    |
| 125 | 5  | 4  | 5  | 10 | 6  | 6  | 15 | 20 | 7  | 13 | 16 | 8  | 11 | 3  | 7  | 3  | 14 | 10 | 7  | 1  | 1  | 3  | 1  | 2   | 178             | May 04 Saturday  |
| 126 | 5  | 3  | 0  | 6  | 5  | 5  | 3  | 5  | 1  | 1  | 9  | 5  | 5  | 1  | 3  | 3  | 0  | 0  | 4  | 3  | 7  | 10 | 5  | 6   | 95              | May 05 Sunday    |
| 127 | 4  | 9  | 5  | 9  | 3  | 8  | 9  | 11 | 13 | 35 | 23 | 25 | 24 | 13 | 20 | 9  | 10 | 15 | 8  | 8  | 11 | 4  | 10 | 5   | 291             | May 06 Monday    |
| 128 | 4  | 8  | 6  | 1  | 6  | 6  | 12 | 15 | 19 | 27 | 37 | 15 | 32 | 19 | 12 | 6  | 9  | 10 | 2  | 11 | 13 | 19 | 3  | 7   | 299             | May 07 Tuesday   |
| 129 | 1  | 3  | 9  | 2  | 7  | 14 | 5  | 17 | 11 | 17 | 24 | 8  | 12 | 3  | 7  | 7  | 10 | 11 | 7  | 13 | 9  | 7  | 13 | 16  | 233             | May 08 Wednesday |
| 130 | 23 | 13 | 5  | 9  | 11 | 8  | 9  | 11 | 19 | 12 | 26 | 21 | 15 | 19 | 9  | 11 | 10 | 10 | 10 | 12 | 12 | 9  | 7  | 9   | 300             | May 09 Thursday  |
| 131 | 5  | 6  | 8  | 14 | 17 | 5  | 8  | 18 | 11 | 22 | 35 | 16 | 12 | 7  | 6  | 4  | 14 | 5  | 2  | 2  | 8  | 3  | 10 | 2   | 240             | May 10 Friday    |
| 132 | 4  | 14 | 13 | 11 | 12 | 8  | 6  | 10 | 3  | 10 | 23 | 4  | 5  | 3  | 7  | 6  | 9  | 11 | 4  | 3  | 2  | 5  | 0  | 1   | 174             | May 11 Saturday  |
| 133 | 4  | 3  | 3  | 3  | 2  | 2  | 2  | 4  | 26 | 5  | 8  | 3  | 8  | 4  | 7  | 6  | 5  | 7  | 0  | 4  | 1  | 7  | 9  | 8   | 131             | May 12 Sunday    |
| 134 | 6  | 5  | 6  | 1  | 6  | 12 | 19 | 8  | 36 | 25 | 27 | 21 | 23 | 7  | 14 | 11 | 6  | 6  | 13 | 19 | 5  | 4  | 10 | 7   | 297             | May 13 Monday    |
| 135 | 4  | 8  | 8  | 2  | 2  | 8  | 9  | 10 | 17 | 30 | 32 | 21 | 24 | 14 | 20 | 9  | 11 | 15 | 4  | 14 | 0  | 4  | 8  | 10  | 284             | May 14 Tuesday   |
| 136 | 10 | 7  | 5  | 2  | 7  | 14 | 11 | 18 | 23 | 24 | 27 | 22 | 26 | 10 | 12 | 10 | 12 | 15 | 7  | 5  | 1  | 9  | 5  | 8   | 290             | May 15 Wednesday |
| 137 | 7  | 0  | 2  | 3  | 10 | 3  | 1  | 4  | 14 | 17 | 13 | 20 | 9  | 10 | 4  | 2  | 1  | 6  | 7  | 2  | 8  | 6  | 11 | 13  | 173             | May 16 Thursday  |
| 138 | 25 | 11 | 11 | 7  | 2  | 6  | 6  | 6  | 7  | 23 | 17 | 21 | 14 | 10 | 3  | 5  | 8  | 16 | 5  | 27 | 15 | 7  | 4  | 5   | 261             | May 17 Friday    |
| 139 | 5  | 2  | 1  | 10 | 3  | 6  | 6  | 8  | 8  | 4  | 6  | 24 | 10 | 20 | 12 | 43 | 45 | 26 | 8  | 6  | 6  | 5  | 1  | 1   | 266             | May 18 Saturday  |
| 140 | 1  | 2  | 0  | 6  | 6  | 3  | 4  | 8  | 2  | 10 | 10 | 18 | 10 | 7  | 24 | 4  | 15 | 2  | 0  | 1  | 6  | 14 | 7  | 17  | 177             | May 19 Sunday    |
| 141 | 6  | 10 | 9  | 4  | 4  | 11 | 17 | 11 | 18 | 17 | 19 | 30 | 19 | 16 | 12 | 4  | 10 | 9  | 10 | 5  | 2  | 5  | 5  | 6   | 259             | May 20 Monday    |
| 142 | 3  | 8  | 6  | 7  | 10 | 8  | 8  | 21 | 16 | 27 | 41 | 16 | 20 | 28 | 8  | 16 | 10 | 5  | 13 | 6  | 14 | 8  | 3  | 8   | 310             | May 21 Tuesday   |
| 143 | 7  | 9  | 3  | 7  | 3  | 9  | 10 | 12 | 16 | 19 | 40 | 25 | 26 | 10 | 6  | 9  | 6  | 8  | 14 | 8  | 16 | 9  | 5  | 9   | 286             | May 22 Wednesday |
| 144 | 4  | 6  | 3  | 2  | 3  | 14 | 14 | 19 | 26 | 35 | 23 | 28 | 19 | 13 | 7  | 10 | 13 | 11 | 3  | 10 | 7  | 5  | 10 | 10  | 295             | May 23 Thursday  |
| 145 | 4  | 8  | 14 | 3  | 4  | 8  | 16 | 15 | 18 | 22 | 34 | 14 | 16 | 10 | 5  | 23 | 10 | 6  | 4  | 11 | 4  | 5  | 3  | 4   | 261             | May 24 Friday    |
| 146 | 3  | 5  | 5  | 8  | 3  | 6  | 9  | 10 | 10 | 8  | 14 | 10 | 4  | 33 | 10 | 2  | 3  | 4  | 7  | 4  | 3  | 1  | 1  | 0   | 163             | May 25 Saturday  |
| 147 | 1  | 1  | 5  | 1  | 1  | 0  | 10 | 5  | 7  | 2  | 6  | 8  | 3  | 7  | 1  | 4  | 1  | 2  | 3  | 1  | 5  | 11 | 2  | 1   | 88              | May 26 Sunday    |

Table 3.5.4 (Page 1 of 4)

## GER .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 148 | 8  | 2  | 5  | 2  | 8  | 4  | 2  | 1  | 12 | 17 | 16 | 24 | 26 | 9  | 13 | 13 | 13 | 5  | 5  | 21 | 5  | 5  | 4  | 1  | 221 | May 27 Monday    |
| 149 | 3  | 3  | 5  | 3  | 6  | 4  | 18 | 15 | 16 | 21 | 33 | 26 | 23 | 24 | 4  | 12 | 8  | 9  | 11 | 5  | 5  | 7  | 6  | 7  | 274 | May 28 Tuesday   |
| 150 | 3  | 4  | 6  | 9  | 7  | 8  | 12 | 16 | 16 | 17 | 23 | 18 | 23 | 16 | 7  | 17 | 12 | 10 | 5  | 9  | 9  | 11 | 5  | 8  | 271 | May 29 Wednesday |
| 151 | 3  | 3  | 3  | 12 | 4  | 3  | 10 | 15 | 18 | 24 | 23 | 20 | 23 | 13 | 11 | 15 | 9  | 7  | 6  | 15 | 8  | 4  | 4  | 5  | 258 | May 30 Thursday  |
| 152 | 3  | 3  | 6  | 6  | 16 | 6  | 7  | 9  | 20 | 26 | 28 | 7  | 19 | 8  | 7  | 7  | 6  | 5  | 2  | 9  | 11 | 5  | 6  | 6  | 228 | May 31 Friday    |
| 153 | 5  | 2  | 5  | 2  | 3  | 7  | 6  | 5  | 7  | 6  | 7  | 19 | 12 | 4  | 7  | 10 | 13 | 8  | 7  | 32 | 0  | 33 | 12 | 3  | 215 | Jun 01 Saturday  |
| 154 | 2  | 7  | 9  | 5  | 6  | 8  | 10 | 5  | 4  | 7  | 4  | 12 | 16 | 10 | 1  | 5  | 8  | 5  | 2  | 3  | 8  | 5  | 11 | 11 | 164 | Jun 02 Sunday    |
| 155 | 6  | 8  | 14 | 11 | 5  | 7  | 21 | 7  | 27 | 20 | 24 | 33 | 22 | 21 | 15 | 9  | 7  | 7  | 7  | 6  | 12 | 7  | 5  | 7  | 308 | Jun 03 Monday    |
| 156 | 6  | 2  | 16 | 7  | 5  | 13 | 10 | 10 | 19 | 22 | 34 | 38 | 20 | 14 | 12 | 14 | 4  | 14 | 8  | 9  | 15 | 6  | 8  | 8  | 314 | Jun 04 Tuesday   |
| 157 | 20 | 25 | 7  | 6  | 8  | 1  | 7  | 11 | 20 | 13 | 22 | 20 | 18 | 8  | 33 | 14 | 7  | 11 | 5  | 12 | 9  | 10 | 6  | 6  | 299 | Jun 05 Wednesday |
| 158 | 2  | 0  | 1  | 2  | 8  | 6  | 7  | 10 | 9  | 9  | 20 | 26 | 17 | 10 | 8  | 8  | 10 | 6  | 2  | 6  | 7  | 20 | 17 | 10 | 221 | Jun 06 Thursday  |
| 159 | 6  | 9  | 3  | 5  | 11 | 10 | 6  | 9  | 27 | 24 | 23 | 15 | 17 | 8  | 11 | 17 | 3  | 16 | 7  | 9  | 11 | 12 | 3  | 4  | 266 | Jun 07 Friday    |
| 160 | 4  | 5  | 3  | 6  | 9  | 9  | 16 | 9  | 7  | 7  | 9  | 6  | 8  | 11 | 6  | 20 | 16 | 10 | 4  | 8  | 5  | 4  | 10 | 16 | 208 | Jun 08 Saturday  |
| 161 | 5  | 9  | 5  | 7  | 7  | 6  | 16 | 8  | 5  | 7  | 14 | 7  | 4  | 1  | 2  | 7  | 3  | 4  | 5  | 3  | 26 | 75 | 77 | 21 | 324 | Jun 09 Sunday    |
| 162 | 12 | 18 | 10 | 11 | 22 | 19 | 11 | 1  | 12 | 35 | 34 | 32 | 10 | 28 | 15 | 24 | 14 | 19 | 7  | 8  | 20 | 10 | 33 | 19 | 424 | Jun 10 Monday    |
| 163 | 34 | 4  | 6  | 11 | 3  | 7  | 14 | 31 | 28 | 48 | 25 | 36 | 18 | 33 | 16 | 7  | 15 | 21 | 15 | 7  | 12 | 6  | 10 | 8  | 415 | Jun 11 Tuesday   |
| 164 | 14 | 19 | 11 | 9  | 2  | 8  | 7  | 9  | 23 | 31 | 41 | 20 | 36 | 12 | 10 | 12 | 14 | 6  | 11 | 5  | 20 | 20 | 20 | 10 | 370 | Jun 12 Wednesday |
| 165 | 17 | 8  | 8  | 2  | 0  | 9  | 3  | 19 | 20 | 19 | 30 | 26 | 14 | 20 | 14 | 13 | 9  | 9  | 6  | 10 | 5  | 9  | 8  | 12 | 290 | Jun 13 Thursday  |
| 166 | 8  | 3  | 6  | 3  | 2  | 7  | 10 | 10 | 32 | 35 | 9  | 34 | 18 | 17 | 12 | 11 | 1  | 8  | 13 | 5  | 2  | 8  | 9  | 3  | 266 | Jun 14 Friday    |
| 167 | 1  | 9  | 5  | 12 | 5  | 5  | 4  | 8  | 12 | 16 | 14 | 17 | 13 | 8  | 4  | 10 | 3  | 3  | 1  | 9  | 3  | 8  | 2  | 9  | 181 | Jun 15 Saturday  |
| 168 | 4  | 8  | 5  | 1  | 3  | 5  | 5  | 3  | 11 | 3  | 2  | 4  | 7  | 11 | 2  | 10 | 3  | 2  | 3  | 3  | 3  | 6  | 6  | 10 | 120 | Jun 16 Sunday    |
| 169 | 12 | 32 | 9  | 9  | 10 | 8  | 17 | 12 | 20 | 30 | 16 | 43 | 21 | 16 | 11 | 16 | 8  | 11 | 13 | 8  | 1  | 7  | 12 | 4  | 346 | Jun 17 Monday    |
| 170 | 9  | 7  | 4  | 6  | 5  | 6  | 8  | 22 | 15 | 25 | 30 | 39 | 16 | 13 | 16 | 12 | 10 | 8  | 7  | 8  | 14 | 10 | 0  | 7  | 297 | Jun 18 Tuesday   |
| 171 | 10 | 21 | 7  | 8  | 7  | 15 | 9  | 18 | 17 | 27 | 21 | 21 | 7  | 18 | 16 | 27 | 5  | 14 | 6  | 10 | 5  | 4  | 3  | 7  | 303 | Jun 19 Wednesday |
| 172 | 7  | 7  | 12 | 3  | 4  | 27 | 0  | 18 | 18 | 27 | 28 | 24 | 9  | 14 | 12 | 4  | 12 | 5  | 6  | 6  | 14 | 6  | 4  | 10 | 277 | Jun 20 Thursday  |
| 173 | 7  | 10 | 8  | 7  | 12 | 10 | 11 | 11 | 22 | 15 | 26 | 30 | 16 | 18 | 13 | 16 | 7  | 6  | 12 | 11 | 6  | 14 | 3  | 9  | 300 | Jun 21 Friday    |
| 174 | 9  | 5  | 8  | 9  | 8  | 11 | 3  | 6  | 2  | 8  | 15 | 6  | 12 | 10 | 3  | 20 | 10 | 13 | 6  | 11 | 5  | 2  | 7  | 5  | 194 | Jun 22 Saturday  |
| 175 | 6  | 12 | 12 | 10 | 5  | 8  | 3  | 6  | 6  | 9  | 6  | 11 | 10 | 7  | 3  | 13 | 7  | 6  | 5  | 6  | 12 | 5  | 7  | 10 | 185 | Jun 23 Sunday    |
| 176 | 21 | 9  | 11 | 5  | 0  | 11 | 8  | 23 | 17 | 39 | 7  | 27 | 26 | 23 | 18 | 10 | 10 | 17 | 1  | 2  | 7  | 6  | 17 | 3  | 318 | Jun 24 Monday    |
| 177 | 3  | 6  | 9  | 16 | 7  | 5  | 11 | 22 | 32 | 34 | 30 | 20 | 22 | 12 | 7  | 11 | 8  | 10 | 10 | 6  | 5  | 7  | 4  | 8  | 305 | Jun 25 Tuesday   |
| 178 | 8  | 10 | 11 | 13 | 10 | 4  | 18 | 10 | 22 | 27 | 16 | 37 | 19 | 26 | 11 | 12 | 12 | 10 | 16 | 14 | 2  | 2  | 7  | 24 | 341 | Jun 26 Wednesday |
| 179 | 4  | 3  | 8  | 4  | 2  | 18 | 13 | 13 | 28 | 25 | 18 | 28 | 38 | 29 | 9  | 18 | 7  | 10 | 11 | 3  | 7  | 6  | 10 | 5  | 317 | Jun 27 Thursday  |
| 180 | 9  | 11 | 13 | 19 | 6  | 7  | 14 | 24 | 20 | 22 | 30 | 26 | 20 | 9  | 7  | 10 | 14 | 10 | 4  | 3  | 12 | 8  | 2  | 3  | 303 | Jun 28 Friday    |
| 181 | 4  | 11 | 5  | 6  | 7  | 15 | 4  | 5  | 17 | 7  | 14 | 33 | 7  | 13 | 5  | 4  | 12 | 22 | 3  | 23 | 2  | 5  | 2  | 6  | 232 | Jun 29 Saturday  |
| 182 | 6  | 7  | 2  | 4  | 5  | 5  | 8  | 9  | 4  | 2  | 10 | 5  | 8  | 2  | 3  | 3  | 5  | 5  | 3  | 6  | 5  | 8  | 12 | 20 | 147 | Jun 30 Sunday    |
| 183 | 10 | 12 | 12 | 3  | 22 | 11 | 9  | 3  | 7  | 12 | 17 | 24 | 24 | 13 | 23 | 6  | 18 | 5  | 6  | 5  | 4  | 6  | 7  | 5  | 264 | Jul 01 Monday    |
| 184 | 4  | 0  | 5  | 13 | 7  | 27 | 18 | 21 | 16 | 30 | 25 | 21 | 23 | 13 | 8  | 10 | 16 | 13 | 4  | 7  | 3  | 4  | 2  | 4  | 294 | Jul 02 Tuesday   |
| 185 | 4  | 6  | 9  | 6  | 3  | 9  | 11 | 14 | 16 | 31 | 27 | 20 | 19 | 14 | 11 | 10 | 11 | 16 | 2  | 5  | 8  | 3  | 3  | 3  | 261 | Jul 03 Wednesday |
| 186 | 14 | 9  | 6  | 47 | 7  | 2  | 11 | 13 | 10 | 20 | 38 | 22 | 7  | 15 | 25 | 28 | 9  | 14 | 14 | 12 | 10 | 11 | 14 | 22 | 380 | Jul 04 Thursday  |
| 187 | 7  | 15 | 10 | 8  | 12 | 5  | 11 | 9  | 12 | 22 | 24 | 21 | 15 | 15 | 4  | 11 | 2  | 10 | 2  | 35 | 53 | 1  | 6  | 3  | 313 | Jul 05 Friday    |
| 188 | 1  | 8  | 1  | 6  | 8  | 6  | 5  | 5  | 3  | 5  | 3  | 9  | 8  | 4  | 1  | 5  | 0  | 1  | 2  | 6  | 1  | 9  | 3  | 1  | 101 | Jul 06 Saturday  |
| 189 | 5  | 5  | 4  | 4  | 2  | 3  | 4  | 5  | 3  | 2  | 5  | 4  | 13 | 4  | 5  | 5  | 4  | 5  | 5  | 5  | 4  | 8  | 12 | 5  | 121 | Jul 07 Sunday    |
| 190 | 9  | 7  | 9  | 12 | 5  | 5  | 5  | 15 | 14 | 22 | 21 | 19 | 19 | 11 | 4  | 8  | 8  | 7  | 14 | 26 | 6  | 4  | 8  | 9  | 267 | Jul 08 Monday    |
| 191 | 3  | 2  | 50 | 72 | 20 | 23 | 12 | 33 | 59 | 13 | 31 | 28 | 16 | 16 | 28 | 81 | 33 | 16 | 20 | 4  | 8  | 10 | 5  | 9  | 592 | Jul 09 Tuesday   |
| 192 | 5  | 10 | 16 | 11 | 7  | 17 | 26 | 19 | 19 | 30 | 26 | 38 | 54 | 29 | 8  | 3  | 8  | 6  | 10 | 15 | 50 | 5  | 3  | 2  | 417 | Jul 10 Wednesday |
| 193 | 1  | 21 | 33 | 25 | 2  | 15 | 13 | 22 | 28 | 21 | 33 | 53 | 18 | 46 | 37 | 25 | 7  | 4  | 9  | 22 | 7  | 10 | 1  | 3  | 456 | Jul 11 Thursday  |
| 194 | 3  | 0  | 71 | 45 | 6  | 2  | 20 | 18 | 20 | 22 | 33 | 42 | 33 | 76 | 60 | 51 | 25 | 37 | 51 | 42 | 11 | 70 | 28 | 2  | 768 | Jul 12 Friday    |
| 195 | 5  | 4  | 4  | 66 | 71 | 16 | 17 | 9  | 19 | 69 | 34 | 10 | 1  | 10 | 9  | 23 | 13 | 13 | 3  | 6  | 5  | 1  | 1  | 0  | 409 | Jul 13 Saturday  |
| 196 | 10 | 0  | 1  | 1  | 0  | 0  | 5  | 2  | 8  | 3  | 9  | 2  | 5  | 5  | 5  | 5  | 7  | 5  | 3  | 14 | 4  | 4  | 8  | 7  | 113 | Jul 14 Sunday    |
| 197 | 14 | 8  | 9  | 6  | 4  | 27 | 25 | 14 | 28 | 41 | 53 | 42 | 19 | 10 | 22 | 17 | 27 | 17 | 49 | 63 | 5  | 8  | 15 | 3  | 526 | Jul 15 Monday    |
| 198 | 5  | 4  | 35 | 69 | 40 | 25 | 28 | 44 | 49 | 37 | 59 | 50 | 48 | 21 | 11 | 15 | 16 | 14 | 17 | 44 | 1  | 5  | 1  | 12 | 650 | Jul 16 Tuesday   |
| 199 | 23 | 16 | 18 | 9  | 8  | 5  | 11 | 19 | 11 | 38 | 36 | 25 | 21 | 52 | 48 | 36 | 14 | 12 | 21 | 8  | 4  | 4  | 8  | 15 | 462 | Jul 17 Wednesday |
| 200 | 5  | 12 | 6  | 19 | 18 | 8  | 34 | 18 | 44 | 22 | 46 | 19 | 24 | 27 | 37 | 17 | 9  | 15 | 4  | 7  | 7  | 4  | 2  | 7  | 411 | Jul 18 Thursday  |
| 201 | 3  | 11 | 9  | 8  | 4  | 11 | 22 | 21 | 26 | 25 | 36 | 27 | 4  | 10 | 6  | 8  | 11 | 3  | 2  | 18 | 1  | 9  | 5  | 6  | 286 | Jul 19 Friday    |
| 202 | 13 | 12 | 8  | 11 | 14 | 1  | 6  | 10 | 10 | 13 | 16 | 8  | 7  | 8  | 4  | 5  | 5  | 13 | 12 | 5  | 2  | 6  | 14 | 3  | 206 | Jul 20 Saturday  |
| 203 | 9  | 6  | 6  | 8  | 10 | 0  | 0  | 0  | 0  | 2  | 4  | 9  | 8  | 7  | 7  | 9  | 3  | 4  | 5  | 1  | 7  | 9  | 12 | 17 | 143 | Jul 21 Sunday    |

Table 3.5.4 (Page 2 of 4)

## GER .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04  | 05 | 06 | 07 | 08 | 09 | 10 | 11  | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|----|----|----|----|-----|----|----|----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 204 | 11 | 14 | 12 | 6  | 7   | 14 | 16 | 11 | 25 | 43 | 20 | 29  | 14 | 11 | 20 | 18 | 8  | 6  | 9  | 5  | 10 | 8  | 9  | 10 | 336 | Jul 22 Monday    |
| 205 | 3  | 7  | 3  | 16 | 109 | 13 | 15 | 12 | 39 | 30 | 31 | 35  | 11 | 26 | 15 | 16 | 9  | 8  | 7  | 8  | 3  | 7  | 48 | 18 | 489 | Jul 23 Tuesday   |
| 206 | 11 | 8  | 3  | 6  | 76  | 19 | 16 | 17 | 56 | 26 | 26 | 30  | 21 | 21 | 10 | 9  | 10 | 4  | 7  | 2  | 4  | 10 | 12 | 8  | 412 | Jul 24 Wednesday |
| 207 | 9  | 9  | 15 | 32 | 1   | 7  | 12 | 12 | 16 | 27 | 31 | 26  | 18 | 10 | 10 | 9  | 18 | 11 | 1  | 2  | 3  | 11 | 7  | 10 | 307 | Jul 25 Thursday  |
| 208 | 5  | 3  | 8  | 26 | 8   | 17 | 12 | 15 | 19 | 31 | 43 | 21  | 11 | 18 | 15 | 6  | 0  | 6  | 8  | 6  | 8  | 1  | 7  | 6  | 300 | Jul 26 Friday    |
| 209 | 10 | 1  | 4  | 13 | 10  | 2  | 12 | 10 | 18 | 6  | 10 | 12  | 7  | 4  | 17 | 22 | 11 | 8  | 6  | 14 | 8  | 4  | 11 | 4  | 224 | Jul 27 Saturday  |
| 210 | 2  | 6  | 2  | 3  | 2   | 3  | 6  | 10 | 6  | 3  | 11 | 6   | 7  | 7  | 6  | 5  | 9  | 1  | 4  | 4  | 4  | 12 | 4  | 6  | 129 | Jul 28 Sunday    |
| 211 | 13 | 10 | 15 | 87 | 1   | 3  | 12 | 21 | 19 | 23 | 30 | 31  | 27 | 22 | 16 | 6  | 2  | 5  | 3  | 4  | 8  | 7  | 6  | 4  | 375 | Jul 29 Monday    |
| 212 | 9  | 13 | 6  | 45 | 5   | 8  | 7  | 9  | 19 | 24 | 29 | 41  | 9  | 11 | 15 | 3  | 4  | 6  | 6  | 5  | 1  | 4  | 5  | 6  | 290 | Jul 30 Tuesday   |
| 213 | 9  | 6  | 6  | 33 | 25  | 7  | 13 | 16 | 28 | 20 | 28 | 22  | 16 | 8  | 12 | 14 | 8  | 6  | 11 | 2  | 7  | 8  | 16 | 10 | 331 | Jul 31 Wednesday |
| 214 | 6  | 11 | 9  | 19 | 16  | 18 | 15 | 21 | 30 | 24 | 29 | 26  | 19 | 9  | 14 | 11 | 11 | 4  | 2  | 9  | 4  | 8  | 14 | 3  | 332 | Aug 01 Thursday  |
| 215 | 9  | 12 | 0  | 0  | 0   | 0  | 16 | 12 | 9  | 32 | 36 | 31  | 15 | 12 | 8  | 23 | 8  | 17 | 9  | 24 | 5  | 36 | 0  | 0  | 322 | Aug 02 Friday    |
| 216 | 0  | 0  | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 4  | 29  | 10 | 2  | 10 | 22 | 15 | 18 | 12 | 4  | 2  | 3  | 1  | 0  | 132 | Aug 03 Saturday  |
| 217 | 2  | 2  | 0  | 2  | 3   | 7  | 5  | 10 | 7  | 21 | 22 | 21  | 1  | 5  | 3  | 7  | 1  | 10 | 2  | 3  | 5  | 5  | 7  | 7  | 158 | Aug 04 Sunday    |
| 218 | 7  | 12 | 23 | 39 | 7   | 8  | 7  | 10 | 21 | 22 | 18 | 28  | 21 | 15 | 4  | 5  | 0  | 8  | 4  | 7  | 6  | 4  | 19 | 11 | 306 | Aug 05 Monday    |
| 219 | 10 | 3  | 8  | 23 | 4   | 8  | 11 | 9  | 20 | 20 | 35 | 23  | 20 | 11 | 8  | 11 | 0  | 3  | 0  | 1  | 10 | 1  | 2  | 9  | 250 | Aug 06 Tuesday   |
| 220 | 3  | 7  | 8  | 1  | 29  | 14 | 14 | 13 | 9  | 26 | 40 | 23  | 24 | 15 | 15 | 8  | 6  | 4  | 3  | 6  | 3  | 6  | 5  | 4  | 286 | Aug 07 Wednesday |
| 221 | 3  | 6  | 17 | 10 | 6   | 13 | 11 | 9  | 28 | 18 | 29 | 32  | 39 | 19 | 9  | 12 | 1  | 10 | 8  | 2  | 1  | 7  | 19 | 7  | 316 | Aug 08 Thursday  |
| 222 | 14 | 7  | 6  | 9  | 6   | 17 | 19 | 13 | 17 | 26 | 40 | 26  | 18 | 6  | 17 | 10 | 9  | 1  | 7  | 1  | 2  | 2  | 3  | 7  | 283 | Aug 09 Friday    |
| 223 | 14 | 2  | 5  | 10 | 7   | 1  | 10 | 3  | 6  | 17 | 6  | 26  | 5  | 13 | 2  | 9  | 1  | 10 | 12 | 3  | 1  | 10 | 10 | 0  | 182 | Aug 10 Saturday  |
| 224 | 5  | 13 | 4  | 7  | 2   | 3  | 3  | 5  | 5  | 3  | 3  | 13  | 9  | 2  | 6  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 83  | Aug 11 Sunday    |
| 225 | 0  | 0  | 0  | 0  | 0   | 0  | 0  | 10 | 15 | 26 | 24 | 17  | 10 | 20 | 16 | 16 | 5  | 3  | 9  | 4  | 10 | 11 | 3  | 6  | 205 | Aug 12 Monday    |
| 226 | 2  | 14 | 9  | 7  | 15  | 18 | 17 | 21 | 14 | 59 | 37 | 17  | 20 | 11 | 21 | 28 | 32 | 15 | 6  | 8  | 8  | 3  | 11 | 4  | 397 | Aug 13 Tuesday   |
| 227 | 4  | 11 | 11 | 9  | 0   | 0  | 17 | 46 | 11 | 16 | 23 | 55  | 22 | 26 | 10 | 13 | 12 | 4  | 2  | 5  | 7  | 4  | 4  | 2  | 314 | Aug 14 Wednesday |
| 228 | 4  | 1  | 6  | 5  | 8   | 1  | 12 | 10 | 10 | 29 | 38 | 27  | 8  | 18 | 11 | 6  | 4  | 5  | 5  | 9  | 3  | 11 | 3  | 16 | 250 | Aug 15 Thursday  |
| 229 | 17 | 8  | 10 | 5  | 15  | 10 | 16 | 12 | 26 | 25 | 45 | 27  | 12 | 19 | 11 | 7  | 7  | 5  | 1  | 8  | 7  | 3  | 3  | 6  | 305 | Aug 16 Friday    |
| 230 | 4  | 5  | 5  | 4  | 4   | 4  | 4  | 4  | 6  | 12 | 7  | 27  | 10 | 5  | 5  | 12 | 5  | 2  | 1  | 0  | 3  | 2  | 1  | 1  | 133 | Aug 17 Saturday  |
| 231 | 4  | 2  | 2  | 3  | 9   | 3  | 4  | 9  | 2  | 7  | 5  | 4   | 4  | 7  | 6  | 7  | 3  | 2  | 5  | 1  | 3  | 6  | 4  | 6  | 108 | Aug 18 Sunday    |
| 232 | 4  | 6  | 5  | 6  | 8   | 9  | 15 | 25 | 20 | 38 | 26 | 21  | 14 | 31 | 20 | 2  | 7  | 4  | 8  | 8  | 5  | 6  | 7  | 6  | 301 | Aug 19 Monday    |
| 233 | 6  | 8  | 3  | 4  | 15  | 21 | 29 | 28 | 23 | 39 | 16 | 32  | 21 | 12 | 13 | 29 | 7  | 10 | 3  | 4  | 5  | 1  | 7  | 3  | 359 | Aug 20 Tuesday   |
| 234 | 5  | 5  | 10 | 3  | 9   | 25 | 16 | 27 | 22 | 31 | 23 | 36  | 22 | 31 | 13 | 23 | 5  | 5  | 6  | 11 | 6  | 5  | 8  | 3  | 350 | Aug 21 Wednesday |
| 235 | 3  | 7  | 14 | 7  | 6   | 10 | 16 | 30 | 15 | 30 | 96 | 102 | 25 | 9  | 19 | 24 | 10 | 5  | 12 | 18 | 13 | 6  | 2  | 7  | 486 | Aug 22 Thursday  |
| 236 | 5  | 11 | 8  | 11 | 12  | 17 | 35 | 19 | 16 | 23 | 38 | 22  | 7  | 14 | 6  | 4  | 1  | 3  | 7  | 18 | 3  | 7  | 2  | 0  | 289 | Aug 23 Friday    |
| 237 | 1  | 1  | 17 | 1  | 3   | 5  | 2  | 1  | 6  | 8  | 2  | 8   | 11 | 7  | 5  | 8  | 2  | 8  | 12 | 7  | 4  | 11 | 5  | 8  | 143 | Aug 24 Saturday  |
| 238 | 8  | 3  | 2  | 2  | 5   | 3  | 3  | 1  | 8  | 6  | 7  | 0   | 8  | 7  | 3  | 8  | 2  | 2  | 0  | 1  | 8  | 5  | 9  | 6  | 107 | Aug 25 Sunday    |
| 239 | 5  | 6  | 14 | 4  | 13  | 11 | 13 | 11 | 19 | 35 | 30 | 23  | 21 | 28 | 9  | 5  | 7  | 9  | 6  | 7  | 8  | 3  | 4  | 2  | 293 | Aug 26 Monday    |
| 240 | 9  | 16 | 9  | 2  | 3   | 7  | 21 | 26 | 17 | 29 | 27 | 33  | 13 | 12 | 41 | 14 | 2  | 5  | 9  | 3  | 1  | 3  | 4  | 9  | 315 | Aug 27 Tuesday   |
| 241 | 5  | 5  | 11 | 4  | 10  | 26 | 20 | 13 | 11 | 17 | 26 | 17  | 23 | 16 | 19 | 8  | 11 | 14 | 10 | 32 | 24 | 6  | 9  | 5  | 342 | Aug 28 Wednesday |
| 242 | 5  | 8  | 9  | 18 | 5   | 20 | 22 | 11 | 23 | 33 | 21 | 35  | 27 | 12 | 9  | 7  | 4  | 9  | 7  | 9  | 9  | 9  | 47 | 7  | 366 | Aug 29 Thursday  |
| 243 | 6  | 8  | 12 | 9  | 5   | 3  | 4  | 18 | 15 | 31 | 35 | 17  | 11 | 11 | 9  | 7  | 14 | 3  | 4  | 7  | 17 | 7  | 4  | 7  | 264 | Aug 30 Friday    |
| 244 | 4  | 2  | 6  | 7  | 22  | 6  | 4  | 7  | 10 | 14 | 27 | 33  | 27 | 9  | 8  | 18 | 9  | 10 | 5  | 8  | 4  | 8  | 0  | 3  | 251 | Aug 31 Saturday  |
| 245 | 1  | 3  | 9  | 3  | 5   | 7  | 19 | 19 | 14 | 18 | 16 | 4   | 3  | 11 | 5  | 7  | 1  | 1  | 3  | 1  | 2  | 3  | 10 | 3  | 168 | Sep 01 Sunday    |
| 246 | 12 | 7  | 11 | 14 | 5   | 13 | 13 | 11 | 15 | 28 | 15 | 29  | 29 | 11 | 7  | 10 | 20 | 8  | 9  | 4  | 8  | 10 | 5  | 9  | 303 | Sep 02 Monday    |
| 247 | 8  | 8  | 5  | 9  | 4   | 7  | 12 | 10 | 20 | 15 | 52 | 27  | 22 | 16 | 7  | 7  | 11 | 2  | 5  | 1  | 7  | 5  | 4  | 4  | 268 | Sep 03 Tuesday   |
| 248 | 9  | 9  | 7  | 7  | 13  | 6  | 17 | 7  | 24 | 29 | 34 | 31  | 28 | 25 | 11 | 23 | 6  | 4  | 11 | 13 | 8  | 8  | 7  | 3  | 340 | Sep 04 Wednesday |
| 249 | 3  | 6  | 6  | 1  | 11  | 3  | 13 | 9  | 19 | 37 | 24 | 19  | 9  | 7  | 22 | 8  | 5  | 3  | 2  | 7  | 13 | 23 | 12 | 17 | 279 | Sep 05 Thursday  |
| 250 | 31 | 21 | 22 | 25 | 12  | 12 | 13 | 20 | 29 | 25 | 29 | 22  | 19 | 13 | 14 | 14 | 24 | 11 | 12 | 14 | 15 | 11 | 1  | 2  | 411 | Sep 06 Friday    |
| 251 | 11 | 3  | 7  | 21 | 25  | 18 | 6  | 6  | 8  | 10 | 19 | 10  | 5  | 10 | 5  | 0  | 0  | 5  | 9  | 13 | 5  | 4  | 1  | 3  | 204 | Sep 07 Saturday  |
| 252 | 6  | 11 | 5  | 6  | 1   | 15 | 15 | 16 | 17 | 18 | 12 | 13  | 21 | 3  | 6  | 4  | 10 | 4  | 1  | 8  | 11 | 10 | 6  | 7  | 226 | Sep 08 Sunday    |
| 253 | 15 | 11 | 7  | 10 | 9   | 9  | 11 | 10 | 21 | 28 | 23 | 30  | 27 | 12 | 22 | 8  | 19 | 12 | 15 | 6  | 4  | 5  | 5  | 7  | 326 | Sep 09 Monday    |
| 254 | 4  | 7  | 6  | 4  | 9   | 14 | 11 | 14 | 19 | 21 | 27 | 24  | 21 | 19 | 6  | 7  | 12 | 13 | 6  | 4  | 7  | 0  | 12 | 6  | 273 | Sep 10 Tuesday   |
| 255 | 10 | 53 | 11 | 23 | 1   | 6  | 5  | 12 | 9  | 29 | 35 | 20  | 18 | 13 | 11 | 8  | 9  | 4  | 0  | 3  | 6  | 3  | 4  | 7  | 300 | Sep 11 Wednesday |
| 256 | 4  | 4  | 7  | 8  | 10  | 6  | 7  | 10 | 14 | 23 | 16 | 30  | 19 | 14 | 16 | 6  | 4  | 4  | 8  | 8  | 3  | 4  | 7  | 7  | 239 | Sep 12 Thursday  |
| 257 | 3  | 12 | 11 | 6  | 4   | 7  | 8  | 21 | 16 | 29 | 39 | 25  | 9  | 4  | 2  | 13 | 4  | 3  | 6  | 7  | 2  | 10 | 4  | 5  | 250 | Sep 13 Friday    |
| 258 | 2  | 3  | 11 | 6  | 4   | 3  | 12 | 3  | 8  | 4  | 2  | 13  | 13 | 12 | 10 | 7  | 6  | 4  | 3  | 2  | 2  | 1  | 12 | 8  | 151 | Sep 14 Saturday  |
| 259 | 7  | 6  | 6  | 8  | 4   | 1  | 3  | 6  | 14 | 11 | 18 | 9   | 11 | 5  | 6  | 5  | 2  | 2  | 6  | 3  | 1  | 4  | 16 | 12 | 166 | Sep 15 Sunday    |

Table 3.5.4 (Page 3 of 4)

## GER .FKX Hourly distribution of detections

| Day | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|-----------|----|----|----|----|----|----|----|----|----|----|-----|------------------|
| 260 | 12   | 7    | 28   | 33   | 26   | 7    | 9    | 10   | 21   | 22   | 13   | 14   | 10    | 12        | 19 | 9  | 7  | 5  | 0  | 1  | 4  | 11 | 5  | 2  | 287 | Sep 16 Monday    |
| 261 | 2    | 6    | 6    | 4    | 3    | 9    | 7    | 14   | 23   | 18   | 18   | 26   | 18    | 29        | 24 | 14 | 1  | 4  | 9  | 3  | 9  | 5  | 6  | 13 | 271 | Sep 17 Tuesday   |
| 262 | 8    | 4    | 7    | 9    | 4    | 13   | 8    | 14   | 23   | 18   | 30   | 36   | 15    | 13        | 24 | 7  | 8  | 8  | 5  | 2  | 6  | 2  | 0  | 12 | 276 | Sep 18 Wednesday |
| 263 | 6    | 9    | 8    | 10   | 15   | 11   | 9    | 10   | 17   | 25   | 34   | 23   | 17    | 11        | 25 | 6  | 6  | 7  | 8  | 6  | 7  | 5  | 3  | 4  | 282 | Sep 19 Thursday  |
| 264 | 11   | 10   | 8    | 4    | 11   | 6    | 7    | 16   | 12   | 25   | 17   | 30   | 16    | 7         | 8  | 7  | 8  | 18 | 11 | 13 | 8  | 11 | 7  | 8  | 279 | Sep 20 Friday    |
| 265 | 5    | 12   | 7    | 13   | 3    | 1    | 2    | 11   | 1    | 1    | 5    | 9    | 10    | 5         | 4  | 2  | 4  | 6  | 7  | 7  | 8  | 2  | 10 | 6  | 141 | Sep 21 Saturday  |
| 266 | 4    | 8    | 6    | 2    | 6    | 1    | 10   | 4    | 4    | 2    | 3    | 11   | 3     | 3         | 2  | 0  | 2  | 0  | 4  | 2  | 7  | 4  | 5  | 5  | 98  | Sep 22 Sunday    |
| 267 | 10   | 10   | 3    | 11   | 3    | 7    | 8    | 8    | 10   | 21   | 34   | 18   | 15    | 18        | 11 | 15 | 12 | 1  | 6  | 3  | 0  | 7  | 5  | 4  | 240 | Sep 23 Monday    |
| 268 | 11   | 8    | 14   | 2    | 20   | 7    | 3    | 11   | 25   | 32   | 28   | 38   | 14    | 15        | 7  | 3  | 6  | 2  | 6  | 7  | 10 | 5  | 6  | 13 | 293 | Sep 24 Tuesday   |
| 269 | 5    | 10   | 10   | 2    | 12   | 9    | 9    | 13   | 10   | 26   | 34   | 35   | 17    | 13        | 16 | 13 | 11 | 20 | 4  | 7  | 3  | 5  | 7  | 3  | 294 | Sep 25 Wednesday |
| 270 | 11   | 13   | 10   | 8    | 4    | 23   | 12   | 11   | 37   | 27   | 50   | 20   | 30    | 26        | 11 | 14 | 7  | 2  | 5  | 4  | 5  | 2  | 5  | 2  | 339 | Sep 26 Thursday  |
| 271 | 7    | 4    | 12   | 2    | 15   | 11   | 17   | 13   | 15   | 32   | 44   | 23   | 31    | 14        | 19 | 1  | 11 | 10 | 5  | 3  | 9  | 3  | 9  | 4  | 314 | Sep 27 Friday    |
| 272 | 4    | 6    | 13   | 6    | 2    | 8    | 8    | 10   | 11   | 10   | 20   | 19   | 9     | 4         | 10 | 7  | 5  | 6  | 3  | 11 | 5  | 4  | 2  | 1  | 184 | Sep 28 Saturday  |
| 273 | 4    | 5    | 5    | 2    | 0    | 3    | 9    | 7    | 0    | 12   | 7    | 14   | 5     | 12        | 4  | 2  | 5  | 5  | 2  | 7  | 6  | 9  | 5  | 5  | 135 | Sep 29 Sunday    |
| 274 | 11   | 9    | 2    | 18   | 10   | 10   | 9    | 20   | 9    | 22   | 34   | 22   | 12    | 16        | 8  | 5  | 13 | 2  | 8  | 10 | 4  | 3  | 6  | 7  | 270 | Sep 30 Monday    |
| GER | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |     |                  |
| Sum | 1425 | 1870 | 1559 | 2261 | 3721 | 3997 | 2450 | 2120 | 1518 | 1560 | 1359 | 1259 |       |           |    |    |    |    |    |    |    |    |    |    |     |                  |
|     | 1335 | 1575 | 1618 | 1916 | 2934 | 4366 | 2877 | 2130 | 1705 | 1341 | 1348 | 1434 | 49678 | Total sum |    |    |    |    |    |    |    |    |    |    |     |                  |
| 183 | 7    | 8    | 9    | 10   | 9    | 9    | 10   | 12   | 16   | 20   | 24   | 22   | 16    | 13        | 12 | 12 | 9  | 8  | 7  | 9  | 7  | 7  | 8  | 7  | 271 | Total average    |
| 124 | 8    | 9    | 10   | 11   | 10   | 10   | 12   | 15   | 20   | 25   | 30   | 26   | 19    | 16        | 14 | 13 | 11 | 9  | 9  | 9  | 8  | 7  | 8  | 7  | 317 | Average workdays |
| 59  | 6    | 5    | 6    | 8    | 7    | 6    | 7    | 7    | 8    | 10   | 11   | 12   | 8     | 7         | 6  | 8  | 7  | 6  | 5  | 6  | 5  | 8  | 7  | 6  | 173 | Average weekends |

Table 3.5.4. (Page 4 of 4) Daily and hourly distribution of GERESS detections. For each day is shown number of detections within each hour of the day, and number of detections for that day. The end statistics give total number of detections distributed for each hour and the total sum of detections during the period. The averages show number of processed days, hourly distribution and average per processed day.

## APA .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23  | Sum              | Date             |               |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|------------------|---------------|
| 92  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0   | 3                | Apr 01 Monday    |               |
| 93  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | 2                | Apr 02 Tuesday   |               |
| 94  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | 2                | Apr 03 Wednesday |               |
| 95  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | 1                | Apr 04 Thursday  |               |
| 96  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 3  | 3  | 0  | 1  | 0  | 0  | 1  | 0  | 0  | 0  | 0  | 0   | 8                | Apr 05 Friday    |               |
| 97  | 0  | 9  | 3  | 6  | 10 | 8  | 11 | 4  | 5  | 14 | 9  | 23 | 13 | 3  | 12 | 16 | 6  | 7  | 0  | 6  | 1  | 12 | 4  | 3   | 185              | Apr 06 Saturday  |               |
| 98  | 1  | 0  | 4  | 4  | 10 | 11 | 21 | 10 | 7  | 3  | 6  | 4  | 11 | 5  | 2  | 10 | 7  | 2  | 2  | 2  | 4  | 5  | 1  | 2   | 134              | Apr 07 Sunday    |               |
| 99  | 3  | 6  | 13 | 14 | 4  | 23 | 19 | 20 | 17 | 10 | 22 | 5  | 13 | 12 | 18 | 4  | 4  | 13 | 6  | 9  | 5  | 4  | 3  | 3   | 250              | Apr 08 Monday    |               |
| 100 | 2  | 6  | 8  | 8  | 20 | 22 | 11 | 16 | 19 | 12 | 8  | 18 | 22 | 14 | 5  | 10 | 8  | 13 | 10 | 7  | 2  | 2  | 0  | 2   | 245              | Apr 09 Tuesday   |               |
| 101 | 4  | 14 | 16 | 10 | 10 | 22 | 20 | 9  | 18 | 16 | 22 | 27 | 13 | 15 | 9  | 12 | 4  | 8  | 4  | 2  | 5  | 6  | 5  | 2   | 273              | Apr 10 Wednesday |               |
| 102 | 3  | 4  | 20 | 13 | 13 | 25 | 21 | 16 | 21 | 0  | 12 | 16 | 16 | 13 | 3  | 3  | 2  | 6  | 1  | 7  | 12 | 3  | 1  | 8   | 239              | Apr 11 Thursday  |               |
| 103 | 9  | 6  | 7  | 20 | 9  | 11 | 15 | 9  | 17 | 24 | 21 | 35 | 14 | 9  | 12 | 14 | 6  | 3  | 0  | 3  | 6  | 5  | 8  | 5   | 268              | Apr 12 Friday    |               |
| 104 | 6  | 6  | 1  | 3  | 6  | 4  | 9  | 3  | 4  | 14 | 21 | 8  | 7  | 8  | 6  | 5  | 11 | 12 | 3  | 4  | 6  | 3  | 8  | 6   | 164              | Apr 13 Saturday  |               |
| 105 | 4  | 2  | 8  | 5  | 10 | 4  | 4  | 2  | 3  | 8  | 10 | 3  | 12 | 5  | 9  | 2  | 3  | 1  | 5  | 3  | 3  | 2  | 1  | 9   | 118              | Apr 14 Sunday    |               |
| 106 | 2  | 6  | 9  | 15 | 14 | 20 | 19 | 12 | 7  | 11 | 11 | 10 | 18 | 4  | 3  | 3  | 4  | 14 | 2  | 3  | 8  | 5  | 3  | 2   | 205              | Apr 15 Monday    |               |
| 107 | 17 | 4  | 8  | 14 | 11 | 11 | 24 | 25 | 8  | 8  | 8  | 11 | 13 | 6  | 2  | 3  | 8  | 6  | 1  | 1  | 7  | 0  | 4  | 9   | 209              | Apr 16 Tuesday   |               |
| 108 | 8  | 21 | 18 | 23 | 13 | 21 | 15 | 9  | 15 | 22 | 16 | 25 | 18 | 14 | 5  | 3  | 7  | 2  | 6  | 3  | 6  | 10 | 11 | 6   | 297              | Apr 17 Wednesday |               |
| 109 | 7  | 13 | 12 | 11 | 22 | 14 | 16 | 13 | 10 | 6  | 9  | 19 | 19 | 10 | 6  | 3  | 6  | 8  | 4  | 7  | 5  | 2  | 12 | 3   | 237              | Apr 18 Thursday  |               |
| 110 | 6  | 7  | 11 | 8  | 8  | 10 | 10 | 18 | 11 | 18 | 6  | 25 | 15 | 18 | 7  | 2  | 6  | 10 | 1  | 0  | 7  | 1  | 4  | 0   | 209              | Apr 19 Friday    |               |
| 111 | 2  | 0  | 1  | 2  | 2  | 3  | 4  | 3  | 6  | 4  | 20 | 10 | 6  | 4  | 0  | 6  | 5  | 4  | 7  | 1  | 2  | 2  | 1  | 4   | 99               | Apr 20 Saturday  |               |
| 112 | 2  | 4  | 3  | 3  | 4  | 7  | 3  | 2  | 0  | 5  | 2  | 8  | 4  | 2  | 4  | 2  | 4  | 1  | 0  | 0  | 1  | 1  | 0  | 0   | 62               | Apr 21 Sunday    |               |
| 113 | 2  | 5  | 9  | 10 | 9  | 11 | 9  | 9  | 15 | 14 | 9  | 18 | 10 | 13 | 8  | 5  | 5  | 2  | 3  | 1  | 2  | 3  | 3  | 1   | 176              | Apr 22 Monday    |               |
| 114 | 0  | 1  | 10 | 10 | 8  | 7  | 7  | 10 | 15 | 10 | 14 | 14 | 4  | 10 | 6  | 9  | 6  | 3  | 2  | 3  | 6  | 4  | 4  | 14  | 177              | Apr 23 Tuesday   |               |
| 115 | 5  | 4  | 9  | 5  | 9  | 7  | 8  | 12 | 11 | 11 | 11 | 14 | 14 | 12 | 2  | 7  | 3  | 0  | 7  | 5  | 3  | 6  | 7  | 174 | Apr 24 Wednesday |                  |               |
| 116 | 7  | 2  | 11 | 7  | 9  | 12 | 9  | 19 | 11 | 19 | 18 | 13 | 25 | 15 | 7  | 2  | 5  | 2  | 6  | 7  | 1  | 1  | 0  | 5   | 213              | Apr 25 Thursday  |               |
| 117 | 2  | 4  | 5  | 1  | 3  | 8  | 11 | 12 | 13 | 18 | 9  | 29 | 7  | 12 | 4  | 9  | 8  | 9  | 9  | 6  | 3  | 5  | 1  | 2   | 190              | Apr 26 Friday    |               |
| 118 | 2  | 5  | 3  | 7  | 5  | 4  | 4  | 7  | 7  | 11 | 17 | 5  | 7  | 5  | 10 | 2  | 13 | 15 | 5  | 6  | 18 | 6  | 1  | 0   | 165              | Apr 27 Saturday  |               |
| 119 | 1  | 1  | 4  | 2  | 2  | 4  | 10 | 1  | 5  | 3  | 8  | 6  | 11 | 2  | 2  | 2  | 5  | 1  | 4  | 7  | 7  | 5  | 4  | 4   | 1                | 100              | Apr 28 Sunday |
| 120 | 4  | 6  | 21 | 12 | 3  | 22 | 36 | 23 | 15 | 8  | 17 | 19 | 38 | 18 | 32 | 16 | 14 | 22 | 5  | 8  | 5  | 4  | 5  | 6   | 359              | Apr 29 Monday    |               |
| 121 | 9  | 8  | 21 | 20 | 23 | 17 | 14 | 23 | 15 | 25 | 14 | 23 | 24 | 13 | 18 | 22 | 14 | 13 | 8  | 6  | 7  | 9  | 4  | 4   | 363              | Apr 30 Tuesday   |               |
| 122 | 8  | 5  | 6  | 3  | 12 | 13 | 18 | 6  | 11 | 8  | 7  | 6  | 5  | 9  | 8  | 7  | 11 | 11 | 12 | 3  | 1  | 6  | 2  | 2   | 180              | May 01 Wednesday |               |
| 123 | 6  | 9  | 13 | 2  | 6  | 15 | 10 | 2  | 4  | 10 | 7  | 5  | 7  | 19 | 15 | 8  | 24 | 4  | 7  | 2  | 3  | 1  | 1  | 7   | 187              | May 02 Thursday  |               |
| 124 | 0  | 6  | 11 | 13 | 6  | 10 | 11 | 6  | 5  | 11 | 0  | 10 | 8  | 4  | 10 | 9  | 14 | 9  | 6  | 3  | 6  | 2  | 2  | 5   | 167              | May 03 Friday    |               |
| 125 | 0  | 8  | 6  | 0  | 8  | 6  | 8  | 15 | 7  | 13 | 6  | 12 | 12 | 4  | 7  | 8  | 7  | 9  | 5  | 1  | 4  | 2  | 4  | 4   | 156              | May 04 Saturday  |               |
| 126 | 1  | 17 | 14 | 15 | 15 | 19 | 30 | 14 | 16 | 15 | 22 | 11 | 22 | 17 | 21 | 5  | 14 | 8  | 11 | 10 | 6  | 2  | 3  | 6   | 314              | May 05 Sunday    |               |
| 127 | 2  | 14 | 21 | 13 | 25 | 43 | 41 | 26 | 39 | 26 | 27 | 37 | 24 | 23 | 13 | 28 | 18 | 20 | 7  | 7  | 5  | 1  | 2  | 1   | 463              | May 06 Monday    |               |
| 128 | 17 | 5  | 14 | 14 | 31 | 34 | 34 | 44 | 30 | 25 | 36 | 39 | 21 | 21 | 23 | 32 | 20 | 21 | 13 | 14 | 10 | 13 | 7  | 8   | 526              | May 07 Tuesday   |               |
| 129 | 10 | 8  | 20 | 22 | 15 | 38 | 37 | 29 | 22 | 34 | 41 | 28 | 30 | 21 | 27 | 29 | 23 | 17 | 6  | 14 | 14 | 8  | 8  | 2   | 503              | May 08 Wednesday |               |
| 130 | 5  | 1  | 3  | 9  | 18 | 1  | 6  | 9  | 2  | 4  | 12 | 6  | 17 | 15 | 18 | 6  | 22 | 5  | 15 | 4  | 3  | 1  | 3  | 1   | 186              | May 09 Thursday  |               |
| 131 | 4  | 1  | 13 | 4  | 8  | 7  | 9  | 5  | 13 | 9  | 20 | 5  | 12 | 4  | 7  | 17 | 12 | 13 | 10 | 11 | 16 | 3  | 2  | 4   | 209              | May 10 Friday    |               |
| 132 | 7  | 3  | 20 | 10 | 22 | 14 | 13 | 11 | 9  | 17 | 3  | 10 | 6  | 7  | 14 | 6  | 11 | 7  | 7  | 1  | 7  | 4  | 8  | 5   | 222              | May 11 Saturday  |               |
| 133 | 8  | 5  | 10 | 13 | 20 | 16 | 24 | 24 | 15 | 15 | 12 | 19 | 16 | 12 | 16 | 11 | 7  | 16 | 19 | 6  | 4  | 9  | 11 | 3   | 311              | May 12 Sunday    |               |
| 134 | 12 | 8  | 32 | 17 | 23 | 43 | 29 | 50 | 36 | 33 | 28 | 26 | 45 | 22 | 7  | 19 | 11 | 12 | 11 | 7  | 5  | 3  | 6  | 2   | 487              | May 13 Monday    |               |
| 135 | 3  | 8  | 11 | 18 | 23 | 56 | 36 | 47 | 18 | 16 | 28 | 20 | 32 | 25 | 10 | 17 | 10 | 10 | 9  | 7  | 6  | 0  | 6  | 2   | 418              | May 14 Tuesday   |               |
| 136 | 7  | 8  | 21 | 26 | 20 | 37 | 35 | 26 | 27 | 32 | 19 | 29 | 28 | 20 | 14 | 16 | 13 | 9  | 7  | 12 | 7  | 10 | 2  | 1   | 426              | May 15 Wednesday |               |
| 137 | 1  | 9  | 31 | 18 | 21 | 24 | 45 | 19 | 23 | 19 | 26 | 41 | 32 | 26 | 17 | 10 | 6  | 11 | 2  | 8  | 1  | 0  | 13 | 10  | 413              | May 16 Thursday  |               |
| 138 | 9  | 13 | 10 | 30 | 32 | 31 | 30 | 36 | 19 | 28 | 40 | 39 | 25 | 48 | 17 | 26 | 17 | 15 | 8  | 5  | 5  | 6  | 7  | 2   | 498              | May 17 Friday    |               |
| 139 | 6  | 9  | 13 | 12 | 3  | 11 | 9  | 17 | 20 | 10 | 8  | 17 | 10 | 15 | 11 | 11 | 20 | 3  | 6  | 6  | 9  | 3  | 4  | 5   | 238              | May 18 Saturday  |               |
| 140 | 5  | 6  | 4  | 12 | 13 | 19 | 9  | 5  | 6  | 6  | 9  | 9  | 10 | 7  | 10 | 6  | 5  | 15 | 2  | 12 | 5  | 4  | 4  | 19  | 202              | May 19 Sunday    |               |
| 141 | 8  | 15 | 23 | 17 | 16 | 30 | 34 | 37 | 39 | 17 | 24 | 25 | 25 | 27 | 19 | 18 | 13 | 9  | 6  | 7  | 5  | 2  | 1  | 3   | 420              | May 20 Monday    |               |
| 142 | 4  | 12 | 30 | 23 | 30 | 43 | 37 | 50 | 31 | 36 | 18 | 27 | 26 | 31 | 34 | 20 | 18 | 14 | 13 | 12 | 5  | 9  | 5  | 0   | 528              | May 21 Tuesday   |               |
| 143 | 8  | 13 | 29 | 32 | 26 | 50 | 31 | 28 | 43 | 33 | 36 | 24 | 32 | 31 | 18 | 9  | 19 | 16 | 12 | 8  | 1  | 6  | 4  | 0   | 509              | May 22 Wednesday |               |
| 144 | 5  | 15 | 26 | 17 | 33 | 23 | 36 | 73 | 58 | 30 | 28 | 32 | 45 | 37 | 13 | 13 | 11 | 7  | 3  | 8  | 6  | 4  | 2  | 1   | 526              | May 23 Thursday  |               |
| 145 | 5  | 5  | 17 | 19 | 16 | 28 | 42 | 38 | 44 | 34 | 20 | 38 | 31 | 33 | 23 | 14 | 23 | 10 | 7  | 8  | 24 | 1  | 9  | 9   | 498              | May 24 Friday    |               |
| 146 | 1  | 7  | 2  | 2  | 11 | 16 | 9  | 4  | 10 | 16 | 18 | 14 | 15 | 10 | 11 | 0  | 10 | 11 | 10 | 1  | 7  | 5  | 0  | 2   | 192              | May 25 Saturday  |               |
| 147 | 8  | 9  | 1  | 0  | 12 | 5  | 15 | 6  | 15 | 12 | 26 | 25 | 12 | 19 | 13 | 2  | 6  | 16 | 6  | 1  | 0  | 8  | 4  | 0   | 221              | May 26 Sunday    |               |

Table 3.5.5 (Page 1 of 4)

## APA .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07  | 08  | 09 | 10  | 11 | 12  | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum  | Date             |
|-----|----|----|----|----|----|----|----|-----|-----|----|-----|----|-----|----|----|----|----|----|----|----|----|----|----|----|------|------------------|
| 148 | 4  | 5  | 13 | 11 | 28 | 31 | 30 | 37  | 35  | 17 | 17  | 26 | 33  | 23 | 24 | 19 | 12 | 10 | 9  | 7  | 5  | 8  | 3  | 4  | 411  | May 27 Monday    |
| 149 | 4  | 11 | 18 | 18 | 38 | 45 | 31 | 21  | 35  | 31 | 37  | 41 | 27  | 37 | 30 | 15 | 20 | 15 | 11 | 20 | 3  | 1  | 6  | 5  | 520  | May 28 Tuesday   |
| 150 | 8  | 13 | 26 | 13 | 23 | 36 | 43 | 29  | 47  | 42 | 40  | 39 | 33  | 42 | 32 | 20 | 15 | 20 | 13 | 9  | 12 | 5  | 8  | 16 | 584  | May 29 Wednesday |
| 151 | 32 | 37 | 56 | 46 | 45 | 76 | 52 | 66  | 68  | 84 | 104 | 81 | 115 | 87 | 67 | 52 | 61 | 50 | 29 | 32 | 19 | 4  | 4  | 9  | 1276 | May 30 Thursday  |
| 152 | 8  | 16 | 15 | 8  | 14 | 40 | 36 | 22  | 26  | 35 | 31  | 40 | 21  | 20 | 19 | 22 | 18 | 10 | 2  | 5  | 9  | 8  | 12 | 8  | 445  | May 31 Friday    |
| 153 | 10 | 4  | 12 | 6  | 9  | 15 | 20 | 14  | 6   | 15 | 9   | 10 | 20  | 14 | 9  | 4  | 14 | 12 | 6  | 10 | 0  | 7  | 5  | 5  | 236  | Jun 01 Saturday  |
| 154 | 1  | 4  | 12 | 15 | 8  | 12 | 11 | 3   | 9   | 12 | 2   | 9  | 7   | 13 | 13 | 7  | 13 | 8  | 3  | 6  | 2  | 0  | 4  | 1  | 175  | Jun 02 Sunday    |
| 155 | 13 | 4  | 14 | 22 | 28 | 27 | 41 | 44  | 11  | 20 | 29  | 21 | 26  | 28 | 21 | 7  | 8  | 7  | 12 | 3  | 6  | 2  | 2  | 10 | 406  | Jun 03 Monday    |
| 156 | 0  | 13 | 26 | 16 | 28 | 21 | 39 | 20  | 21  | 18 | 29  | 37 | 27  | 28 | 17 | 15 | 8  | 8  | 8  | 3  | 9  | 0  | 10 | 5  | 406  | Jun 04 Tuesday   |
| 157 | 8  | 24 | 20 | 33 | 28 | 10 | 4  | 8   | 10  | 12 | 10  | 30 | 40  | 30 | 16 | 22 | 12 | 5  | 0  | 5  | 2  | 1  | 6  | 3  | 339  | Jun 05 Wednesday |
| 158 | 3  | 12 | 20 | 23 | 48 | 44 | 43 | 105 | 129 | 31 | 27  | 44 | 28  | 19 | 21 | 18 | 20 | 26 | 11 | 4  | 5  | 0  | 6  | 2  | 689  | Jun 06 Thursday  |
| 159 | 9  | 20 | 12 | 26 | 30 | 44 | 33 | 43  | 33  | 35 | 50  | 53 | 34  | 24 | 22 | 12 | 14 | 17 | 19 | 9  | 1  | 11 | 11 | 11 | 573  | Jun 07 Friday    |
| 160 | 5  | 6  | 32 | 15 | 20 | 10 | 20 | 4   | 4   | 11 | 6   | 11 | 10  | 14 | 12 | 2  | 18 | 8  | 6  | 4  | 5  | 8  | 3  | 15 | 249  | Jun 08 Saturday  |
| 161 | 5  | 16 | 6  | 11 | 13 | 9  | 17 | 4   | 11  | 23 | 4   | 27 | 18  | 24 | 20 | 20 | 22 | 12 | 10 | 13 | 28 | 23 | 5  | 23 | 364  | Jun 09 Sunday    |
| 162 | 11 | 15 | 24 | 22 | 46 | 33 | 36 | 27  | 29  | 38 | 37  | 32 | 29  | 35 | 13 | 28 | 18 | 17 | 2  | 2  | 8  | 11 | 4  | 1  | 518  | Jun 10 Monday    |
| 163 | 8  | 14 | 12 | 21 | 19 | 51 | 24 | 8   | 34  | 31 | 38  | 52 | 25  | 26 | 15 | 14 | 20 | 11 | 21 | 6  | 0  | 8  | 1  | 2  | 461  | Jun 11 Tuesday   |
| 164 | 4  | 5  | 8  | 21 | 7  | 10 | 7  | 4   | 8   | 10 | 11  | 14 | 10  | 8  | 24 | 3  | 5  | 7  | 9  | 1  | 4  | 8  | 5  | 0  | 193  | Jun 12 Wednesday |
| 165 | 6  | 13 | 21 | 17 | 28 | 36 | 30 | 40  | 21  | 32 | 22  | 25 | 32  | 22 | 15 | 17 | 8  | 23 | 9  | 28 | 13 | 3  | 3  | 3  | 467  | Jun 13 Thursday  |
| 166 | 16 | 14 | 25 | 37 | 30 | 38 | 67 | 37  | 45  | 62 | 47  | 55 | 50  | 52 | 43 | 46 | 34 | 28 | 28 | 31 | 35 | 21 | 19 | 25 | 885  | Jun 14 Friday    |
| 167 | 12 | 22 | 12 | 21 | 8  | 2  | 12 | 10  | 15  | 19 | 23  | 9  | 15  | 15 | 8  | 5  | 5  | 5  | 7  | 8  | 3  | 3  | 5  |    | 254  | Jun 15 Saturday  |
| 168 | 1  | 4  | 7  | 5  | 13 | 9  | 6  | 10  | 17  | 22 | 22  | 27 | 6   | 11 | 14 | 16 | 10 | 20 | 19 | 25 | 8  | 23 | 37 |    | 346  | Jun 16 Sunday    |
| 169 | 24 | 29 | 24 | 32 | 55 | 65 | 55 | 60  | 55  | 51 | 51  | 57 | 35  | 53 | 40 | 36 | 13 | 11 | 18 | 7  | 10 | 12 | 16 | 0  | 809  | Jun 17 Monday    |
| 170 | 6  | 6  | 23 | 17 | 28 | 30 | 40 | 31  | 63  | 34 | 38  | 29 | 27  | 46 | 20 | 18 | 19 | 6  | 0  | 10 | 5  | 0  | 4  | 7  | 507  | Jun 18 Tuesday   |
| 171 | 1  | 14 | 17 | 11 | 28 | 48 | 50 | 33  | 43  | 29 | 19  | 36 | 23  | 35 | 20 | 20 | 16 | 10 | 18 | 10 | 8  | 7  | 2  | 6  | 504  | Jun 19 Wednesday |
| 172 | 3  | 5  | 21 | 25 | 23 | 29 | 40 | 22  | 17  | 26 | 29  | 18 | 26  | 27 | 9  | 24 | 9  | 7  | 15 | 7  | 2  | 14 | 7  |    | 407  | Jun 20 Thursday  |
| 173 | 8  | 11 | 10 | 18 | 24 | 27 | 30 | 35  | 30  | 35 | 59  | 29 | 1   | 3  | 14 | 11 | 19 | 5  | 9  | 1  | 3  | 3  | 0  |    | 420  | Jun 21 Friday    |
| 174 | 2  | 7  | 7  | 13 | 11 | 14 | 17 | 4   | 28  | 16 | 20  | 16 | 15  | 12 | 14 | 4  | 14 | 10 | 8  | 2  | 1  | 0  | 1  | 8  | 244  | Jun 22 Saturday  |
| 175 | 2  | 7  | 17 | 9  | 13 | 14 | 16 | 5   | 21  | 2  | 9   | 9  | 22  | 15 | 11 | 18 | 8  | 6  | 0  | 7  | 7  | 9  | 2  | 1  | 230  | Jun 23 Sunday    |
| 176 | 8  | 13 | 15 | 13 | 24 | 34 | 33 | 24  | 26  | 31 | 37  | 35 | 29  | 27 | 20 | 11 | 20 | 15 | 7  | 16 | 0  | 1  | 3  | 0  | 442  | Jun 24 Monday    |
| 177 | 3  | 10 | 24 | 24 | 13 | 50 | 55 | 37  | 26  | 27 | 27  | 39 | 33  | 42 | 12 | 25 | 17 | 16 | 16 | 6  | 9  | 4  | 2  |    | 521  | Jun 25 Tuesday   |
| 178 | 13 | 18 | 12 | 22 | 25 | 26 | 37 | 41  | 30  | 33 | 41  | 44 | 35  | 21 | 12 | 27 | 14 | 19 | 22 | 3  | 4  | 8  | 10 | 4  | 521  | Jun 26 Wednesday |
| 179 | 7  | 3  | 27 | 22 | 29 | 49 | 28 | 25  | 20  | 23 | 18  | 31 | 28  | 26 | 21 | 27 | 8  | 15 | 11 | 6  | 6  | 2  | 6  | 5  | 443  | Jun 27 Thursday  |
| 180 | 4  | 22 | 28 | 16 | 25 | 22 | 31 | 32  | 28  | 29 | 34  | 53 | 24  | 35 | 26 | 13 | 24 | 14 | 7  | 7  | 5  | 10 | 2  | 1  | 492  | Jun 28 Friday    |
| 181 | 0  | 0  | 20 | 9  | 13 | 6  | 13 | 9   | 11  | 12 | 9   | 17 | 12  | 13 | 21 | 5  | 15 | 11 | 4  | 3  | 5  | 0  | 4  | 2  | 214  | Jun 29 Saturday  |
| 182 | 3  | 3  | 5  | 5  | 6  | 13 | 20 | 9   | 18  | 12 | 20  | 16 | 11  | 14 | 16 | 10 | 9  | 5  | 1  | 2  | 0  | 4  | 9  | 8  | 219  | Jun 30 Sunday    |
| 183 | 5  | 6  | 13 | 16 | 18 | 23 | 39 | 27  | 51  | 11 | 22  | 39 | 30  | 22 | 17 | 13 | 11 | 15 | 15 | 11 | 3  | 5  | 7  | 7  | 426  | Jul 01 Monday    |
| 184 | 0  | 11 | 12 | 19 | 26 | 56 | 26 | 22  | 32  | 21 | 24  | 26 | 22  | 21 | 26 | 15 | 22 | 9  | 8  | 6  | 2  | 2  | 1  | 2  | 411  | Jul 02 Tuesday   |
| 185 | 5  | 5  | 6  | 7  | 9  | 12 | 13 | 11  | 9   | 6  | 15  | 9  | 4   | 6  | 2  | 8  | 17 | 3  | 6  | 5  | 0  | 3  | 0  | 2  | 163  | Jul 03 Wednesday |
| 186 | 6  | 24 | 19 | 24 | 27 | 36 | 58 | 36  | 26  | 35 | 38  | 36 | 31  | 31 | 22 | 15 | 22 | 19 | 6  | 12 | 3  | 3  | 11 | 5  | 545  | Jul 04 Thursday  |
| 187 | 12 | 7  | 25 | 21 | 20 | 27 | 47 | 33  | 16  | 29 | 34  | 31 | 39  | 26 | 24 | 20 | 34 | 15 | 15 | 8  | 3  | 2  | 13 | 2  | 503  | Jul 05 Friday    |
| 188 | 2  | 15 | 6  | 7  | 19 | 25 | 10 | 27  | 18  | 9  | 11  | 19 | 15  | 9  | 8  | 10 | 7  | 15 | 7  | 1  | 7  | 10 | 2  | 7  | 266  | Jul 06 Saturday  |
| 189 | 2  | 7  | 5  | 10 | 8  | 4  | 13 | 4   | 13  | 19 | 10  | 12 | 13  | 16 | 6  | 12 | 8  | 6  | 8  | 2  | 7  | 9  | 15 | 18 | 227  | Jul 07 Sunday    |
| 190 | 32 | 26 | 35 | 44 | 25 | 43 | 37 | 47  | 33  | 23 | 40  | 42 | 31  | 31 | 23 | 21 | 13 | 17 | 10 | 18 | 15 | 4  | 10 | 5  | 625  | Jul 08 Monday    |
| 191 | 16 | 3  | 24 | 31 | 32 | 42 | 40 | 36  | 42  | 40 | 42  | 27 | 29  | 46 | 26 | 32 | 15 | 14 | 1  | 9  | 9  | 3  | 2  | 2  | 563  | Jul 09 Tuesday   |
| 192 | 7  | 8  | 9  | 23 | 21 | 39 | 30 | 43  | 23  | 38 | 28  | 33 | 21  | 27 | 14 | 9  | 20 | 18 | 2  | 17 | 0  | 12 | 3  | 2  | 447  | Jul 10 Wednesday |
| 193 | 0  | 11 | 13 | 15 | 21 | 29 | 30 | 41  | 30  | 33 | 38  | 38 | 33  | 34 | 23 | 28 | 20 | 19 | 5  | 16 | 6  | 4  | 8  | 0  | 495  | Jul 11 Thursday  |
| 194 | 2  | 9  | 17 | 17 | 16 | 37 | 39 | 34  | 25  | 40 | 26  | 57 | 38  | 32 | 26 | 21 | 27 | 9  | 23 | 12 | 3  | 4  | 0  | 2  | 516  | Jul 12 Friday    |
| 195 | 1  | 10 | 13 | 4  | 11 | 13 | 17 | 10  | 22  | 10 | 13  | 15 | 8   | 10 | 15 | 13 | 14 | 10 | 4  | 9  | 4  | 3  | 13 | 7  | 249  | Jul 13 Saturday  |
| 196 | 4  | 2  | 7  | 4  | 6  | 9  | 18 | 5   | 12  | 6  | 16  | 4  | 8   | 10 | 16 | 14 | 8  | 6  | 5  | 9  | 1  | 0  | 0  | 11 | 181  | Jul 14 Sunday    |
| 197 | 12 | 9  | 22 | 24 | 36 | 49 | 34 | 33  | 42  | 37 | 27  | 26 | 42  | 29 | 26 | 18 | 6  | 19 | 12 | 5  | 15 | 19 | 0  | 0  | 542  | Jul 15 Monday    |
| 198 | 6  | 10 | 21 | 19 | 34 | 46 | 44 | 50  | 39  | 33 | 52  | 28 | 17  | 35 | 25 | 6  | 20 | 16 | 6  | 8  | 19 | 14 | 4  | 1  | 553  | Jul 16 Tuesday   |
| 199 | 6  | 14 | 21 | 18 | 19 | 34 | 40 | 34  | 27  | 32 | 42  | 35 | 31  | 29 | 23 | 8  | 29 | 17 | 12 | 12 | 1  | 8  | 3  | 5  | 500  | Jul 17 Wednesday |
| 200 | 13 | 15 | 15 | 17 | 11 | 42 | 37 | 32  | 44  | 28 | 47  | 43 | 27  | 35 | 17 | 13 | 6  | 3  | 5  | 11 | 2  | 8  | 5  | 9  | 485  | Jul 18 Thursday  |
| 201 | 3  | 11 | 11 | 12 | 13 | 36 | 42 | 52  | 12  | 36 | 47  | 54 | 27  | 22 | 19 | 18 | 23 | 9  | 12 | 10 | 0  | 4  | 3  | 4  | 480  | Jul 19 Friday    |
| 202 | 8  | 9  | 4  | 5  | 16 | 11 | 4  | 11  | 12  | 19 | 6   | 3  | 6   | 3  | 10 | 14 | 9  | 9  | 6  | 11 | 1  | 9  | 0  | 5  | 191  | Jul 20 Saturday  |
| 203 | 3  | 4  | 8  | 6  | 11 | 11 | 13 | 13  | 12  | 5  | 1   | 9  | 13  | 3  | 10 | 16 | 7  | 10 | 0  | 8  | 8  | 0  | 0  | 7  | 178  | Jul 21 Sunday    |

Table 3.5.5 (Page 2 of 4)

## APA .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07  | 08 | 09 | 10 | 11  | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23  | Sum           | Date             |
|-----|----|----|----|----|----|----|----|-----|----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|-----|---------------|------------------|
| 204 | 3  | 5  | 15 | 17 | 23 | 22 | 49 | 35  | 44 | 25 | 58 | 26  | 29 | 10 | 26 | 18 | 13 | 4  | 1  | 10 | 13 | 7  | 4  | 4   | 461           | Jul 22 Monday    |
| 205 | 9  | 7  | 13 | 36 | 20 | 43 | 31 | 34  | 22 | 21 | 20 | 31  | 26 | 20 | 12 | 14 | 11 | 5  | 12 | 13 | 14 | 7  | 5  | 1   | 427           | Jul 23 Tuesday   |
| 206 | 3  | 21 | 9  | 27 | 18 | 33 | 40 | 39  | 37 | 26 | 21 | 46  | 27 | 46 | 14 | 19 | 5  | 9  | 2  | 9  | 4  | 5  | 6  | 0   | 466           | Jul 24 Wednesday |
| 207 | 11 | 12 | 8  | 29 | 24 | 57 | 37 | 35  | 41 | 12 | 45 | 49  | 36 | 34 | 16 | 21 | 18 | 13 | 11 | 18 | 11 | 5  | 1  | 3   | 547           | Jul 25 Thursday  |
| 208 | 12 | 14 | 8  | 28 | 37 | 39 | 46 | 29  | 29 | 40 | 24 | 37  | 29 | 31 | 20 | 34 | 25 | 11 | 13 | 16 | 9  | 9  | 16 | 4   | 560           | Jul 26 Friday    |
| 209 | 4  | 12 | 10 | 10 | 12 | 7  | 18 | 15  | 36 | 11 | 16 | 27  | 23 | 23 | 10 | 14 | 3  | 8  | 3  | 0  | 6  | 0  | 3  | 5   | 276           | Jul 27 Saturday  |
| 210 | 2  | 0  | 10 | 16 | 13 | 5  | 13 | 21  | 11 | 4  | 17 | 7   | 17 | 17 | 11 | 10 | 2  | 7  | 15 | 7  | 6  | 12 | 0  | 5   | 228           | Jul 28 Sunday    |
| 211 | 7  | 18 | 14 | 19 | 21 | 41 | 49 | 37  | 29 | 22 | 35 | 36  | 30 | 32 | 27 | 12 | 7  | 8  | 9  | 8  | 14 | 8  | 2  | 5   | 490           | Jul 29 Monday    |
| 212 | 1  | 6  | 25 | 23 | 23 | 35 | 44 | 27  | 15 | 26 | 27 | 23  | 41 | 17 | 29 | 10 | 19 | 18 | 0  | 15 | 9  | 0  | 5  | 4   | 442           | Jul 30 Tuesday   |
| 213 | 0  | 12 | 14 | 27 | 28 | 50 | 47 | 23  | 35 | 32 | 28 | 55  | 17 | 35 | 22 | 16 | 10 | 20 | 5  | 19 | 3  | 0  | 1  | 3   | 502           | Jul 31 Wednesday |
| 214 | 2  | 26 | 13 | 14 | 20 | 42 | 54 | 84  | 35 | 23 | 23 | 20  | 25 | 37 | 23 | 15 | 9  | 14 | 10 | 4  | 5  | 4  | 7  | 5   | 514           | Aug 01 Thursday  |
| 215 | 10 | 10 | 24 | 21 | 28 | 39 | 32 | 51  | 45 | 43 | 33 | 36  | 37 | 34 | 27 | 18 | 24 | 9  | 10 | 7  | 4  | 7  | 2  | 7   | 558           | Aug 02 Friday    |
| 216 | 6  | 1  | 17 | 3  | 18 | 1  | 11 | 5   | 10 | 7  | 4  | 21  | 2  | 4  | 9  | 5  | 6  | 6  | 3  | 4  | 8  | 2  | 4  | 4   | 161           | Aug 03 Saturday  |
| 217 | 2  | 7  | 13 | 11 | 12 | 22 | 25 | 17  | 34 | 28 | 22 | 26  | 17 | 16 | 21 | 21 | 17 | 10 | 9  | 10 | 2  | 6  | 10 | 27  | 385           | Aug 04 Sunday    |
| 218 | 17 | 14 | 34 | 45 | 55 | 79 | 39 | 30  | 40 | 29 | 38 | 31  | 42 | 31 | 15 | 17 | 22 | 16 | 12 | 4  | 3  | 23 | 8  | 702 | Aug 05 Monday |                  |
| 219 | 2  | 8  | 12 | 34 | 40 | 27 | 47 | 36  | 25 | 39 | 26 | 52  | 23 | 37 | 26 | 13 | 25 | 10 | 7  | 6  | 10 | 9  | 4  | 6   | 524           | Aug 06 Tuesday   |
| 220 | 2  | 3  | 19 | 25 | 28 | 28 | 32 | 54  | 35 | 29 | 54 | 31  | 26 | 38 | 18 | 13 | 19 | 13 | 12 | 9  | 5  | 7  | 0  | 12  | 512           | Aug 07 Wednesday |
| 221 | 9  | 10 | 16 | 31 | 37 | 40 | 31 | 65  | 46 | 22 | 33 | 28  | 20 | 29 | 29 | 18 | 6  | 23 | 18 | 21 | 10 | 12 | 2  | 11  | 567           | Aug 08 Thursday  |
| 222 | 20 | 5  | 21 | 22 | 35 | 27 | 50 | 33  | 38 | 42 | 41 | 51  | 34 | 27 | 14 | 21 | 8  | 18 | 23 | 15 | 16 | 14 | 3  | 4   | 582           | Aug 09 Friday    |
| 223 | 1  | 19 | 3  | 17 | 19 | 16 | 34 | 10  | 46 | 20 | 43 | 15  | 54 | 19 | 26 | 25 | 6  | 25 | 19 | 41 | 17 | 0  | 9  | 4   | 488           | Aug 10 Saturday  |
| 224 | 0  | 5  | 4  | 11 | 15 | 10 | 3  | 12  | 17 | 0  | 4  | 11  | 11 | 18 | 15 | 10 | 12 | 9  | 11 | 5  | 2  | 6  | 0  | 3   | 194           | Aug 11 Sunday    |
| 225 | 2  | 6  | 18 | 21 | 18 | 44 | 39 | 42  | 41 | 26 | 19 | 37  | 28 | 22 | 15 | 14 | 19 | 17 | 6  | 9  | 0  | 4  | 5  | 4   | 456           | Aug 12 Monday    |
| 226 | 6  | 3  | 17 | 19 | 18 | 31 | 48 | 35  | 35 | 23 | 54 | 8   | 21 | 40 | 24 | 27 | 17 | 14 | 1  | 13 | 7  | 7  | 7  | 2   | 477           | Aug 13 Tuesday   |
| 227 | 2  | 11 | 24 | 36 | 45 | 35 | 39 | 26  | 30 | 33 | 30 | 46  | 44 | 26 | 21 | 12 | 18 | 18 | 2  | 5  | 7  | 7  | 4  | 3   | 524           | Aug 14 Wednesday |
| 228 | 0  | 7  | 13 | 21 | 34 | 47 | 42 | 22  | 24 | 33 | 38 | 28  | 23 | 29 | 14 | 22 | 42 | 27 | 12 | 13 | 5  | 0  | 10 | 2   | 508           | Aug 15 Thursday  |
| 229 | 6  | 6  | 20 | 13 | 27 | 45 | 47 | 41  | 46 | 54 | 46 | 35  | 52 | 37 | 42 | 18 | 27 | 9  | 5  | 9  | 10 | 7  | 2  | 8   | 612           | Aug 16 Friday    |
| 230 | 1  | 3  | 13 | 5  | 24 | 19 | 12 | 11  | 50 | 12 | 35 | 28  | 6  | 16 | 6  | 6  | 11 | 9  | 2  | 6  | 3  | 3  | 0  | 2   | 283           | Aug 17 Saturday  |
| 231 | 8  | 2  | 10 | 13 | 13 | 10 | 13 | 4   | 20 | 3  | 16 | 23  | 19 | 22 | 9  | 6  | 15 | 3  | 0  | 0  | 0  | 0  | 0  | 0   | 209           | Aug 18 Sunday    |
| 232 | 0  | 0  | 0  | 1  | 28 | 36 | 40 | 46  | 50 | 9  | 29 | 40  | 36 | 30 | 31 | 8  | 16 | 13 | 14 | 6  | 1  | 7  | 3  | 0   | 444           | Aug 19 Monday    |
| 233 | 11 | 8  | 25 | 28 | 34 | 51 | 38 | 41  | 22 | 41 | 44 | 45  | 45 | 25 | 39 | 26 | 16 | 16 | 7  | 5  | 16 | 2  | 6  | 6   | 597           | Aug 20 Tuesday   |
| 234 | 5  | 8  | 23 | 30 | 30 | 56 | 41 | 37  | 53 | 44 | 34 | 47  | 30 | 16 | 43 | 30 | 18 | 13 | 15 | 10 | 3  | 0  | 6  | 3   | 595           | Aug 21 Wednesday |
| 235 | 3  | 23 | 13 | 26 | 34 | 43 | 44 | 50  | 36 | 16 | 24 | 47  | 40 | 28 | 37 | 14 | 21 | 8  | 17 | 21 | 5  | 4  | 18 | 7   | 579           | Aug 22 Thursday  |
| 236 | 2  | 16 | 21 | 25 | 29 | 44 | 36 | 28  | 47 | 29 | 46 | 59  | 42 | 33 | 34 | 24 | 8  | 13 | 14 | 7  | 1  | 9  | 7  | 5   | 579           | Aug 23 Friday    |
| 237 | 1  | 6  | 10 | 5  | 13 | 7  | 17 | 12  | 10 | 12 | 5  | 4   | 5  | 8  | 20 | 18 | 19 | 16 | 6  | 13 | 16 | 1  | 3  | 12  | 239           | Aug 24 Saturday  |
| 238 | 0  | 6  | 7  | 8  | 12 | 4  | 19 | 11  | 17 | 5  | 15 | 4   | 2  | 11 | 9  | 7  | 13 | 7  | 1  | 2  | 7  | 6  | 4  | 2   | 179           | Aug 25 Sunday    |
| 239 | 4  | 15 | 26 | 24 | 14 | 51 | 42 | 40  | 45 | 27 | 29 | 38  | 33 | 31 | 39 | 6  | 8  | 19 | 11 | 0  | 8  | 1  | 0  | 1   | 512           | Aug 26 Monday    |
| 240 | 0  | 3  | 63 | 20 | 13 | 41 | 54 | 42  | 31 | 47 | 28 | 27  | 45 | 28 | 40 | 44 | 35 | 42 | 43 | 31 | 40 | 35 | 17 | 2   | 771           | Aug 27 Tuesday   |
| 241 | 0  | 10 | 50 | 40 | 24 | 35 | 35 | 34  | 45 | 24 | 29 | 46  | 38 | 22 | 28 | 21 | 25 | 17 | 4  | 4  | 10 | 0  | 0  | 8   | 549           | Aug 28 Wednesday |
| 242 | 5  | 9  | 16 | 29 | 26 | 51 | 40 | 34  | 28 | 38 | 32 | 28  | 37 | 38 | 35 | 38 | 12 | 11 | 18 | 2  | 8  | 2  | 2  | 7   | 546           | Aug 29 Thursday  |
| 243 | 1  | 11 | 25 | 24 | 29 | 40 | 38 | 43  | 34 | 45 | 24 | 35  | 34 | 29 | 21 | 14 | 21 | 46 | 47 | 17 | 4  | 7  | 6  | 8   | 603           | Aug 30 Friday    |
| 244 | 0  | 5  | 16 | 5  | 13 | 5  | 12 | 25  | 14 | 10 | 15 | 11  | 16 | 21 | 19 | 13 | 12 | 3  | 6  | 0  | 7  | 10 | 7  | 0   | 245           | Aug 31 Saturday  |
| 245 | 0  | 5  | 8  | 11 | 25 | 7  | 6  | 7   | 21 | 8  | 6  | 9   | 7  | 11 | 9  | 19 | 20 | 9  | 7  | 0  | 3  | 4  | 8  | 6   | 216           | Sep 01 Sunday    |
| 246 | 3  | 25 | 7  | 34 | 10 | 35 | 54 | 48  | 55 | 33 | 26 | 29  | 50 | 35 | 26 | 10 | 21 | 19 | 18 | 9  | 4  | 0  | 5  | 11  | 567           | Sep 02 Monday    |
| 247 | 11 | 21 | 19 | 19 | 25 | 52 | 34 | 22  | 33 | 35 | 23 | 33  | 37 | 25 | 24 | 20 | 26 | 18 | 6  | 19 | 9  | 2  | 3  | 7   | 523           | Sep 03 Tuesday   |
| 248 | 3  | 13 | 14 | 30 | 31 | 47 | 48 | 67  | 59 | 30 | 41 | 46  | 32 | 51 | 40 | 21 | 33 | 28 | 32 | 58 | 62 | 29 | 62 | 72  | 949           | Sep 04 Wednesday |
| 249 | 57 | 42 | 75 | 96 | 81 | 61 | 60 | 110 | 43 | 46 | 58 | 110 | 31 | 38 | 26 | 22 | 19 | 13 | 6  | 19 | 19 | 10 | 10 | 17  | 1069          | Sep 05 Thursday  |
| 250 | 12 | 19 | 23 | 34 | 13 | 42 | 34 | 49  | 35 | 40 | 43 | 60  | 64 | 40 | 43 | 24 | 36 | 43 | 74 | 47 | 34 | 9  | 30 | 28  | 876           | Sep 06 Friday    |
| 251 | 23 | 43 | 48 | 32 | 70 | 45 | 25 | 14  | 12 | 16 | 53 | 48  | 38 | 54 | 48 | 54 | 59 | 87 | 60 | 21 | 4  | 8  | 12 | 7   | 881           | Sep 07 Saturday  |
| 252 | 7  | 6  | 10 | 8  | 5  | 17 | 21 | 15  | 13 | 10 | 17 | 24  | 7  | 11 | 24 | 14 | 1  | 0  | 0  | 0  | 0  | 0  | 0  | 0   | 210           | Sep 08 Sunday    |
| 253 | 0  | 0  | 0  | 0  | 9  | 23 | 42 | 57  | 34 | 19 | 33 | 29  | 28 | 44 | 18 | 15 | 21 | 21 | 15 | 8  | 11 | 6  | 17 | 9   | 459           | Sep 09 Monday    |
| 254 | 11 | 16 | 18 | 23 | 22 | 29 | 45 | 35  | 32 | 16 | 30 | 25  | 21 | 39 | 22 | 29 | 14 | 12 | 17 | 1  | 9  | 4  | 8  | 4   | 482           | Sep 10 Tuesday   |
| 255 | 6  | 6  | 17 | 33 | 10 | 49 | 39 | 30  | 38 | 32 | 23 | 52  | 31 | 46 | 28 | 21 | 13 | 14 | 17 | 5  | 3  | 1  | 5  | 1   | 520           | Sep 11 Wednesday |
| 256 | 2  | 3  | 28 | 31 | 35 | 45 | 29 | 22  | 36 | 60 | 23 | 35  | 45 | 25 | 35 | 27 | 21 | 21 | 12 | 14 | 16 | 22 | 11 | 14  | 612           | Sep 12 Thursday  |
| 257 | 19 | 28 | 33 | 29 | 38 | 41 | 55 | 36  | 34 | 55 | 31 | 31  | 37 | 38 | 26 | 8  | 32 | 13 | 19 | 10 | 6  | 1  | 3  | 7   | 630           | Sep 13 Friday    |
| 258 | 1  | 3  | 28 | 11 | 16 | 16 | 25 | 5   | 35 | 9  | 37 | 5   | 25 | 22 | 11 | 27 | 14 | 4  | 2  | 0  | 6  | 5  | 3  | 6   | 316           | Sep 14 Saturday  |
| 259 | 0  | 1  | 11 | 3  | 17 | 13 | 12 | 6   | 10 | 7  | 10 | 14  | 14 | 13 | 23 | 25 | 13 | 19 | 8  | 6  | 1  | 4  | 2  | 5   | 237           | Sep 15 Sunday    |

Table 3.5.5 (Page 3 of 4)

## APA .FKX Hourly distribution of detections

| Day | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |                 |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|-----------|----|----|----|----|----|----|----|----|----|----|-----|------------------|-----------------|
| 260 | 6    | 6    | 26   | 33   | 19   | 47   | 47   | 40   | 28   | 37   | 32   | 34   | 20    | 29        | 20 | 15 | 8  | 7  | 8  | 7  | 4  | 3  | 3  | 3  | 482 | Sep 16 Monday    |                 |
| 261 | 1    | 9    | 27   | 33   | 18   | 33   | 40   | 39   | 45   | 37   | 20   | 38   | 36    | 33        | 25 | 26 | 9  | 16 | 10 | 9  | 1  | 1  | 4  | 6  | 516 | Sep 17 Tuesday   |                 |
| 262 | 5    | 7    | 12   | 42   | 43   | 60   | 89   | 72   | 71   | 59   | 45   | 54   | 41    | 32        | 34 | 18 | 29 | 17 | 20 | 24 | 23 | 25 | 30 | 41 | 893 | Sep 18 Wednesday |                 |
| 263 | 12   | 11   | 17   | 31   | 66   | 43   | 48   | 50   | 42   | 33   | 30   | 53   | 39    | 38        | 30 | 16 | 30 | 15 | 19 | 17 | 12 | 9  | 20 | 4  | 1   | 884              | Sep 19 Thursday |
| 264 | 10   | 9    | 16   | 23   | 28   | 48   | 59   | 42   | 48   | 25   | 45   | 54   | 49    | 33        | 33 | 45 | 23 | 24 | 29 | 29 | 11 | 13 | 10 | 6  | 712 | Sep 20 Friday    |                 |
| 265 | 4    | 3    | 24   | 17   | 27   | 16   | 19   | 11   | 18   | 29   | 19   | 14   | 14    | 37        | 13 | 9  | 20 | 14 | 7  | 11 | 2  | 7  | 2  | 0  | 337 | Sep 21 Saturday  |                 |
| 266 | 3    | 0    | 11   | 4    | 11   | 15   | 12   | 9    | 17   | 15   | 23   | 20   | 18    | 14        | 7  | 32 | 24 | 15 | 6  | 4  | 10 | 7  | 0  | 13 | 290 | Sep 22 Sunday    |                 |
| 267 | 3    | 8    | 11   | 18   | 30   | 22   | 35   | 46   | 37   | 29   | 29   | 22   | 22    | 27        | 25 | 29 | 16 | 16 | 14 | 5  | 8  | 1  | 0  | 2  | 455 | Sep 23 Monday    |                 |
| 268 | 6    | 12   | 11   | 24   | 20   | 31   | 42   | 37   | 47   | 25   | 40   | 44   | 39    | 28        | 45 | 18 | 17 | 7  | 8  | 16 | 4  | 6  | 1  | 1  | 529 | Sep 24 Tuesday   |                 |
| 269 | 6    | 3    | 21   | 20   | 33   | 28   | 57   | 39   | 27   | 23   | 36   | 42   | 39    | 26        | 38 | 33 | 16 | 13 | 18 | 11 | 11 | 13 | 10 | 2  | 565 | Sep 25 Wednesday |                 |
| 270 | 5    | 4    | 21   | 17   | 25   | 52   | 43   | 41   | 26   | 30   | 35   | 31   | 19    | 38        | 19 | 24 | 16 | 19 | 1  | 1  | 18 | 8  | 3  | 1  | 497 | Sep 26 Thursday  |                 |
| 271 | 6    | 8    | 19   | 30   | 14   | 38   | 40   | 49   | 41   | 26   | 32   | 46   | 30    | 43        | 37 | 33 | 21 | 19 | 32 | 31 | 10 | 2  | 3  | 0  | 610 | Sep 27 Friday    |                 |
| 272 | 8    | 5    | 19   | 11   | 16   | 11   | 25   | 12   | 25   | 19   | 5    | 29   | 26    | 17        | 21 | 11 | 19 | 17 | 4  | 3  | 5  | 1  | 4  | 9  | 322 | Sep 28 Saturday  |                 |
| 273 | 3    | 0    | 3    | 7    | 15   | 11   | 49   | 19   | 19   | 14   | 20   | 13   | 14    | 13        | 22 | 23 | 25 | 20 | 10 | 6  | 12 | 7  | 4  | 4  | 333 | Sep 29 Sunday    |                 |
| 274 | 9    | 9    | 14   | 26   | 15   | 30   | 30   | 37   | 36   | 41   | 28   | 24   | 38    | 40        | 15 | 28 | 14 | 10 | 7  | 6  | 2  | 4  | 6  | 4  | 473 | Sep 30 Monday    |                 |
| APA | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |     |                  |                 |
| Sum | 1811 | 3214 | 4948 | 4833 | 4188 | 5062 | 4192 | 2892 | 2357 | 1631 | 1006 | 1053 |       |           |    |    |    |    |    |    |    |    |    |    |     |                  |                 |
|     | 1193 | 2909 | 3706 | 5310 | 4765 | 4536 | 4416 | 3410 | 2684 | 1787 | 1321 | 1028 | 74252 | Total sum |    |    |    |    |    |    |    |    |    |    |     |                  |                 |
| 183 | 7    | 10   | 16   | 18   | 20   | 27   | 29   | 26   | 26   | 23   | 25   | 28   | 24    | 23        | 19 | 16 | 15 | 13 | 10 | 9  | 7  | 5  | 6  | 6  | 406 | Total average    |                 |
| 124 | 8    | 11   | 18   | 22   | 23   | 34   | 35   | 34   | 31   | 28   | 29   | 34   | 29    | 27        | 21 | 18 | 16 | 14 | 11 | 10 | 8  | 6  | 6  | 6  | 480 | Average workdays |                 |
| 59  | 4    | 6    | 10   | 9    | 14   | 12   | 16   | 11   | 15   | 12   | 15   | 15   | 14    | 14        | 13 | 12 | 11 | 11 | 7  | 6  | 6  | 5  | 4  | 6  | 246 | Average weekends |                 |

**Table 3.5.5.** (Page 4 of 4) Daily and hourly distribution of Apatity array detections. For each day is shown number of detections within each hour of the day, and number of detections for that day. The end statistics give total number of detections distributed for each hour and the total sum of detections during the period. The averages show number of processed days, hourly distribution and average per processed day.

**SPI .FKX Hourly distribution of detections**

[illegible]

**Table 3.5.6 (Page 1 of 4)**

## SPI .FKX Hourly distribution of detections

| Day | 00 | 01 | 02  | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum  | Date               |
|-----|----|----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|------|--------------------|
| 148 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 May 27 Monday    |
| 149 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 May 28 Tuesday   |
| 150 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 May 29 Wednesday |
| 151 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 May 30 Thursday  |
| 152 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 May 31 Friday    |
| 153 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 01 Saturday  |
| 154 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 02 Sunday    |
| 155 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 03 Monday    |
| 156 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 04 Tuesday   |
| 157 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 05 Wednesday |
| 158 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 06 Thursday  |
| 159 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 07 Friday    |
| 160 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 08 Saturday  |
| 161 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 09 Sunday    |
| 162 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 10 Monday    |
| 163 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 11 Tuesday   |
| 164 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 12 Wednesday |
| 165 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 13 Thursday  |
| 166 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 14 Friday    |
| 167 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 15 Saturday  |
| 168 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 16 Sunday    |
| 169 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 17 Monday    |
| 170 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 18 Tuesday   |
| 171 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 19 Wednesday |
| 172 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 20 Thursday  |
| 173 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 21 Friday    |
| 174 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 22 Saturday  |
| 175 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 23 Sunday    |
| 176 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 24 Monday    |
| 177 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 25 Tuesday   |
| 178 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 26 Wednesday |
| 179 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0    | 0 Jun 27 Thursday  |
| 180 | 0  | 0  | 0   | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 0  | 13 | 22 | 31 | 46 | 40 | 0  | 2  | 71 | 39 | 51 | 15 | 330  | Jun 28 Friday      |
| 181 | 25 | 34 | 38  | 24 | 34 | 18 | 13 | 30 | 37 | 43 | 48 | 36 | 47 | 24 | 37 | 31 | 38 | 30 | 34 | 31 | 27 | 47 | 67 | 19 | 812  | Jun 29 Saturday    |
| 182 | 23 | 41 | 22  | 28 | 25 | 26 | 35 | 29 | 43 | 50 | 83 | 26 | 25 | 12 | 10 | 26 | 20 | 19 | 22 | 22 | 20 | 17 | 29 | 40 | 693  | Jun 30 Sunday      |
| 183 | 36 | 23 | 19  | 6  | 22 | 24 | 30 | 32 | 59 | 26 | 27 | 12 | 17 | 23 | 21 | 29 | 26 | 23 | 32 | 22 | 25 | 21 | 43 | 31 | 629  | Jul 01 Monday      |
| 184 | 27 | 19 | 20  | 36 | 34 | 13 | 15 | 43 | 39 | 15 | 24 | 22 | 21 | 16 | 13 | 23 | 14 | 35 | 13 | 24 | 15 | 29 | 26 | 17 | 553  | Jul 02 Tuesday     |
| 185 | 21 | 17 | 15  | 11 | 21 | 28 | 20 | 35 | 21 | 14 | 18 | 18 | 14 | 20 | 13 | 12 | 29 | 19 | 10 | 21 | 3  | 12 | 16 | 19 | 427  | Jul 03 Wednesday   |
| 186 | 19 | 18 | 9   | 14 | 14 | 11 | 19 | 6  | 29 | 21 | 18 | 28 | 20 | 11 | 17 | 26 | 26 | 25 | 17 | 30 | 17 | 26 | 26 | 28 | 475  | Jul 04 Thursday    |
| 187 | 28 | 23 | 28  | 25 | 23 | 18 | 17 | 31 | 31 | 29 | 33 | 36 | 38 | 25 | 25 | 14 | 21 | 19 | 23 | 32 | 32 | 22 | 22 | 46 | 641  | Jul 05 Friday      |
| 188 | 33 | 41 | 21  | 25 | 26 | 34 | 27 | 39 | 25 | 30 | 39 | 32 | 28 | 23 | 38 | 13 | 14 | 29 | 30 | 37 | 45 | 41 | 34 | 36 | 740  | Jul 06 Saturday    |
| 189 | 17 | 10 | 32  | 22 | 33 | 22 | 18 | 20 | 21 | 24 | 45 | 33 | 36 | 31 | 16 | 18 | 20 | 28 | 31 | 21 | 16 | 23 | 29 | 20 | 586  | Jul 07 Sunday      |
| 190 | 23 | 22 | 98  | 67 | 29 | 23 | 16 | 35 | 33 | 27 | 30 | 46 | 16 | 22 | 28 | 35 | 20 | 39 | 26 | 25 | 27 | 17 | 31 | 24 | 759  | Jul 08 Monday      |
| 191 | 41 | 31 | 24  | 22 | 24 | 29 | 25 | 19 | 10 | 8  | 15 | 22 | 35 | 28 | 27 | 23 | 28 | 22 | 7  | 8  | 8  | 14 | 10 | 12 | 492  | Jul 09 Tuesday     |
| 192 | 26 | 14 | 11  | 19 | 17 | 25 | 30 | 28 | 28 | 33 | 14 | 21 | 20 | 12 | 18 | 13 | 24 | 26 | 39 | 50 | 41 | 43 | 60 | 60 | 672  | Jul 10 Wednesday   |
| 193 | 67 | 45 | 47  | 36 | 39 | 46 | 33 | 31 | 44 | 46 | 28 | 41 | 18 | 18 | 28 | 47 | 27 | 35 | 39 | 35 | 46 | 40 | 40 | 44 | 920  | Jul 11 Thursday    |
| 194 | 31 | 34 | 31  | 39 | 43 | 59 | 62 | 47 | 41 | 42 | 31 | 31 | 30 | 26 | 30 | 26 | 22 | 40 | 21 | 30 | 36 | 22 | 25 | 23 | 822  | Jul 12 Friday      |
| 195 | 39 | 32 | 50  | 53 | 27 | 45 | 27 | 42 | 54 | 42 | 44 | 51 | 31 | 38 | 47 | 26 | 22 | 12 | 27 | 51 | 23 | 35 | 49 | 62 | 929  | Jul 13 Saturday    |
| 196 | 64 | 60 | 50  | 50 | 42 | 52 | 48 | 62 | 63 | 44 | 51 | 55 | 61 | 67 | 78 | 41 | 29 | 26 | 21 | 28 | 40 | 32 | 20 | 33 | 1117 | Jul 14 Sunday      |
| 197 | 27 | 20 | 22  | 37 | 42 | 33 | 36 | 28 | 45 | 35 | 40 | 41 | 26 | 21 | 30 | 38 | 33 | 32 | 36 | 24 | 47 | 42 | 28 | 59 | 822  | Jul 15 Monday      |
| 198 | 42 | 67 | 105 | 91 | 63 | 44 | 47 | 40 | 37 | 50 | 59 | 65 | 40 | 49 | 56 | 65 | 42 | 44 | 46 | 35 | 42 | 52 | 47 | 44 | 1272 | Jul 16 Tuesday     |
| 199 | 20 | 29 | 52  | 39 | 33 | 34 | 34 | 39 | 34 | 48 | 38 | 30 | 29 | 18 | 22 | 25 | 28 | 28 | 18 | 37 | 24 | 22 | 29 | 21 | 731  | Jul 17 Wednesday   |
| 200 | 26 | 21 | 39  | 24 | 19 | 30 | 28 | 26 | 34 | 30 | 40 | 43 | 25 | 30 | 23 | 25 | 54 | 42 | 22 | 14 | 31 | 17 | 13 | 23 | 679  | Jul 18 Thursday    |
| 201 | 29 | 43 | 30  | 30 | 33 | 25 | 40 | 36 | 42 | 20 | 49 | 34 | 16 | 21 | 22 | 26 | 33 | 27 | 23 | 41 | 37 | 32 | 31 | 14 | 734  | Jul 19 Friday      |
| 202 | 45 | 40 | 31  | 43 | 30 | 38 | 36 | 65 | 60 | 41 | 33 | 42 | 39 | 23 | 29 | 28 | 18 | 9  | 17 | 13 | 7  | 8  | 9  | 7  | 711  | Jul 20 Saturday    |
| 203 | 26 | 25 | 26  | 24 | 24 | 27 | 24 | 11 | 0  | 0  | 0  | 2  | 0  | 0  | 0  | 0  | 0  | 4  | 14 | 19 | 14 | 25 | 29 | 23 | 317  | Jul 21 Sunday      |

Table 3.5.6 (Page 2 of 4)

## SPI .FKX Hourly distribution of detections

| Day | 00   | 01  | 02  | 03  | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21    | 22 | 23   | Sum             | Date             |                  |
|-----|------|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-------|----|------|-----------------|------------------|------------------|
| 204 | 24   | 12  | 41  | 35  | 36 | 40 | 36 | 25 | 25 | 4  | 13 | 6  | 33 | 22 | 23 | 10 | 12 | 1  | 16 | 15 | 22 | 15    | 33 | 16   | 515             | Jul 22 Monday    |                  |
| 205 | 28   | 38  | 50  | 34  | 32 | 32 | 52 | 40 | 36 | 39 | 34 | 35 | 33 | 30 | 28 | 38 | 21 | 34 | 39 | 33 | 28 | 8     | 0  | 0    | 742             | Jul 23 Tuesday   |                  |
| 206 | 0    | 0   | 0   | 0   | 18 | 11 | 25 | 38 | 12 | 34 | 15 | 21 | 18 | 13 | 18 | 21 | 19 | 23 | 20 | 26 | 37 | 29    | 17 | 38   | 453             | Jul 24 Wednesday |                  |
| 207 | 31   | 41  | 48  | 49  | 50 | 52 | 44 | 50 | 49 | 46 | 18 | 26 | 31 | 37 | 42 | 20 | 20 | 30 | 21 | 15 | 37 | 29    | 21 | 32   | 839             | Jul 25 Thursday  |                  |
| 208 | 29   | 30  | 27  | 43  | 39 | 27 | 49 | 46 | 38 | 52 | 23 | 38 | 33 | 37 | 25 | 34 | 40 | 62 | 36 | 43 | 23 | 27    | 34 | 44   | 879             | Jul 26 Friday    |                  |
| 209 | 9    | 19  | 28  | 30  | 24 | 24 | 34 | 27 | 31 | 33 | 33 | 22 | 39 | 14 | 34 | 28 | 22 | 39 | 34 | 36 | 29 | 35    | 28 | 50   | 702             | Jul 27 Saturday  |                  |
| 210 | 51   | 40  | 44  | 43  | 54 | 35 | 51 | 13 | 0  | 0  | 0  | 31 | 23 | 23 | 26 | 30 | 63 | 37 | 46 | 57 | 48 | 45    | 64 | 51   | 875             | Jul 28 Sunday    |                  |
| 211 | 46   | 54  | 42  | 60  | 83 | 88 | 49 | 45 | 22 | 26 | 48 | 33 | 27 | 23 | 16 | 36 | 27 | 40 | 29 | 55 | 54 | 34    | 75 | 77   | 1089            | Jul 29 Monday    |                  |
| 212 | 88   | 38  | 40  | 29  | 34 | 29 | 48 | 28 | 48 | 32 | 37 | 25 | 49 | 37 | 35 | 31 | 26 | 31 | 43 | 49 | 49 | 37    | 37 | 57   | 957             | Jul 30 Tuesday   |                  |
| 213 | 46   | 33  | 53  | 50  | 76 | 59 | 56 | 77 | 65 | 65 | 57 | 50 | 46 | 51 | 44 | 31 | 36 | 38 | 42 | 46 | 30 | 48    | 46 | 44   | 1189            | Jul 31 Wednesday |                  |
| 214 | 55   | 63  | 48  | 43  | 48 | 43 | 55 | 48 | 47 | 49 | 30 | 38 | 18 | 39 | 17 | 37 | 26 | 45 | 65 | 67 | 53 | 65    | 64 | 55   | 1118            | Aug 01 Thursday  |                  |
| 215 | 47   | 51  | 52  | 43  | 60 | 73 | 50 | 64 | 72 | 60 | 61 | 61 | 47 | 40 | 57 | 30 | 42 | 42 | 33 | 34 | 46 | 48    | 51 | 60   | 1224            | Aug 02 Friday    |                  |
| 216 | 45   | 50  | 58  | 77  | 67 | 82 | 66 | 67 | 76 | 66 | 51 | 51 | 56 | 35 | 52 | 47 | 44 | 44 | 43 | 29 | 39 | 61    | 84 | 57   | 1347            | Aug 03 Saturday  |                  |
| 217 | 69   | 50  | 63  | 70  | 78 | 69 | 48 | 60 | 70 | 49 | 52 | 30 | 55 | 29 | 48 | 54 | 50 | 56 | 38 | 43 | 33 | 49    | 32 | 37   | 1232            | Aug 04 Sunday    |                  |
| 218 | 53   | 44  | 44  | 53  | 48 | 46 | 50 | 40 | 58 | 28 | 38 | 35 | 50 | 37 | 29 | 38 | 49 | 24 | 48 | 52 | 57 | 47    | 62 | 44   | 1074            | Aug 05 Monday    |                  |
| 219 | 39   | 41  | 34  | 43  | 43 | 30 | 39 | 44 | 34 | 32 | 37 | 41 | 39 | 45 | 34 | 29 | 31 | 40 | 14 | 28 | 23 | 2     | 0  | 0    | 742             | Aug 06 Tuesday   |                  |
| 220 | 0    | 0   | 0   | 0   | 0  | 0  | 0  | 7  | 3  | 0  | 24 | 30 | 29 | 35 | 41 | 36 | 37 | 64 | 33 | 41 | 25 | 26    | 31 | 56   | 38              | 556              | Aug 07 Wednesday |
| 221 | 46   | 41  | 38  | 65  | 72 | 57 | 44 | 30 | 47 | 34 | 32 | 30 | 39 | 38 | 36 | 27 | 28 | 44 | 52 | 34 | 38 | 44    | 37 | 45   | 998             | Aug 08 Thursday  |                  |
| 222 | 52   | 46  | 46  | 45  | 45 | 46 | 45 | 42 | 36 | 13 | 16 | 27 | 27 | 33 | 44 | 31 | 25 | 32 | 24 | 32 | 29 | 24    | 30 | 19   | 809             | Aug 09 Friday    |                  |
| 223 | 15   | 31  | 24  | 16  | 33 | 29 | 63 | 29 | 17 | 16 | 28 | 31 | 27 | 32 | 48 | 58 | 55 | 46 | 52 | 71 | 86 | 56    | 59 | 59   | 981             | Aug 10 Saturday  |                  |
| 224 | 39   | 44  | 45  | 32  | 38 | 37 | 19 | 21 | 34 | 26 | 34 | 20 | 24 | 17 | 13 | 26 | 35 | 32 | 23 | 45 | 45 | 33    | 54 | 41   | 777             | Aug 11 Sunday    |                  |
| 225 | 62   | 35  | 62  | 72  | 45 | 44 | 55 | 61 | 61 | 71 | 58 | 62 | 53 | 50 | 52 | 50 | 49 | 72 | 41 | 43 | 66 | 40    | 53 | 47   | 1304            | Aug 12 Monday    |                  |
| 226 | 41   | 48  | 53  | 53  | 43 | 54 | 44 | 47 | 44 | 41 | 55 | 53 | 22 | 27 | 40 | 46 | 32 | 33 | 37 | 47 | 64 | 46    | 53 | 54   | 1077            | Aug 13 Tuesday   |                  |
| 227 | 28   | 48  | 50  | 36  | 37 | 34 | 39 | 31 | 38 | 33 | 33 | 29 | 31 | 29 | 37 | 36 | 46 | 39 | 57 | 32 | 64 | 39    | 49 | 57   | 952             | Aug 14 Wednesday |                  |
| 228 | 47   | 44  | 46  | 53  | 49 | 54 | 50 | 44 | 54 | 52 | 37 | 41 | 37 | 50 | 59 | 53 | 65 | 42 | 68 | 56 | 54 | 62    | 57 | 39   | 1213            | Aug 15 Thursday  |                  |
| 229 | 42   | 47  | 51  | 53  | 57 | 53 | 61 | 51 | 53 | 73 | 62 | 39 | 39 | 40 | 40 | 39 | 42 | 24 | 44 | 29 | 43 | 49    | 32 | 34   | 1097            | Aug 16 Friday    |                  |
| 230 | 44   | 50  | 40  | 62  | 61 | 40 | 36 | 33 | 36 | 64 | 37 | 38 | 41 | 51 | 48 | 29 | 36 | 34 | 47 | 39 | 50 | 52    | 23 | 44   | 1035            | Aug 17 Saturday  |                  |
| 231 | 23   | 53  | 44  | 36  | 40 | 42 | 38 | 36 | 26 | 45 | 26 | 39 | 35 | 40 | 33 | 34 | 26 | 30 | 35 | 29 | 27 | 44    | 52 | 38   | 871             | Aug 18 Sunday    |                  |
| 232 | 38   | 24  | 48  | 43  | 53 | 27 | 24 | 48 | 41 | 49 | 37 | 50 | 59 | 58 | 51 | 35 | 23 | 23 | 28 | 22 | 29 | 29    | 35 | 46   | 920             | Aug 19 Monday    |                  |
| 233 | 1741 | 321 | 421 | 551 | 28 | 99 | 74 | 73 | 55 | 67 | 91 | 75 | 91 | 81 | 90 | 76 | 89 | 90 | 78 | 78 | 94 | 77    | 74 | 76   | 2259            | Aug 20 Tuesday   |                  |
| 234 | 76   | 57  | 58  | 60  | 52 | 55 | 42 | 59 | 49 | 58 | 42 | 30 | 30 | 39 | 51 | 57 | 42 | 43 | 57 | 70 | 48 | 43    | 71 | 43   | 1232            | Aug 21 Wednesday |                  |
| 235 | 55   | 36  | 67  | 41  | 41 | 57 | 54 | 39 | 43 | 59 | 33 | 39 | 46 | 50 | 46 | 36 | 42 | 41 | 37 | 31 | 55 | 35    | 41 | 60   | 1084            | Aug 22 Thursday  |                  |
| 236 | 41   | 66  | 73  | 60  | 48 | 54 | 38 | 31 | 53 | 34 | 46 | 33 | 22 | 40 | 22 | 36 | 31 | 49 | 23 | 42 | 43 | 70104 | 89 | 1148 | Aug 23 Friday   |                  |                  |
| 237 | 95   | 61  | 74  | 61  | 98 | 58 | 58 | 77 | 78 | 65 | 83 | 72 | 63 | 72 | 48 | 59 | 49 | 53 | 61 | 75 | 56 | 35    | 41 | 1550 | Aug 24 Saturday |                  |                  |
| 238 | 41   | 36  | 38  | 44  | 30 | 9  | 12 | 5  | 25 | 10 | 16 | 11 | 15 | 14 | 11 | 9  | 6  | 11 | 22 | 26 | 28 | 16    | 13 | 11   | 459             | Aug 25 Sunday    |                  |
| 239 | 25   | 60  | 36  | 20  | 34 | 51 | 9  | 30 | 27 | 28 | 26 | 22 | 26 | 58 | 33 | 26 | 35 | 53 | 37 | 53 | 31 | 25    | 32 | 30   | 807             | Aug 26 Monday    |                  |
| 240 | 35   | 51  | 36  | 40  | 51 | 36 | 42 | 36 | 38 | 31 | 30 | 37 | 34 | 52 | 44 | 46 | 61 | 40 | 36 | 51 | 53 | 43    | 29 | 40   | 992             | Aug 27 Tuesday   |                  |
| 241 | 39   | 62  | 58  | 48  | 46 | 66 | 56 | 30 | 51 | 36 | 67 | 26 | 28 | 51 | 33 | 30 | 36 | 43 | 35 | 25 | 21 | 25    | 44 | 20   | 976             | Aug 28 Wednesday |                  |
| 242 | 26   | 22  | 29  | 33  | 37 | 39 | 43 | 39 | 45 | 45 | 40 | 16 | 31 | 30 | 34 | 20 | 30 | 35 | 18 | 27 | 22 | 31    | 49 | 43   | 784             | Aug 29 Thursday  |                  |
| 243 | 36   | 46  | 34  | 49  | 59 | 68 | 40 | 55 | 44 | 58 | 48 | 47 | 46 | 31 | 42 | 52 | 56 | 62 | 48 | 40 | 59 | 62    | 53 | 40   | 1175            | Aug 30 Friday    |                  |
| 244 | 48   | 39  | 37  | 43  | 28 | 55 | 44 | 59 | 55 | 60 | 61 | 58 | 32 | 39 | 40 | 51 | 57 | 34 | 41 | 51 | 34 | 31    | 36 | 48   | 1081            | Aug 31 Saturday  |                  |
| 245 | 35   | 24  | 20  | 34  | 32 | 34 | 31 | 21 | 23 | 16 | 17 | 8  | 30 | 27 | 34 | 18 | 18 | 24 | 22 | 22 | 14 | 27    | 38 | 19   | 588             | Sep 01 Sunday    |                  |
| 246 | 46   | 64  | 54  | 54  | 43 | 55 | 32 | 45 | 53 | 38 | 41 | 45 | 53 | 57 | 63 | 37 | 19 | 32 | 41 | 56 | 30 | 40    | 31 | 33   | 1062            | Sep 02 Monday    |                  |
| 247 | 50   | 44  | 51  | 42  | 48 | 48 | 43 | 47 | 42 | 39 | 46 | 31 | 41 | 48 | 27 | 38 | 40 | 54 | 52 | 40 | 45 | 32    | 43 | 38   | 1029            | Sep 03 Tuesday   |                  |
| 248 | 49   | 33  | 49  | 40  | 47 | 32 | 37 | 33 | 34 | 48 | 39 | 31 | 46 | 29 | 40 | 49 | 57 | 56 | 29 | 46 | 22 | 63    | 30 | 41   | 980             | Sep 04 Wednesday |                  |
| 249 | 38   | 52  | 46  | 51  | 55 | 45 | 59 | 58 | 52 | 33 | 61 | 33 | 38 | 33 | 31 | 35 | 36 | 24 | 26 | 33 | 31 | 20    | 9  | 12   | 911             | Sep 05 Thursday  |                  |
| 250 | 5    | 7   | 1   | 5   | 13 | 10 | 19 | 22 | 21 | 18 | 22 | 21 | 19 | 31 | 19 | 23 | 17 | 16 | 1  | 6  | 4  | 7     | 16 | 53   | 376             | Sep 06 Friday    |                  |
| 251 | 69   | 58  | 54  | 71  | 75 | 86 | 76 | 87 | 62 | 71 | 61 | 40 | 27 | 17 | 27 | 22 | 16 | 18 | 21 | 16 | 35 | 30    | 23 | 35   | 1097            | Sep 07 Saturday  |                  |
| 252 | 31   | 34  | 35  | 27  | 37 | 37 | 29 | 37 | 34 | 21 | 35 | 21 | 16 | 19 | 32 | 25 | 13 | 30 | 23 | 24 | 42 | 10    | 19 | 23   | 654             | Sep 08 Sunday    |                  |
| 253 | 35   | 28  | 41  | 41  | 36 | 25 | 27 | 62 | 30 | 31 | 28 | 32 | 44 | 38 | 37 | 35 | 42 | 33 | 43 | 36 | 59 | 59    | 86 | 83   | 1011            | Sep 09 Monday    |                  |
| 254 | 1231 | 181 | 061 | 121 | 77 | 36 | 35 | 41 | 24 | 26 | 22 | 39 | 41 | 33 | 33 | 29 | 31 | 29 | 36 | 23 | 21 | 28    | 25 | 30   | 1127            | Sep 10 Tuesday   |                  |
| 255 | 38   | 37  | 27  | 53  | 26 | 14 | 19 | 26 | 17 | 36 | 35 | 29 | 36 | 36 | 21 | 27 | 45 | 38 | 58 | 34 | 42 | 47    | 53 | 36   | 830             | Sep 11 Wednesday |                  |
| 256 | 72   | 84  | 44  | 87  | 64 | 38 | 49 | 60 | 53 | 68 | 47 | 33 | 29 | 32 | 44 | 48 | 47 | 49 | 59 | 46 | 36 | 65    | 36 | 44   | 1234            | Sep 12 Thursday  |                  |
| 257 | 43   | 41  | 43  | 53  | 52 | 33 | 31 | 28 | 37 | 57 | 52 | 32 | 42 | 50 | 52 | 48 | 34 | 52 | 59 | 39 | 28 | 52    | 40 | 23   | 1021            | Sep 13 Friday    |                  |
| 258 | 36   | 30  | 34  | 25  | 9  | 23 | 26 | 19 | 16 | 22 | 8  | 8  | 14 | 16 | 11 | 22 | 31 | 12 | 15 | 25 | 5  | 25    | 9  | 13   | 454             | Sep 14 Saturday  |                  |
| 259 | 12   | 14  | 23  | 13  | 30 | 17 | 20 | 39 | 30 | 30 | 21 | 23 | 25 | 36 | 38 | 26 | 48 | 47 | 52 | 39 | 45 | 42    | 50 | 40   | 760             | Sep 15 Sunday    |                  |

Table 3.5.6 (Page 3 of 4)

## SPI .FKX Hourly distribution of detections

| Day | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15  | 16 | 17 | 18  | 19  | 20  | 21 | 22 | 23 | Sum  | Date             |
|-----|------|------|------|------|------|------|------|------|------|------|------|------|-------|-----------|----|-----|----|----|-----|-----|-----|----|----|----|------|------------------|
| 260 | 74   | 97   | 68   | 48   | 31   | 44   | 52   | 52   | 51   | 57   | 38   | 36   | 64    | 67        | 50 | 49  | 46 | 59 | 53  | 50  | 67  | 63 | 56 | 47 | 1319 | Sep 16 Monday    |
| 261 | 271  | 202  | 55   | 117  | 35   | 39   | 38   | 26   | 34   | 30   | 29   | 29   | 51    | 42        | 27 | 32  | 34 | 35 | 44  | 36  | 46  | 37 | 34 | 40 | 1237 | Sep 17 Tuesday   |
| 262 | 43   | 34   | 35   | 51   | 31   | 39   | 23   | 39   | 25   | 43   | 30   | 24   | 36    | 55        | 61 | 49  | 38 | 50 | 60  | 41  | 39  | 58 | 32 | 74 | 1010 | Sep 18 Wednesday |
| 263 | 71   | 51   | 29   | 55   | 35   | 18   | 5    | 0    | 4    | 11   | 8    | 3    | 7     | 10        | 21 | 21  | 31 | 36 | 22  | 25  | 17  | 46 | 41 | 33 | 600  | Sep 19 Thursday  |
| 264 | 39   | 42   | 36   | 35   | 30   | 44   | 48   | 43   | 68   | 46   | 36   | 33   | 47    | 28        | 29 | 45  | 50 | 72 | 47  | 154 | 127 | 77 | 51 | 28 | 1255 | Sep 20 Friday    |
| 265 | 46   | 52   | 60   | 54   | 52   | 46   | 17   | 51   | 38   | 43   | 33   | 33   | 41    | 31        | 41 | 48  | 52 | 47 | 36  | 40  | 42  | 71 | 67 | 51 | 1092 | Sep 21 Saturday  |
| 266 | 56   | 45   | 62   | 52   | 80   | 59   | 73   | 44   | 71   | 48   | 55   | 72   | 69    | 54        | 48 | 63  | 46 | 69 | 112 | 165 | 118 | 75 | 60 | 71 | 1667 | Sep 22 Sunday    |
| 267 | 64   | 57   | 51   | 73   | 74   | 70   | 94   | 42   | 57   | 43   | 71   | 102  | 27    | 38        | 58 | 54  | 40 | 68 | 33  | 29  | 26  | 14 | 21 | 23 | 1226 | Sep 23 Monday    |
| 268 | 25   | 42   | 23   | 52   | 47   | 51   | 67   | 27   | 53   | 36   | 41   | 48   | 50    | 59        | 49 | 55  | 50 | 35 | 49  | 25  | 34  | 44 | 63 | 61 | 1086 | Sep 24 Tuesday   |
| 269 | 52   | 48   | 56   | 69   | 41   | 25   | 67   | 56   | 57   | 44   | 36   | 67   | 40    | 65        | 47 | 117 | 43 | 41 | 43  | 34  | 64  | 68 | 46 | 56 | 1282 | Sep 25 Wednesday |
| 270 | 57   | 60   | 67   | 69   | 52   | 64   | 43   | 58   | 26   | 42   | 57   | 30   | 49    | 55        | 69 | 105 | 74 | 51 | 67  | 58  | 85  | 62 | 39 | 92 | 1431 | Sep 26 Thursday  |
| 271 | 53   | 44   | 37   | 61   | 36   | 52   | 31   | 31   | 27   | 16   | 16   | 27   | 23    | 28        | 34 | 41  | 25 | 19 | 18  | 29  | 55  | 29 | 39 | 35 | 806  | Sep 27 Friday    |
| 272 | 26   | 42   | 48   | 51   | 52   | 67   | 63   | 44   | 31   | 62   | 32   | 55   | 71    | 73        | 57 | 41  | 74 | 56 | 48  | 71  | 68  | 76 | 35 | 47 | 1290 | Sep 28 Saturday  |
| 273 | 60   | 36   | 50   | 66   | 39   | 63   | 84   | 51   | 49   | 50   | 57   | 45   | 73    | 41        | 56 | 52  | 49 | 44 | 48  | 54  | 64  | 61 | 75 | 51 | 1318 | Sep 29 Sunday    |
| 274 | 45   | 41   | 45   | 41   | 47   | 65   | 45   | 55   | 38   | 57   | 40   | 48   | 50    | 26        | 30 | 32  | 36 | 21 | 67  | 65  | 49  | 44 | 55 | 34 | 1076 | Sep 30 Monday    |
| SPI | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11   | 12    | 13        | 14 | 15  | 16 | 17 | 18  | 19  | 20  | 21 | 22 | 23 |      |                  |
| Sum | 3981 | 4316 | 3914 | 3746 | 3643 | 3381 | 3334 | 3442 | 3503 | 3709 | 3697 | 3756 |       |           |    |     |    |    |     |     |     |    |    |    |      |                  |
|     | 3990 | 4287 | 4058 | 3781 | 3745 | 3543 | 3394 | 3438 | 3429 | 3463 | 3853 | 3811 | 89214 | Total sum |    |     |    |    |     |     |     |    |    |    |      |                  |
| 95  | 42   | 42   | 45   | 45   | 43   | 41   | 40   | 39   | 39   | 38   | 37   | 36   | 36    | 35        | 36 | 36  | 36 | 37 | 36  | 39  | 41  | 39 | 40 | 40 | 939  | Total average    |
| 67  | 43   | 43   | 47   | 47   | 42   | 40   | 39   | 39   | 39   | 38   | 37   | 35   | 35    | 36        | 36 | 37  | 37 | 38 | 37  | 38  | 41  | 38 | 40 | 40 | 941  | Average workdays |
| 28  | 40   | 39   | 41   | 42   | 43   | 42   | 40   | 39   | 39   | 39   | 38   | 36   | 38    | 32        | 37 | 33  | 34 | 33 | 36  | 42  | 40  | 40 | 40 | 38 | 919  | Average weekends |

Table 3.5.6. (Page 4 of 4) Daily and hourly distribution of Spitsbergen array detections.

For each day is shown number of detections within each hour of the day, and number of detections for that day. The end statistics give total number of detections distributed for each hour and the total sum of detections during the period. The averages show number of processed days, hourly distribution and average per processed day.

## HFS .FKX Hourly distribution of detections

| Day | 00  | 01  | 02  | 03  | 04  | 05  | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20  | 21  | 22  | 23  | Sum  | Date             |
|-----|-----|-----|-----|-----|-----|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|------|------------------|
| 92  | 14  | 9   | 12  | 21  | 11  | 7   | 4  | 5  | 6  | 5  | 4  | 10 | 10 | 14 | 25 | 13 | 5  | 6  | 19 | 15 | 22  | 36  | 24  | 34  | 331  | Apr 01 Monday    |
| 93  | 24  | 27  | 15  | 36  | 17  | 5   | 7  | 12 | 15 | 10 | 15 | 21 | 16 | 9  | 22 | 6  | 3  | 7  | 5  | 28 | 23  | 22  | 21  | 30  | 396  | Apr 02 Tuesday   |
| 94  | 29  | 25  | 24  | 32  | 29  | 12  | 8  | 7  | 11 | 20 | 59 | 64 | 32 | 26 | 19 | 5  | 13 | 8  | 1  | 2  | 12  | 13  | 12  | 27  | 490  | Apr 03 Wednesday |
| 95  | 36  | 45  | 39  | 41  | 21  | 6   | 4  | 14 | 11 | 10 | 9  | 22 | 12 | 9  | 16 | 10 | 10 | 17 | 4  | 4  | 2   | 2   | 3   | 20  | 367  | Apr 04 Thursday  |
| 96  | 25  | 40  | 70  | 67  | 76  | 47  | 23 | 16 | 17 | 20 | 18 | 11 | 18 | 25 | 7  | 5  | 6  | 14 | 9  | 5  | 9   | 15  | 24  | 43  | 610  | Apr 05 Friday    |
| 97  | 46  | 86  | 87  | 111 | 114 | 56  | 8  | 18 | 5  | 16 | 14 | 30 | 12 | 14 | 3  | 11 | 2  | 8  | 5  | 4  | 4   | 12  | 11  | 12  | 689  | Apr 06 Saturday  |
| 98  | 31  | 49  | 20  | 14  | 10  | 6   | 20 | 8  | 14 | 5  | 9  | 14 | 7  | 10 | 25 | 12 | 9  | 8  | 5  | 13 | 6   | 4   | 5   | 16  | 320  | Apr 07 Sunday    |
| 99  | 10  | 18  | 13  | 7   | 11  | 4   | 10 | 8  | 4  | 4  | 14 | 28 | 6  | 14 | 13 | 4  | 7  | 12 | 15 | 0  | 4   | 8   | 6   | 13  | 233  | Apr 08 Monday    |
| 100 | 18  | 9   | 27  | 15  | 9   | 11  | 6  | 4  | 4  | 4  | 6  | 22 | 5  | 17 | 7  | 7  | 4  | 9  | 3  | 3  | 2   | 3   | 5   | 5   | 205  | Apr 09 Tuesday   |
| 101 | 1   | 1   | 15  | 2   | 5   | 4   | 7  | 6  | 8  | 5  | 3  | 10 | 17 | 17 | 17 | 13 | 7  | 5  | 2  | 4  | 19  | 33  | 60  | 48  | 309  | Apr 10 Wednesday |
| 102 | 34  | 78  | 87  | 95  | 79  | 48  | 2  | 5  | 14 | 15 | 10 | 12 | 15 | 13 | 6  | 15 | 5  | 46 | 58 | 86 | 100 | 108 | 129 | 116 | 1176 | Apr 11 Thursday  |
| 103 | 141 | 154 | 154 | 170 | 129 | 52  | 15 | 7  | 7  | 16 | 15 | 14 | 28 | 27 | 15 | 24 | 8  | 8  | 7  | 9  | 27  | 45  | 88  | 126 | 1286 | Apr 12 Friday    |
| 104 | 135 | 160 | 155 | 159 | 146 | 111 | 24 | 11 | 4  | 11 | 14 | 9  | 11 | 13 | 5  | 20 | 14 | 14 | 9  | 17 | 16  | 21  | 18  | 48  | 1145 | Apr 13 Saturday  |
| 105 | 75  | 115 | 109 | 149 | 155 | 122 | 39 | 28 | 19 | 7  | 16 | 17 | 18 | 12 | 11 | 13 | 8  | 3  | 6  | 15 | 2   | 13  | 18  | 26  | 996  | Apr 14 Sunday    |
| 106 | 67  | 116 | 117 | 128 | 118 | 36  | 23 | 6  | 1  | 13 | 9  | 8  | 16 | 17 | 12 | 6  | 5  | 12 | 10 | 1  | 10  | 7   | 8   | 7   | 753  | Apr 15 Monday    |
| 107 | 28  | 48  | 71  | 64  | 49  | 9   | 6  | 2  | 5  | 10 | 24 | 13 | 7  | 9  | 23 | 5  | 18 | 8  | 9  | 21 | 5   | 15  | 10  | 5   | 464  | Apr 16 Tuesday   |
| 108 | 15  | 1   | 9   | 7   | 9   | 3   | 5  | 3  | 2  | 11 | 12 | 45 | 22 | 17 | 24 | 8  | 15 | 2  | 4  | 3  | 3   | 4   | 6   | 4   | 234  | Apr 17 Wednesday |
| 109 | 8   | 13  | 14  | 19  | 12  | 1   | 10 | 4  | 22 | 8  | 10 | 25 | 11 | 5  | 4  | 2  | 7  | 11 | 6  | 5  | 3   | 1   | 14  | 8   | 223  | Apr 18 Thursday  |
| 110 | 9   | 6   | 26  | 12  | 3   | 5   | 2  | 3  | 1  | 19 | 10 | 17 | 25 | 35 | 10 | 10 | 12 | 3  | 12 | 7  | 6   | 3   | 6   | 2   | 244  | Apr 19 Friday    |
| 111 | 6   | 3   | 6   | 9   | 11  | 4   | 7  | 7  | 6  | 21 | 8  | 11 | 12 | 11 | 6  | 11 | 21 | 1  | 17 | 16 | 29  | 12  | 24  | 27  | 286  | Apr 20 Saturday  |
| 112 | 31  | 16  | 25  | 21  | 18  | 9   | 21 | 21 | 17 | 9  | 14 | 20 | 9  | 8  | 11 | 10 | 18 | 5  | 20 | 12 | 3   | 3   | 8   | 3   | 332  | Apr 21 Sunday    |
| 113 | 6   | 5   | 5   | 6   | 9   | 3   | 6  | 3  | 5  | 15 | 8  | 17 | 9  | 13 | 11 | 12 | 8  | 1  | 4  | 1  | 9   | 4   | 4   | 4   | 168  | Apr 22 Monday    |
| 114 | 11  | 8   | 4   | 5   | 4   | 3   | 1  | 3  | 3  | 4  | 1  | 6  | 9  | 29 | 3  | 0  | 4  | 8  | 1  | 3  | 6   | 0   | 6   | 7   | 129  | Apr 23 Tuesday   |
| 115 | 2   | 4   | 4   | 5   | 3   | 7   | 4  | 5  | 6  | 26 | 6  | 10 | 17 | 27 | 6  | 6  | 17 | 8  | 1  | 4  | 2   | 4   | 4   | 1   | 179  | Apr 24 Wednesday |
| 116 | 4   | 0   | 11  | 4   | 1   | 6   | 6  | 2  | 1  | 0  | 7  | 4  | 14 | 13 | 6  | 3  | 9  | 3  | 17 | 7  | 5   | 7   | 8   | 5   | 143  | Apr 25 Thursday  |
| 117 | 2   | 9   | 2   | 3   | 1   | 6   | 5  | 8  | 2  | 6  | 21 | 4  | 10 | 3  | 22 | 9  | 13 | 10 | 11 | 7  | 16  | 16  | 14  | 9   | 209  | Apr 26 Friday    |
| 118 | 19  | 10  | 13  | 25  | 5   | 9   | 6  | 17 | 9  | 7  | 5  | 5  | 12 | 6  | 5  | 7  | 10 | 7  | 10 | 2  | 4   | 8   | 6   | 2   | 209  | Apr 27 Saturday  |
| 119 | 7   | 3   | 9   | 8   | 2   | 14  | 4  | 8  | 8  | 4  | 9  | 5  | 3  | 2  | 10 | 2  | 7  | 4  | 5  | 5  | 3   | 6   | 2   | 4   | 134  | Apr 28 Sunday    |
| 120 | 2   | 2   | 9   | 2   | 2   | 4   | 1  | 9  | 1  | 2  | 9  | 9  | 11 | 6  | 25 | 16 | 8  | 4  | 9  | 3  | 5   | 2   | 6   | 6   | 153  | Apr 29 Monday    |
| 121 | 2   | 1   | 5   | 2   | 4   | 5   | 3  | 1  | 0  | 14 | 9  | 34 | 8  | 19 | 4  | 9  | 1  | 6  | 1  | 4  | 6   | 4   | 9   | 6   | 157  | Apr 30 Tuesday   |
| 122 | 5   | 6   | 8   | 19  | 10  | 6   | 4  | 13 | 7  | 9  | 11 | 8  | 6  | 6  | 20 | 1  | 11 | 9  | 7  | 12 | 7   | 0   | 6   | 1   | 192  | May 01 Wednesday |
| 123 | 10  | 4   | 4   | 1   | 5   | 16  | 13 | 1  | 2  | 3  | 2  | 22 | 19 | 24 | 16 | 9  | 17 | 8  | 13 | 3  | 3   | 5   | 7   | 2   | 209  | May 02 Thursday  |
| 124 | 5   | 8   | 11  | 11  | 4   | 13  | 5  | 5  | 8  | 19 | 4  | 6  | 13 | 27 | 37 | 8  | 7  | 4  | 10 | 1  | 4   | 5   | 10  | 10  | 235  | May 03 Friday    |
| 125 | 3   | 4   | 4   | 6   | 10  | 0   | 2  | 7  | 8  | 10 | 3  | 9  | 4  | 3  | 6  | 6  | 12 | 8  | 12 | 6  | 3   | 4   | 13  | 14  | 157  | May 04 Saturday  |
| 126 | 17  | 3   | 5   | 8   | 6   | 3   | 4  | 5  | 35 | 10 | 12 | 33 | 6  | 9  | 19 | 6  | 7  | 2  | 16 | 11 | 12  | 8   | 20  | 9   | 266  | May 05 Sunday    |
| 127 | 17  | 5   | 10  | 7   | 1   | 5   | 7  | 9  | 5  | 9  | 18 | 17 | 4  | 10 | 5  | 1  | 6  | 3  | 40 | 13 | 14  | 2   | 4   | 5   | 217  | May 06 Monday    |
| 128 | 4   | 2   | 5   | 6   | 6   | 6   | 9  | 3  | 9  | 9  | 5  | 1  | 11 | 19 | 12 | 6  | 5  | 1  | 9  | 3  | 13  | 4   | 13  | 7   | 168  | May 07 Tuesday   |
| 129 | 4   | 5   | 10  | 3   | 1   | 6   | 1  | 8  | 7  | 7  | 7  | 35 | 52 | 27 | 12 | 1  | 11 | 2  | 1  | 2  | 5   | 3   | 3   | 4   | 217  | May 08 Wednesday |
| 130 | 3   | 4   | 4   | 13  | 17  | 12  | 3  | 12 | 2  | 3  | 17 | 12 | 11 | 8  | 17 | 9  | 7  | 22 | 26 | 5  | 7   | 7   | 2   | 2   | 225  | May 09 Thursday  |
| 131 | 11  | 8   | 5   | 7   | 7   | 2   | 2  | 1  | 6  | 5  | 1  | 3  | 5  | 10 | 4  | 10 | 1  | 3  | 4  | 10 | 3   | 7   | 4   | 8   | 127  | May 10 Friday    |
| 132 | 4   | 4   | 4   | 3   | 18  | 15  | 6  | 6  | 11 | 1  | 13 | 6  | 3  | 18 | 22 | 23 | 8  | 7  | 16 | 15 | 6   | 8   | 6   | 15  | 238  | May 11 Saturday  |
| 133 | 10  | 6   | 26  | 18  | 12  | 14  | 7  | 12 | 8  | 7  | 9  | 15 | 12 | 5  | 3  | 12 | 8  | 4  | 4  | 6  | 4   | 9   | 6   | 9   | 226  | May 12 Sunday    |
| 134 | 2   | 5   | 8   | 5   | 7   | 5   | 1  | 0  | 8  | 2  | 5  | 3  | 10 | 8  | 0  | 5  | 2  | 2  | 2  | 6  | 2   | 2   | 1   | 6   | 97   | May 13 Monday    |
| 135 | 7   | 3   | 4   | 2   | 1   | 2   | 0  | 3  | 4  | 1  | 3  | 17 | 24 | 9  | 4  | 12 | 7  | 8  | 0  | 16 | 3   | 7   | 3   | 6   | 146  | May 14 Tuesday   |
| 136 | 6   | 2   | 5   | 3   | 2   | 4   | 3  | 2  | 3  | 15 | 11 | 7  | 11 | 14 | 19 | 3  | 5  | 2  | 4  | 4  | 3   | 1   | 1   | 5   | 135  | May 15 Wednesday |
| 137 | 2   | 3   | 4   | 7   | 3   | 5   | 2  | 3  | 7  | 4  | 14 | 3  | 2  | 11 | 2  | 10 | 3  | 8  | 2  | 4  | 2   | 11  | 2   | 7   | 121  | May 16 Thursday  |
| 138 | 6   | 1   | 5   | 10  | 4   | 3   | 2  | 4  | 6  | 3  | 19 | 9  | 7  | 1  | 0  | 9  | 1  | 9  | 5  | 1  | 6   | 0   | 1   | 4   | 116  | May 17 Friday    |
| 139 | 7   | 5   | 4   | 8   | 2   | 6   | 2  | 2  | 6  | 2  | 8  | 3  | 7  | 4  | 5  | 0  | 3  | 4  | 8  | 8  | 6   | 10  | 3   | 5   | 118  | May 18 Saturday  |
| 140 | 0   | 9   | 2   | 13  | 6   | 5   | 5  | 9  | 6  | 2  | 7  | 7  | 9  | 7  | 17 | 2  | 11 | 4  | 5  | 3  | 8   | 9   | 2   | 3   | 151  | May 19 Sunday    |
| 141 | 2   | 6   | 6   | 6   | 5   | 6   | 2  | 1  | 11 | 2  | 6  | 4  | 6  | 1  | 5  | 2  | 8  | 9  | 1  | 1  | 3   | 3   | 10  | 1   | 107  | May 20 Monday    |
| 142 | 2   | 5   | 4   | 5   | 9   | 4   | 2  | 34 | 3  | 2  | 14 | 4  | 14 | 5  | 17 | 6  | 2  | 5  | 1  | 4  | 11  | 11  | 5   | 11  | 180  | May 21 Tuesday   |
| 143 | 8   | 3   | 3   | 5   | 0   | 5   | 3  | 1  | 0  | 0  | 5  | 8  | 2  | 14 | 21 | 20 | 13 | 2  | 5  | 6  | 13  | 5   | 7   | 5   | 154  | May 22 Wednesday |
| 144 | 1   | 6   | 7   | 5   | 3   | 1   | 3  | 11 | 17 | 19 | 4  | 12 | 17 | 8  | 13 | 5  | 5  | 10 | 9  | 3  | 1   | 1   | 9   | 8   | 178  | May 23 Thursday  |
| 145 | 2   | 1   | 2   | 2   | 1   | 3   | 10 | 16 | 2  | 16 | 5  | 0  | 16 | 4  | 6  | 5  | 5  | 1  | 5  | 2  | 1   | 5   | 2   | 6   | 118  | May 24 Friday    |
| 146 | 6   | 3   | 0   | 2   | 2   | 2   | 15 | 11 | 6  | 11 | 11 | 11 | 13 | 3  | 8  | 9  | 6  | 8  | 5  | 5  | 11  | 9   | 2   | 1   | 160  | May 25 Saturday  |
| 147 | 0   | 5   | 14  | 0   | 7   | 7   | 16 | 9  | 7  | 9  | 20 | 5  | 5  | 8  | 12 | 12 | 12 | 5  | 10 | 10 | 5   | 9   | 1   | 4   | 192  | May 26 Sunday    |

Table 3.5.7 (Page 1 of 4)

## HFS .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date             |                 |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|------------------|-----------------|
| 148 | 9  | 8  | 7  | 4  | 6  | 7  | 4  | 6  | 8  | 14 | 6  | 8  | 8  | 2  | 26 | 11 | 7  | 0  | 5  | 2  | 6  | 3  | 3  | 8  | 168 | May 27 Monday    |                 |
| 149 | 3  | 13 | 3  | 4  | 4  | 3  | 2  | 2  | 9  | 2  | 8  | 5  | 9  | 7  | 8  | 3  | 8  | 8  | 13 | 17 | 7  | 4  | 6  | 13 | 161 | May 28 Tuesday   |                 |
| 150 | 1  | 12 | 1  | 5  | 4  | 16 | 3  | 5  | 2  | 5  | 9  | 7  | 5  | 23 | 8  | 11 | 6  | 11 | 2  | 7  | 2  | 3  | 3  | 1  | 152 | May 29 Wednesday |                 |
| 151 | 1  | 2  | 1  | 11 | 4  | 2  | 6  | 5  | 7  | 3  | 26 | 8  | 14 | 10 | 10 | 6  | 6  | 0  | 16 | 6  | 2  | 1  | 0  | 1  | 148 | May 30 Thursday  |                 |
| 152 | 4  | 5  | 5  | 2  | 6  | 0  | 3  | 2  | 6  | 18 | 2  | 16 | 11 | 7  | 2  | 5  | 5  | 3  | 2  | 5  | 2  | 2  | 1  | 5  | 119 | May 31 Friday    |                 |
| 153 | 3  | 3  | 1  | 4  | 1  | 0  | 2  | 5  | 4  | 6  | 2  | 5  | 12 | 10 | 12 | 5  | 10 | 8  | 17 | 9  | 6  | 4  | 2  | 1  | 132 | Jun 01 Saturday  |                 |
| 154 | 3  | 2  | 17 | 6  | 7  | 3  | 2  | 6  | 6  | 8  | 2  | 1  | 13 | 8  | 4  | 4  | 6  | 7  | 2  | 2  | 3  | 8  | 3  | 2  | 125 | Jun 02 Sunday    |                 |
| 155 | 9  | 16 | 3  | 2  | 7  | 1  | 2  | 1  | 7  | 3  | 8  | 16 | 17 | 10 | 13 | 32 | 10 | 9  | 12 | 3  | 3  | 3  | 0  | 5  | 192 | Jun 03 Monday    |                 |
| 156 | 4  | 3  | 5  | 8  | 10 | 7  | 2  | 3  | 15 | 2  | 8  | 10 | 10 | 6  | 13 | 2  | 5  | 5  | 5  | 7  | 6  | 2  | 2  | 8  | 148 | Jun 04 Tuesday   |                 |
| 157 | 5  | 4  | 1  | 0  | 11 | 3  | 2  | 3  | 4  | 20 | 12 | 17 | 16 | 19 | 51 | 12 | 3  | 4  | 3  | 15 | 0  | 1  | 2  | 7  | 215 | Jun 05 Wednesday |                 |
| 158 | 7  | 3  | 4  | 3  | 2  | 2  | 19 | 0  | 12 | 2  | 7  | 13 | 13 | 21 | 10 | 9  | 16 | 4  | 7  | 5  | 13 | 5  | 4  | 8  | 189 | Jun 06 Thursday  |                 |
| 159 | 1  | 1  | 5  | 6  | 1  | 26 | 20 | 19 | 29 | 42 | 50 | 28 | 21 | 22 | 16 | 3  | 1  | 1  | 2  | 2  | 2  | 2  | 3  | 10 | 313 | Jun 07 Friday    |                 |
| 160 | 0  | 3  | 11 | 8  | 12 | 10 | 12 | 10 | 36 | 72 | 64 | 28 | 35 | 12 | 8  | 3  | 10 | 7  | 5  | 4  | 6  | 5  | 11 | 10 | 382 | Jun 08 Saturday  |                 |
| 161 | 4  | 13 | 14 | 13 | 10 | 9  | 9  | 9  | 17 | 15 | 15 | 13 | 13 | 12 | 7  | 8  | 10 | 8  | 9  | 5  | 6  | 5  | 2  | 13 | 239 | Jun 09 Sunday    |                 |
| 162 | 4  | 22 | 2  | 2  | 65 | 34 | 15 | 13 | 19 | 24 | 23 | 23 | 10 | 29 | 18 | 25 | 19 | 31 | 12 | 11 | 6  | 5  | 5  | 9  | 426 | Jun 10 Monday    |                 |
| 163 | 10 | 7  | 3  | 4  | 6  | 8  | 7  | 13 | 4  | 9  | 20 | 17 | 18 | 13 | 18 | 17 | 8  | 14 | 20 | 6  | 7  | 13 | 3  | 4  | 249 | Jun 11 Tuesday   |                 |
| 164 | 6  | 4  | 6  | 9  | 9  | 2  | 1  | 3  | 7  | 16 | 10 | 9  | 6  | 12 | 26 | 12 | 2  | 9  | 4  | 2  | 8  | 5  | 7  | 8  | 183 | Jun 12 Wednesday |                 |
| 165 | 18 | 2  | 6  | 4  | 3  | 6  | 1  | 8  | 3  | 1  | 6  | 10 | 18 | 4  | 7  | 5  | 4  | 6  | 5  | 7  | 2  | 1  | 5  | 3  | 135 | Jun 13 Thursday  |                 |
| 166 | 2  | 0  | 1  | 2  | 5  | 3  | 3  | 5  | 9  | 14 | 8  | 4  | 4  | 17 | 12 | 23 | 7  | 9  | 11 | 6  | 1  | 7  | 14 | 13 | 180 | Jun 14 Friday    |                 |
| 167 | 5  | 5  | 4  | 0  | 13 | 3  | 11 | 6  | 13 | 5  | 10 | 10 | 14 | 4  | 9  | 12 | 10 | 10 | 9  | 10 | 8  | 7  | 6  | 15 | 199 | Jun 15 Saturday  |                 |
| 168 | 23 | 10 | 17 | 13 | 8  | 3  | 4  | 16 | 4  | 10 | 5  | 8  | 14 | 15 | 9  | 11 | 14 | 8  | 6  | 18 | 15 | 8  | 5  | 3  | 247 | Jun 16 Sunday    |                 |
| 169 | 6  | 9  | 12 | 7  | 4  | 2  | 1  | 1  | 0  | 4  | 13 | 48 | 13 | 2  | 16 | 16 | 14 | 14 | 8  | 6  | 2  | 10 | 9  | 2  | 219 | Jun 17 Monday    |                 |
| 170 | 3  | 8  | 10 | 2  | 0  | 2  | 11 | 6  | 6  | 5  | 8  | 3  | 16 | 14 | 31 | 6  | 5  | 11 | 4  | 7  | 8  | 6  | 4  | 3  | 179 | Jun 18 Tuesday   |                 |
| 171 | 7  | 6  | 8  | 2  | 1  | 5  | 4  | 3  | 11 | 6  | 5  | 11 | 9  | 23 | 7  | 11 | 12 | 3  | 3  | 1  | 5  | 9  | 4  | 2  | 158 | Jun 19 Wednesday |                 |
| 172 | 1  | 3  | 4  | 1  | 2  | 3  | 6  | 5  | 8  | 19 | 9  | 11 | 9  | 16 | 17 | 10 | 5  | 3  | 3  | 6  | 14 | 10 | 9  | 4  | 178 | Jun 20 Thursday  |                 |
| 173 | 10 | 4  | 1  | 11 | 3  | 2  | 4  | 2  | 4  | 11 | 13 | 24 | 19 | 16 | 35 | 12 | 13 | 13 | 18 | 22 | 16 | 20 | 9  | 16 | 298 | Jun 21 Friday    |                 |
| 174 | 9  | 12 | 8  | 13 | 11 | 1  | 9  | 4  | 2  | 6  | 15 | 21 | 17 | 12 | 6  | 30 | 12 | 20 | 16 | 21 | 12 | 17 | 11 | 10 | 295 | Jun 22 Saturday  |                 |
| 175 | 5  | 41 | 29 | 31 | 10 | 9  | 10 | 12 | 15 | 13 | 10 | 33 | 43 | 25 | 27 | 40 | 23 | 14 | 17 | 17 | 28 | 13 | 11 | 34 | 510 | Jun 23 Sunday    |                 |
| 176 | 19 | 9  | 6  | 14 | 3  | 8  | 10 | 4  | 5  | 5  | 6  | 14 | 1  | 8  | 24 | 18 | 5  | 7  | 5  | 5  | 4  | 12 | 10 | 1  | 203 | Jun 24 Monday    |                 |
| 177 | 12 | 3  | 17 | 17 | 3  | 7  | 4  | 15 | 3  | 9  | 20 | 10 | 13 | 17 | 23 | 2  | 11 | 10 | 7  | 11 | 24 | 10 | 10 | 2  | 260 | Jun 25 Tuesday   |                 |
| 178 | 7  | 4  | 19 | 13 | 13 | 5  | 16 | 9  | 12 | 5  | 12 | 14 | 16 | 13 | 26 | 23 | 10 | 12 | 45 | 15 | 12 | 6  | 4  | 0  | 311 | Jun 26 Wednesday |                 |
| 179 | 4  | 2  | 0  | 2  | 1  | 5  | 7  | 7  | 14 | 12 | 18 | 12 | 15 | 15 | 16 | 16 | 9  | 15 | 7  | 2  | 5  | 5  | 6  | 5  | 0   | 184              | Jun 27 Thursday |
| 180 | 2  | 1  | 2  | 9  | 17 | 12 | 20 | 10 | 21 | 8  | 13 | 3  | 17 | 2  | 12 | 6  | 9  | 10 | 2  | 1  | 14 | 9  | 11 | 4  | 215 | Jun 28 Friday    |                 |
| 181 | 2  | 10 | 5  | 5  | 7  | 3  | 14 | 7  | 23 | 8  | 5  | 11 | 9  | 4  | 3  | 7  | 9  | 12 | 10 | 6  | 7  | 7  | 0  | 7  | 181 | Jun 29 Saturday  |                 |
| 182 | 10 | 12 | 4  | 10 | 10 | 1  | 3  | 6  | 16 | 17 | 9  | 19 | 26 | 8  | 9  | 17 | 7  | 18 | 11 | 12 | 7  | 9  | 4  | 14 | 259 | Jun 30 Sunday    |                 |
| 183 | 8  | 11 | 9  | 6  | 7  | 4  | 10 | 17 | 6  | 5  | 12 | 4  | 17 | 12 | 19 | 4  | 3  | 4  | 10 | 3  | 6  | 9  | 11 | 6  | 203 | Jul 01 Monday    |                 |
| 184 | 7  | 8  | 4  | 9  | 4  | 1  | 1  | 13 | 4  | 6  | 6  | 13 | 15 | 12 | 12 | 14 | 11 | 4  | 5  | 5  | 18 | 2  | 4  | 4  | 182 | Jul 02 Tuesday   |                 |
| 185 | 2  | 6  | 5  | 3  | 2  | 1  | 13 | 7  | 8  | 4  | 10 | 32 | 7  | 17 | 10 | 27 | 5  | 8  | 4  | 12 | 12 | 3  | 2  | 1  | 201 | Jul 03 Wednesday |                 |
| 186 | 0  | 2  | 3  | 5  | 1  | 2  | 0  | 7  | 10 | 9  | 7  | 9  | 17 | 9  | 10 | 14 | 9  | 9  | 6  | 1  | 5  | 4  | 9  | 14 | 162 | Jul 04 Thursday  |                 |
| 187 | 4  | 8  | 9  | 0  | 5  | 3  | 6  | 5  | 18 | 10 | 20 | 21 | 13 | 10 | 22 | 5  | 14 | 8  | 7  | 19 | 9  | 5  | 3  | 10 | 234 | Jul 05 Friday    |                 |
| 188 | 1  | 2  | 2  | 4  | 2  | 13 | 5  | 10 | 10 | 25 | 13 | 11 | 13 | 17 | 20 | 10 | 14 | 12 | 22 | 20 | 14 | 27 | 7  | 3  | 277 | Jul 06 Saturday  |                 |
| 189 | 3  | 7  | 2  | 8  | 7  | 5  | 6  | 8  | 3  | 8  | 15 | 18 | 18 | 17 | 18 | 11 | 21 | 22 | 20 | 12 | 9  | 12 | 4  | 2  | 256 | Jul 07 Sunday    |                 |
| 190 | 8  | 10 | 4  | 3  | 9  | 2  | 3  | 4  | 1  | 3  | 2  | 13 | 9  | 10 | 7  | 15 | 4  | 15 | 6  | 9  | 9  | 17 | 3  | 7  | 173 | Jul 08 Monday    |                 |
| 191 | 12 | 9  | 5  | 8  | 9  | 8  | 9  | 4  | 14 | 7  | 7  | 15 | 23 | 20 | 6  | 11 | 3  | 23 | 13 | 7  | 4  | 7  | 9  | 5  | 238 | Jul 09 Tuesday   |                 |
| 192 | 12 | 9  | 7  | 6  | 12 | 11 | 8  | 6  | 6  | 7  | 5  | 43 | 6  | 11 | 19 | 10 | 7  | 10 | 18 | 14 | 2  | 2  | 5  | 2  | 238 | Jul 10 Wednesday |                 |
| 193 | 2  | 5  | 4  | 3  | 5  | 2  | 29 | 18 | 23 | 8  | 10 | 9  | 13 | 8  | 18 | 3  | 8  | 8  | 25 | 6  | 8  | 6  | 9  | 1  | 231 | Jul 11 Thursday  |                 |
| 194 | 4  | 3  | 7  | 12 | 6  | 9  | 9  | 12 | 0  | 12 | 17 | 7  | 19 | 18 | 13 | 14 | 17 | 9  | 11 | 21 | 8  | 18 | 7  | 3  | 256 | Jul 12 Friday    |                 |
| 195 | 6  | 10 | 9  | 3  | 5  | 13 | 2  | 10 | 30 | 25 | 23 | 16 | 16 | 7  | 17 | 9  | 5  | 5  | 10 | 17 | 11 | 5  | 16 | 2  | 272 | Jul 13 Saturday  |                 |
| 196 | 10 | 3  | 6  | 3  | 4  | 10 | 2  | 14 | 5  | 20 | 10 | 5  | 15 | 14 | 9  | 17 | 22 | 16 | 11 | 19 | 6  | 5  | 7  | 9  | 242 | Jul 14 Sunday    |                 |
| 197 | 12 | 5  | 17 | 1  | 28 | 13 | 7  | 4  | 6  | 3  | 6  | 9  | 7  | 8  | 7  | 4  | 15 | 27 | 10 | 14 | 11 | 13 | 7  | 2  | 236 | Jul 15 Monday    |                 |
| 198 | 9  | 14 | 6  | 19 | 15 | 11 | 12 | 3  | 11 | 13 | 12 | 3  | 4  | 10 | 4  | 11 | 16 | 10 | 19 | 17 | 7  | 3  | 8  | 2  | 239 | Jul 16 Tuesday   |                 |
| 199 | 6  | 11 | 8  | 4  | 7  | 10 | 14 | 17 | 3  | 9  | 12 | 11 | 5  | 2  | 17 | 9  | 17 | 16 | 13 | 9  | 11 | 9  | 12 | 3  | 235 | Jul 17 Wednesday |                 |
| 200 | 4  | 9  | 2  | 3  | 5  | 2  | 2  | 4  | 1  | 15 | 12 | 11 | 10 | 9  | 17 | 3  | 11 | 11 | 8  | 7  | 5  | 16 | 1  | 13 | 181 | Jul 18 Thursday  |                 |
| 201 | 4  | 7  | 10 | 7  | 10 | 3  | 12 | 5  | 9  | 4  | 12 | 9  | 14 | 14 | 15 | 18 | 22 | 17 | 10 | 26 | 7  | 7  | 2  | 2  | 246 | Jul 19 Friday    |                 |
| 202 | 15 | 16 | 13 | 17 | 15 | 6  | 14 | 23 | 21 | 33 | 24 | 32 | 22 | 16 | 6  | 17 | 23 | 19 | 27 | 16 | 9  | 13 | 19 | 4  | 420 | Jul 20 Saturday  |                 |
| 203 | 16 | 10 | 13 | 3  | 9  | 8  | 13 | 6  | 15 | 22 | 12 | 25 | 17 | 10 | 31 | 40 | 24 | 41 | 18 | 5  | 20 | 11 | 1  | 10 | 380 | Jul 21 Sunday    |                 |

Table 3.5.7 (Page 2 of 4)

## HFS .FKX Hourly distribution of detections

| Day | 00 | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20  | 21  | 22  | 23  | Sum | Date             |
|-----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|------------------|
| 204 | 7  | 19 | 7  | 5  | 15 | 10 | 8  | 9  | 15 | 10 | 11 | 8  | 8  | 16 | 29 | 17 | 26 | 7  | 21 | 15 | 6   | 15  | 4   | 7   | 295 | Jul 22 Monday    |
| 205 | 2  | 9  | 3  | 16 | 13 | 26 | 23 | 3  | 4  | 16 | 13 | 18 | 20 | 11 | 6  | 4  | 4  | 15 | 21 | 10 | 11  | 13  | 27  | 10  | 298 | Jul 23 Tuesday   |
| 206 | 9  | 13 | 8  | 10 | 19 | 7  | 15 | 7  | 17 | 5  | 19 | 24 | 24 | 10 | 15 | 19 | 17 | 16 | 9  | 14 | 14  | 12  | 3   | 3   | 309 | Jul 24 Wednesday |
| 207 | 9  | 10 | 10 | 17 | 12 | 10 | 8  | 5  | 20 | 8  | 5  | 10 | 9  | 53 | 58 | 31 | 12 | 19 | 44 | 98 | 51  | 7   | 3   | 21  | 530 | Jul 25 Thursday  |
| 208 | 4  | 5  | 4  | 5  | 2  | 10 | 10 | 6  | 17 | 15 | 7  | 23 | 45 | 38 | 21 | 29 | 17 | 19 | 14 | 12 | 14  | 7   | 20  | 40  | 384 | Jul 26 Friday    |
| 209 | 8  | 3  | 4  | 4  | 8  | 7  | 8  | 8  | 16 | 8  | 23 | 26 | 18 | 10 | 14 | 15 | 25 | 19 | 9  | 17 | 14  | 11  | 20  | 9   | 304 | Jul 27 Saturday  |
| 210 | 6  | 10 | 1  | 5  | 5  | 9  | 3  | 22 | 13 | 19 | 21 | 21 | 11 | 7  | 11 | 13 | 20 | 12 | 13 | 3  | 16  | 5   | 1   | 5   | 252 | Jul 28 Sunday    |
| 211 | 6  | 6  | 6  | 5  | 6  | 11 | 2  | 7  | 2  | 15 | 3  | 33 | 9  | 30 | 5  | 5  | 14 | 9  | 5  | 16 | 8   | 3   | 3   | 3   | 214 | Jul 29 Monday    |
| 212 | 4  | 6  | 7  | 9  | 12 | 4  | 12 | 5  | 7  | 13 | 15 | 29 | 22 | 20 | 34 | 19 | 7  | 10 | 7  | 6  | 8   | 13  | 6   | 9   | 284 | Jul 30 Tuesday   |
| 213 | 15 | 4  | 11 | 9  | 5  | 12 | 5  | 10 | 14 | 18 | 8  | 20 | 15 | 14 | 40 | 17 | 10 | 14 | 14 | 8  | 6   | 7   | 16  | 10  | 302 | Jul 31 Wednesday |
| 214 | 4  | 11 | 5  | 7  | 5  | 6  | 2  | 3  | 17 | 15 | 3  | 18 | 11 | 8  | 20 | 10 | 5  | 10 | 11 | 6  | 10  | 2   | 14  | 5   | 208 | Aug 01 Thursday  |
| 215 | 4  | 5  | 8  | 6  | 9  | 2  | 12 | 4  | 4  | 24 | 4  | 12 | 9  | 31 | 16 | 20 | 23 | 81 | 66 | 1  | 9   | 8   | 6   | 7   | 371 | Aug 02 Friday    |
| 216 | 8  | 4  | 10 | 15 | 13 | 11 | 3  | 17 | 5  | 15 | 12 | 13 | 16 | 5  | 17 | 16 | 9  | 12 | 6  | 8  | 4   | 10  | 14  | 5   | 248 | Aug 03 Saturday  |
| 217 | 18 | 11 | 17 | 11 | 17 | 7  | 7  | 12 | 13 | 16 | 21 | 16 | 10 | 12 | 15 | 12 | 14 | 21 | 10 | 19 | 13  | 7   | 10  | 5   | 314 | Aug 04 Sunday    |
| 218 | 13 | 9  | 17 | 3  | 12 | 2  | 2  | 0  | 15 | 5  | 4  | 9  | 9  | 18 | 16 | 8  | 17 | 13 | 3  | 8  | 5   | 8   | 14  | 22  | 232 | Aug 05 Monday    |
| 219 | 11 | 7  | 8  | 4  | 2  | 3  | 4  | 1  | 7  | 4  | 12 | 22 | 35 | 9  | 5  | 14 | 14 | 14 | 6  | 0  | 10  | 11  | 3   | 6   | 212 | Aug 06 Tuesday   |
| 220 | 2  | 9  | 6  | 4  | 2  | 3  | 1  | 1  | 7  | 11 | 7  | 7  | 11 | 20 | 9  | 9  | 11 | 7  | 8  | 4  | 3   | 5   | 4   | 10  | 161 | Aug 07 Wednesday |
| 221 | 5  | 7  | 8  | 7  | 1  | 9  | 7  | 8  | 4  | 9  | 13 | 10 | 13 | 7  | 18 | 16 | 5  | 12 | 9  | 6  | 5   | 2   | 5   | 10  | 196 | Aug 08 Thursday  |
| 222 | 21 | 4  | 4  | 8  | 6  | 8  | 11 | 6  | 12 | 24 | 16 | 6  | 9  | 12 | 9  | 27 | 26 | 12 | 12 | 12 | 12  | 5   | 1   | 9   | 272 | Aug 09 Friday    |
| 223 | 2  | 4  | 9  | 8  | 14 | 17 | 14 | 21 | 15 | 12 | 16 | 19 | 17 | 10 | 10 | 22 | 20 | 12 | 18 | 17 | 26  | 22  | 24  | 30  | 379 | Aug 10 Saturday  |
| 224 | 20 | 16 | 19 | 14 | 25 | 25 | 20 | 34 | 22 | 30 | 11 | 20 | 23 | 17 | 17 | 34 | 19 | 20 | 10 | 5  | 2   | 8   | 7   | 11  | 429 | Aug 11 Sunday    |
| 225 | 10 | 9  | 3  | 3  | 2  | 1  | 3  | 7  | 2  | 5  | 12 | 6  | 7  | 13 | 13 | 18 | 9  | 25 | 4  | 11 | 7   | 3   | 6   | 4   | 183 | Aug 12 Monday    |
| 226 | 16 | 7  | 9  | 4  | 7  | 3  | 13 | 7  | 5  | 12 | 37 | 15 | 36 | 28 | 43 | 50 | 45 | 19 | 31 | 39 | 17  | 8   | 9   | 4   | 464 | Aug 13 Tuesday   |
| 227 | 5  | 8  | 51 | 39 | 40 | 18 | 19 | 22 | 28 | 36 | 34 | 37 | 31 | 44 | 47 | 60 | 80 | 47 | 34 | 43 | 7   | 6   | 1   | 10  | 747 | Aug 14 Wednesday |
| 228 | 5  | 7  | 7  | 46 | 32 | 27 | 46 | 37 | 13 | 10 | 3  | 12 | 7  | 5  | 20 | 10 | 19 | 9  | 13 | 17 | 12  | 3   | 9   | 11  | 380 | Aug 15 Thursday  |
| 229 | 5  | 11 | 5  | 6  | 8  | 1  | 7  | 0  | 7  | 15 | 9  | 27 | 16 | 13 | 9  | 12 | 13 | 24 | 18 | 19 | 7   | 6   | 6   | 5   | 249 | Aug 16 Friday    |
| 230 | 5  | 24 | 11 | 3  | 9  | 14 | 10 | 11 | 5  | 25 | 16 | 34 | 16 | 12 | 12 | 8  | 10 | 6  | 19 | 7  | 13  | 16  | 19  | 14  | 319 | Aug 17 Saturday  |
| 231 | 18 | 6  | 33 | 3  | 8  | 25 | 10 | 12 | 12 | 15 | 8  | 15 | 12 | 24 | 18 | 10 | 16 | 7  | 18 | 9  | 6   | 6   | 3   | 6   | 300 | Aug 18 Sunday    |
| 232 | 3  | 8  | 6  | 8  | 12 | 4  | 9  | 5  | 6  | 2  | 11 | 25 | 40 | 18 | 8  | 8  | 1  | 3  | 4  | 10 | 4   | 3   | 10  | 3   | 211 | Aug 19 Monday    |
| 233 | 10 | 11 | 2  | 13 | 7  | 3  | 4  | 4  | 5  | 16 | 8  | 17 | 30 | 8  | 18 | 17 | 13 | 17 | 3  | 3  | 5   | 5   | 7   | 14  | 240 | Aug 20 Tuesday   |
| 234 | 4  | 4  | 6  | 4  | 3  | 1  | 2  | 11 | 4  | 13 | 9  | 15 | 14 | 22 | 14 | 5  | 9  | 3  | 7  | 4  | 1   | 4   | 8   | 3   | 170 | Aug 21 Wednesday |
| 235 | 2  | 8  | 6  | 5  | 14 | 10 | 11 | 16 | 15 | 16 | 4  | 13 | 12 | 35 | 18 | 6  | 17 | 14 | 11 | 8  | 10  | 12  | 17  | 11  | 291 | Aug 22 Thursday  |
| 236 | 10 | 8  | 7  | 1  | 9  | 9  | 18 | 4  | 10 | 16 | 8  | 10 | 11 | 9  | 22 | 9  | 8  | 21 | 4  | 10 | 4   | 6   | 8   | 6   | 228 | Aug 23 Friday    |
| 237 | 6  | 5  | 8  | 4  | 10 | 7  | 4  | 11 | 13 | 16 | 7  | 5  | 12 | 16 | 4  | 12 | 6  | 23 | 23 | 19 | 18  | 14  | 13  | 20  | 276 | Aug 24 Saturday  |
| 238 | 30 | 14 | 21 | 11 | 9  | 13 | 5  | 22 | 7  | 10 | 8  | 7  | 15 | 11 | 12 | 10 | 7  | 17 | 11 | 6  | 6   | 9   | 2   | 0   | 263 | Aug 25 Sunday    |
| 239 | 4  | 3  | 7  | 9  | 8  | 6  | 6  | 5  | 3  | 5  | 11 | 5  | 9  | 16 | 11 | 3  | 14 | 4  | 6  | 7  | 4   | 11  | 4   | 3   | 164 | Aug 26 Monday    |
| 240 | 7  | 12 | 7  | 6  | 5  | 6  | 12 | 9  | 8  | 9  | 8  | 37 | 10 | 16 | 25 | 17 | 10 | 10 | 7  | 4  | 1   | 3   | 2   | 2   | 233 | Aug 27 Tuesday   |
| 241 | 0  | 5  | 8  | 7  | 5  | 2  | 9  | 12 | 4  | 10 | 20 | 14 | 36 | 19 | 15 | 6  | 6  | 12 | 10 | 5  | 4   | 5   | 8   | 5   | 227 | Aug 28 Wednesday |
| 242 | 8  | 1  | 6  | 1  | 1  | 6  | 13 | 5  | 5  | 8  | 3  | 5  | 10 | 14 | 12 | 14 | 4  | 6  | 7  | 7  | 3   | 5   | 5   | 7   | 156 | Aug 29 Thursday  |
| 243 | 2  | 7  | 9  | 2  | 3  | 2  | 1  | 4  | 5  | 17 | 5  | 15 | 11 | 6  | 13 | 3  | 14 | 6  | 8  | 7  | 1   | 8   | 11  | 11  | 171 | Aug 30 Friday    |
| 244 | 2  | 4  | 6  | 4  | 12 | 13 | 11 | 8  | 11 | 37 | 27 | 11 | 14 | 16 | 3  | 7  | 10 | 3  | 17 | 5  | 7   | 9   | 10  | 5   | 252 | Aug 31 Saturday  |
| 245 | 15 | 6  | 8  | 8  | 17 | 3  | 9  | 17 | 11 | 16 | 10 | 11 | 16 | 10 | 16 | 12 | 7  | 21 | 18 | 1  | 2   | 5   | 6   | 5   | 250 | Sep 01 Sunday    |
| 246 | 1  | 4  | 8  | 3  | 7  | 3  | 2  | 9  | 8  | 5  | 20 | 14 | 15 | 9  | 10 | 20 | 1  | 3  | 4  | 9  | 5   | 0   | 5   | 3   | 168 | Sep 02 Monday    |
| 247 | 4  | 0  | 0  | 4  | 9  | 3  | 5  | 3  | 11 | 9  | 27 | 15 | 14 | 10 | 14 | 5  | 19 | 8  | 3  | 2  | 3   | 4   | 2   | 3   | 177 | Sep 03 Tuesday   |
| 248 | 14 | 5  | 4  | 21 | 20 | 14 | 48 | 19 | 14 | 7  | 12 | 11 | 15 | 28 | 20 | 21 | 15 | 10 | 16 | 9  | 7   | 0   | 4   | 3   | 337 | Sep 04 Wednesday |
| 249 | 4  | 3  | 30 | 7  | 2  | 4  | 2  | 1  | 16 | 4  | 5  | 24 | 3  | 19 | 19 | 5  | 9  | 15 | 20 | 8  | 16  | 11  | 8   | 14  | 249 | Sep 05 Thursday  |
| 250 | 22 | 20 | 44 | 17 | 9  | 5  | 12 | 15 | 17 | 13 | 9  | 22 | 36 | 25 | 17 | 13 | 3  | 9  | 13 | 68 | 113 | 114 | 117 | 140 | 873 | Sep 06 Friday    |
| 251 | 80 | 1  | 6  | 10 | 15 | 11 | 4  | 6  | 12 | 13 | 14 | 13 | 13 | 9  | 2  | 14 | 7  | 9  | 14 | 7  | 12  | 10  | 11  | 10  | 303 | Sep 07 Saturday  |
| 252 | 5  | 8  | 9  | 5  | 7  | 8  | 3  | 4  | 25 | 7  | 5  | 19 | 12 | 6  | 1  | 6  | 14 | 11 | 8  | 10 | 9   | 8   | 6   | 5   | 201 | Sep 08 Sunday    |
| 253 | 10 | 4  | 5  | 8  | 8  | 7  | 3  | 7  | 10 | 7  | 8  | 9  | 13 | 11 | 1  | 3  | 9  | 11 | 8  | 5  | 0   | 2   | 4   | 1   | 154 | Sep 09 Monday    |
| 254 | 0  | 2  | 1  | 3  | 4  | 4  | 7  | 2  | 20 | 10 | 13 | 34 | 21 | 15 | 14 | 4  | 11 | 1  | 2  | 1  | 3   | 4   | 4   | 4   | 184 | Sep 10 Tuesday   |
| 255 | 7  | 2  | 13 | 21 | 11 | 10 | 9  | 4  | 9  | 5  | 2  | 11 | 10 | 22 | 16 | 7  | 3  | 5  | 8  | 6  | 5   | 1   | 1   | 7   | 195 | Sep 11 Wednesday |
| 256 | 9  | 7  | 8  | 7  | 5  | 10 | 3  | 0  | 12 | 17 | 4  | 11 | 14 | 19 | 14 | 6  | 4  | 3  | 9  | 4  | 4   | 8   | 6   | 3   | 187 | Sep 12 Thursday  |
| 257 | 6  | 9  | 4  | 15 | 4  | 10 | 3  | 4  | 19 | 11 | 6  | 2  | 10 | 22 | 9  | 11 | 2  | 5  | 5  | 7  | 1   | 8   | 3   | 7   | 183 | Sep 13 Friday    |
| 258 | 13 | 3  | 14 | 11 | 10 | 9  | 9  | 7  | 12 | 5  | 8  | 5  | 7  | 20 | 16 | 5  | 11 | 10 | 17 | 12 | 5   | 6   | 7   | 2   | 224 | Sep 14 Saturday  |
| 259 | 3  | 3  | 10 | 11 | 5  | 5  | 11 | 14 | 10 | 7  | 14 | 7  | 7  | 9  | 5  | 9  | 12 | 9  | 13 | 3  | 13  | 11  | 5   | 4   | 200 | Sep 15 Sunday    |

Table 3.5.7 (Page 3 of 4)

## HFS .FKX Hourly distribution of detections

| Day  | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11    | 12        | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | Sum | Date              |
|------|------|------|------|------|------|------|------|------|------|------|------|-------|-----------|----|----|----|----|----|----|----|----|----|----|----|-----|-------------------|
| 260  | 4    | 11   | 9    | 4    | 15   | 3    | 11   | 4    | 6    | 8    | 11   | 15    | 25        | 21 | 26 | 18 | 9  | 18 | 11 | 3  | 8  | 10 | 7  | 3  | 260 | Sep 16 Monday     |
| 261  | 6    | 4    | 4    | 3    | 5    | 13   | 12   | 3    | 4    | 14   | 6    | 6     | 13        | 27 | 7  | 20 | 13 | 3  | 4  | 2  | 3  | 1  | 5  | 12 | 190 | Sep 17 Tuesday    |
| 262  | 7    | 1    | 4    | 8    | 8    | 7    | 10   | 7    | 20   | 12   | 16   | 11    | 15        | 14 | 9  | 13 | 3  | 21 | 11 | 1  | 2  | 2  | 4  | 5  | 211 | Sep 18 Wednesday  |
| 263  | 0    | 2    | 4    | 0    | 13   | 7    | 2    | 3    | 10   | 2    | 8    | 25    | 14        | 24 | 17 | 9  | 13 | 2  | 2  | 2  | 2  | 14 | 4  | 2  | 181 | Sep 19 Thursday   |
| 264  | 14   | 2    | 8    | 3    | 18   | 7    | 4    | 8    | 3    | 9    | 15   | 16    | 21        | 20 | 12 | 11 | 16 | 14 | 16 | 27 | 12 | 10 | 18 | 6  | 290 | Sep 20 Friday     |
| 265  | 11   | 17   | 11   | 21   | 8    | 10   | 3    | 5    | 10   | 4    | 7    | 10    | 19        | 7  | 3  | 8  | 10 | 23 | 7  | 8  | 3  | 8  | 12 | 7  | 232 | Sep 21 Saturday   |
| 266  | 9    | 7    | 10   | 2    | 2    | 4    | 5    | 8    | 10   | 12   | 10   | 14    | 10        | 9  | 15 | 4  | 7  | 13 | 5  | 6  | 6  | 2  | 3  | 1  | 174 | Sep 22 Sunday     |
| 267  | 1    | 4    | 3    | 3    | 6    | 4    | 2    | 8    | 27   | 10   | 9    | 17    | 17        | 18 | 6  | 13 | 6  | 9  | 15 | 8  | 0  | 4  | 1  | 1  | 192 | Sep 23 Monday     |
| 268  | 9    | 4    | 4    | 5    | 11   | 2    | 9    | 7    | 7    | 4    | 8    | 43    | 26        | 25 | 20 | 8  | 7  | 4  | 9  | 20 | 3  | 7  | 2  | 0  | 244 | Sep 24 Tuesday    |
| 269  | 3    | 2    | 10   | 12   | 8    | 3    | 2    | 13   | 11   | 4    | 9    | 25    | 17        | 11 | 24 | 23 | 8  | 10 | 5  | 13 | 4  | 5  | 2  | 0  | 224 | Sep 25 Wednesday  |
| 270  | 1    | 4    | 3    | 5    | 11   | 5    | 7    | 5    | 4    | 9    | 8    | 2     | 12        | 7  | 1  | 3  | 12 | 6  | 2  | 1  | 3  | 3  | 0  | 2  | 116 | Sep 26 Thursday   |
| 271  | 7    | 1    | 7    | 3    | 8    | 3    | 5    | 3    | 11   | 7    | 3    | 19    | 21        | 5  | 14 | 3  | 9  | 5  | 2  | 4  | 0  | 4  | 4  | 8  | 156 | Sep 27 Friday     |
| 272  | 6    | 1    | 9    | 8    | 3    | 8    | 5    | 11   | 8    | 7    | 1    | 13    | 15        | 6  | 12 | 14 | 6  | 9  | 10 | 8  | 5  | 8  | 7  | 7  | 187 | Sep 28 Saturday   |
| 273  | 2    | 2    | 2    | 4    | 8    | 9    | 17   | 7    | 3    | 8    | 18   | 10    | 30        | 6  | 5  | 2  | 1  | 4  | 9  | 8  | 3  | 7  | 3  | 6  | 174 | Sep 29 Sunday     |
| 274  | 11   | 5    | 3    | 5    | 1    | 7    | 4    | 4    | 12   | 6    | 4    | 25    | 12        | 9  | 6  | 6  | 5  | 11 | 1  | 6  | 4  | 2  | 3  | 1  | 153 | Sep 30 Monday     |
| HFS  | 00   | 01   | 02   | 03   | 04   | 05   | 06   | 07   | 08   | 09   | 10   | 11    | 12        | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |     |                   |
| Sum  | 2124 | 2421 | 1730 | 1515 | 2039 | 2767 | 2573 | 2132 | 1972 | 1831 | 1654 | 1866  |           |    |    |    |    |    |    |    |    |    |    |    |     |                   |
| 2002 | 2398 | 2366 | 1500 | 1792 | 2125 | 2677 | 2620 | 1950 | 1974 | 1668 | 1703 | 49399 | Total sum |    |    |    |    |    |    |    |    |    |    |    |     |                   |
| 183  | 11   | 12   | 13   | 13   | 13   | 9    | 8    | 8    | 10   | 11   | 12   | 15    | 15        | 14 | 14 | 12 | 11 | 11 | 11 | 10 | 9  | 9  | 9  | 10 | 270 | Total average     |
| 124  | 9    | 9    | 11   | 11   | 11   | 7    | 8    | 7    | 9    | 10   | 11   | 15    | 15        | 16 | 16 | 11 | 10 | 10 | 10 | 10 | 9  | 9  | 10 | 10 | 253 | Average workdays  |
| 59   | 15   | 15   | 17   | 17   | 17   | 13   | 9    | 11   | 12   | 13   | 13   | 14    | 13        | 10 | 11 | 12 | 11 | 11 | 11 | 9  | 9  | 9  | 8  | 10 | 290 | Average week-ends |

**Table 3.5.7.** (Page 4 of 4) Daily and hourly distribution of Hagfors array detections. For each day is shown number of detections within each hour of the day, and number of detections for that day. The end statistics give total number of detections distributed for each hour and the total sum of detections during the period. The averages show number of processed days, hourly distribution and average per processed day

### 3.6 Regional Monitoring System operation

The Regional Monitoring System (RMS) was installed at NORSAR in December 1989 and was operated at NORSAR from 1 January 1990 for automatic processing of data from ARCESS and NORESS. A second version of RMS that accepts data from an arbitrary number of arrays and single 3-component stations was installed at NORSAR in October 1991, and regular operation of the system comprising analysis of data from the 4 arrays ARCESS, NORESS, FINESS and GERESS started on 15 October 1991. As opposed to the first version of RMS, the one in current operation also has the capability of locating events at teleseismic distance.

Data from the Apatity array were included on 14 December 1992, and from the Spitsbergen array on 12 January 1994. Detections from the Hagfors array were available to the analysts and could be added manually during analysis from 6 December 1994. After 2 February 1995, Hagfors detections were also used in the automatic phase association.

The operational stability of RMS has been very good during the reporting period. In fact the RMS event processor (pipeline) has had no downtime of its own; i.e., all data available to RMS have been processed by RMS.

#### *Phase and event statistics*

Table 3.6.1 gives a summary of phase detections and events declared by RMS. From top to bottom the table gives the total number of detections by the RMS, the number of detections that are associated with events automatically declared by the RMS, the number of detections that are not associated with any events, the number of events automatically declared by the RMS, the total number of events defined by the analyst, and finally the number of events accepted by the analyst without any changes (i.e., from the set of events automatically declared by the RMS).

Due to reductions in the FY94 funding for RMS activities (relative to previous years), new criteria for event analysis were introduced from 1 January 1994. Since that date, only regional events in areas of special interest (e.g, Spitsbergen, since it is necessary to acquire new knowledge in this region) or other significant events (e.g, felt earthquakes and large industrial explosions) were thoroughly analyzed. Teleseismic events were analyzed as before.

To further reduce the workload on the analysts and to focus on regional events in preparation for Gamma-data submission during GSETT-3, a new processing scheme was introduced on 2 February 1995. The GBF (Generalized Beamforming) program is used as a pre-processor to RMS, and only phases associated to selected events in northern Europe are considered in the automatic RMS phase association. All detections, however, are still available to the analysts and can be added manually during analysis.

There is one exception to the new rule for automatic phase association: all detections from the Spitsbergen array are passed directly on to the RMS. This allows for thorough analysis of all events in the Spitsbergen region.

|                                              | Apr 96 | May 96 | Jun 96 | Jul 96 | Aug 96 | Sep 96 | Total  |
|----------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
| Phase detections                             | 49876  | 48613  | 56095  | 55741  | 95034  | 86911  | 392270 |
| - Associated phases                          | 2870   | 2974   | 2860   | 3580   | 7617   | 7262   | 27163  |
| - Unassociated phases                        | 47006  | 45639  | 53235  | 52161  | 87417  | 79649  | 365107 |
| Events automatically declared by RMS         | 594    | 585    | 597    | 942    | 2130   | 2015   | 6863   |
| No. of events defined by the analyst         | 111    | 128    | 159    | 394    | 980    | 624    | 2396   |
| No. of events accepted without modifications | 0      | 0      | 0      | 162    | 6      | 0      | 168    |

**Table 3.6.1.** RMS phase detections and event summary.

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**B.Kr. Hokland**  
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## 4 Improvements and Modifications

### 4.1 NORSAR

#### *NORSAR naming convention*

The naming convention for NORSAR stations has been modified. See section 7.2 for details.

#### *NORSAR configuration changes 1969-1996*

The NORSAR array has undergone several significant changes over time. The original array with 22 subarrays, each with 6 short period seismometers and one three-component long period seismometer, was reduced to 7 subarrays as of 1 October 1976. This configuration remained stable for many years. However, in the early 1990s, it became more and more difficult to operate the old communication system, and from 1 January 1994 a backup system was operated awaiting a complete refurbishment of the array. From 20 December 1994 the current system has been operated.

In addition to these major changes, several experiments temporarily affecting the array configuration have been performed, especially in connection with the installation of the NORESS array.

For the period 1969 to September 1982, we retain segmented short period data stored on magnetic tapes. These segments correspond to selected events only. We are still able to read such data tapes, even those from the earliest time period. From September 1982, all data recorded (i.e., continuous data) are archived.

It is important to know the status of each "data channel" throughout the history of NORSAR. An effort has been made to record all relevant information into CSS 3.0 tables. We have now completed site, sensor, sitechan and instrument tables for the entire operational period of the NORSAR array which uniquely describe the system for any point in time. Any data requested hereafter will be delivered in CSS 3.0 format with appropriate site, sensor, sitechan and instrument information.

#### *NORSAR data acquisition*

See NORSAR Sci.Rep. No. 1-95/96 for a description of the final phase of the NORSAR refurbishment effort.

The Science Horizons XAVE data acquisition system has been operating satisfactorily during and after the installation period. A block diagram of the digitizer and communication controller components is found in NORSAR Sci. Rep No 2-94/95.

#### *NORSAR detection processing and feature extraction*

The NORSAR detection processor has been running satisfactorily. To maintain consistent detection capability, the NORSAR beam tables have remained unchanged.

Detection statistics for the NORSAR array are given in section 2.

The NORSAR detecting beams include slowness vector and time delay corrections using precalculated, calibrated time delays. The method has been implemented into DFX, and IDC testbed operation of station NOA has been initiated.

See NORSAR Sci. Rep. 2-95/96 for a description of NORSAR beamforming techniques. See also section 7.2.

### ***NORSAR event processing***

The automatic routine processing of NORSAR events as described in NORSAR Sci. Rep No. 2-93/94, has been running satisfactorily. The analyst tools for reviewing and updating the solutions have been continuously modified to simplify operations and improve results.

**J. Fyen**

## 5 Maintenance Activities

### Activities in the field and at the Maintenance Center

This section summarizes the activities at the Maintenance Center (NMC) Hamar, and includes activities related to monitoring and control of the NORSAR teleseismic array, as well as the NORESS, ARCESS, FINESS, GERESS, Apatity, Spitsbergen and Hagfors small-aperture arrays.

Activities also involve preventive and corrective maintenance, planning and activities related to the refurbishment of the NORSAR teleseismic array.

#### NORSAR

Visits to subarrays in connection with:

- Replacement of protection control cards at various sites
- Replacement of AIM-24 digitizers and preamplifiers at various sites
- Power line and equipment failure due to thunderstorms
- Cable splicing at various sites

#### NORESS

- Repair of digitizer unit and seismometers from site C2 after the vault was found to be filled with water.
- Extensive repairs of array electronics after thunderstorms in June and July

#### ARCESS

- Restart of the UPS unit after a local power outage

#### Spitsbergen

- Reinstallation of seismometers, GPS receiver and telemetry equipment at the array. An extra battery regulator was installed in parallel with the old one.
- Replacement of the main board in the NORAC unit at NTA in Longyearbyen.

#### NMC

- Repair of defective electronic equipment removed from the arrays.

Additional details for the reporting period are provided in Table 5.1.

**P.W. Larsen**

**K.A. Løken**

| Subarray/<br>area | Task                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Date    |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| <b>April 1996</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |
| NORSAR<br>04C     | Disconnected data from remote site SP01 due to defective communication                                                                                                                                                                                                                                                                                                                                                                                                        | 11/4    |
| Spitsbergen       | Replaced the 12V battery with a 24 V battery. The 12V battery had been overcharged due to a defective diode in the charge regulator. The generator in the windmill was replaced and returned to the manufacturer for tests. The whole installation at the site was found to be damaged by overvoltage. The Guralp seismometers were returned to England for repair. The digitizers, GPS receiver and the telemetry equipment were taken to the maintenance center for repair. | 22-24/4 |
| NMC               | Repair of defective electronic equipment                                                                                                                                                                                                                                                                                                                                                                                                                                      | April   |
| <b>May 1996</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |
| NORSAR<br>01A     | Replaced protection-control card at SP02 and SP05. Replaced +9V zender diode in junction box at SP00                                                                                                                                                                                                                                                                                                                                                                          | 14/5    |
| 01A               | Took AIM-24 digitizer and Brick amplifier out from SP02 for testing at NMC. The remote site SP02 did not work due a defective cable between site and CTV. Replaced Brick amplifier at remote site SP05.                                                                                                                                                                                                                                                                       | 20/5    |
| 01B               | Replaced Brick amplifier at SP01 due to noisy data. The remote site SP02 does not work due defective cable between site and CTV                                                                                                                                                                                                                                                                                                                                               | 21/5    |
| 06C               | Replaced broken fuses on the protection cards in CTV for remote sites SP03, 04 and 05. Replaced -9V zender diode in the junction box at SP03.                                                                                                                                                                                                                                                                                                                                 | 23/5    |
| 04C               | Replaced protection-control card at SP03 and 04. At SP04 we also had to replace the Brick amplifier                                                                                                                                                                                                                                                                                                                                                                           | 30/5    |
| 01B               | The AIM-24 digitizer at remote site SP02 was found to be defective and was taken to the NMC for repair.                                                                                                                                                                                                                                                                                                                                                                       | 31/5    |
| NORESS            | The vault at C2 was found to be full of water. The frozen ground during the winter had damaged the cable entrance pipe. The digitizer unit and seismometers were taken to NMC for repair.                                                                                                                                                                                                                                                                                     | 26/5    |

| Subarray/<br>area | Task                                                                                                                                                                                                                                    | Date    |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| NMC               | Repair of defective electronic equipment                                                                                                                                                                                                | May     |
| <b>June 1996</b>  |                                                                                                                                                                                                                                         |         |
| NORSAR            |                                                                                                                                                                                                                                         |         |
| 04C               | Replaced the preamplifier at SP03                                                                                                                                                                                                       | 3/6     |
| 06C               | Replaced the preamplifier at SP03                                                                                                                                                                                                       | 5/6     |
| 03C               | Replaced protection-control card at SP02 and SP00                                                                                                                                                                                       | 6/6     |
| 06C               | Replaced protection-control card at SP00. The digitizer and the preamplifier at SP05 were taken to NMC for repair. The cable to SP01 was found to be damaged by lightning 330 m from the CTV                                            | 7/6     |
| 02C               | Replaced preamplifier at SP05                                                                                                                                                                                                           | 10/6    |
| 02B               | The 1000 VAC power line was found to be damaged by lightning                                                                                                                                                                            | 11/6    |
| 04C               | Replaced protection-control card at SP01; a fault was also found in the cable to this remote site                                                                                                                                       | 11/6    |
| 04C               | The digitizer and preamplifier at SP04 were taken to NMC for repair. The cable to SP03 was found to be damaged by lightning                                                                                                             | 24/6    |
| NORESS            | Repaired the LF-DC receiver/digital clock, the HUB digital interface card, the HUB CPU card and the HUB power unit, all damaged by lightning.                                                                                           | 10-20/6 |
| Spitsbergen       | Reinstallation of seismometers, GPS receiver and telemetry equipment at the array. An extra battery regulator was installed in parallel with the old one.<br>The main board in the NORAC unit at NTA in Longyearbyen was also replaced. | 28-30/6 |
| NMC               | Repair of defective electronic equipment                                                                                                                                                                                                | June    |
| <b>July 1996</b>  |                                                                                                                                                                                                                                         |         |
| NORSAR            |                                                                                                                                                                                                                                         |         |
| 03C               | Visited site due to power line failure                                                                                                                                                                                                  | 5/7     |

| Subarray/<br>area  | Task                                                                                                                                                                                                                                    | Date                    |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 02B                | Visited site due to power line failure caused by lightning                                                                                                                                                                              | 8/7                     |
| 02C                | Repaired broken surge protection card in the AIM-24BB digitizer                                                                                                                                                                         | 9/7                     |
| 02B                | Visited the site due to power line problems all caused by lightning                                                                                                                                                                     | 26/7, 29/7<br>& 31/7    |
| NORESS             | A severe thunderstorm over the array damaged 3/4 of the entire installation. The Hub installation and the following remote sites were in operation again at the end of July: A1, A2, A3, B1, B3, B4, B5, C1, C5, C6, D1, D2, D7 and D8. | 12-31/7                 |
| ARCESS             | The UPS unit had to be restarted after a local power surge.                                                                                                                                                                             | 12/7                    |
| NMC                | Repair of defective electronic equipment                                                                                                                                                                                                | July                    |
| <b>August 1996</b> |                                                                                                                                                                                                                                         |                         |
| NORSAR             |                                                                                                                                                                                                                                         |                         |
| 02B                | Visited site due to power line problems all caused by lightning                                                                                                                                                                         | 1,5,12,16,<br>19 & 30/8 |
| 02B                | Replaced the battery card at remote sites SP04 and SP00                                                                                                                                                                                 | 16/8                    |
| 03C                | Cable splicing at SP01                                                                                                                                                                                                                  | 13, 15 &<br>20/8        |
| 06C                | Cable splicing at SD03, SP04 and SP00                                                                                                                                                                                                   | 21, 22, 23<br>& 27/8    |
| 04C                | Replaced AIM-BB digitizer in LPV.                                                                                                                                                                                                       | 26/8                    |
| 06C                | Replaced AIM-24 digitizer at remote sites SP03, SP04 and SP05                                                                                                                                                                           | 28/8                    |
| 02B                | Replaced battery card at remote sites SP04 and SP00                                                                                                                                                                                     | 30/8                    |
| NORESS             | Repaired A0, C4, C7, D4 and D9 remote site electronic units. The electronic units from remote sites B2, C2, D5 and D6 were all taken to NMC for repair. The Hub power supply unit was also repaired during the period.                  | 1-14/8                  |
| NMC                | Repair of defective electronic equipment                                                                                                                                                                                                | August                  |

| Subarray/<br>area | Task                                                                                                                                                                                                                              | Date                    |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| September 1996    |                                                                                                                                                                                                                                   |                         |
| NORSAR            |                                                                                                                                                                                                                                   |                         |
| 02B               | Replaced the +9V protection diode at remote site SP02                                                                                                                                                                             | 2/9                     |
| 06C               | Replaced AIM-24 digitizer and preamplifier at remote sites SP03 and SP05                                                                                                                                                          | 3/9                     |
| 02B               | The AIM-24 digitizer and preamplifier at remote sites SP05 and SP00 were taken to NMC for repair.<br>Replaced the +9V protection diode at SP03                                                                                    | 3/9                     |
| 02C               | Cable splicing at SP05<br>Replaced the protection card for the BB digitizer at remote site SP03                                                                                                                                   | 4, 5 & 6/9              |
| 02B               | Replaced blown fuses on the protection card for remote site SP03                                                                                                                                                                  | 9/9                     |
| 01A               | All main fuses and the lightning protection for the 220VAC line were found to be damaged by lightning. The 48 VDC power supply in the UPS unit was also defective and had to be taken to NMC for repair                           | 9/9                     |
| 01A               | Replaced the 48 VDC power supply                                                                                                                                                                                                  | 10.9                    |
| 03C               | Cable splicing at SP04, SP05 and SP00                                                                                                                                                                                             | 11, 12,<br>13/9         |
| 03C               | Cable splicing at SP01 and SP02                                                                                                                                                                                                   | 16, 17, 18,<br>19, 20/9 |
| 04C               | Cable splicing at SP01, SP03 and SP 04<br>Replaced preamplifier at SP03                                                                                                                                                           | 23, 24 &<br>25/9        |
| 01B               | Cable splicing at SP02 and SP04.<br>Replaced SP seismometer at SP01<br>At SP05 we found the vault empty except for the SP seismometer. Someone had stolen the AIM-24 digitizer, GPS clock, preamplifier and the modem/control box | 26, 27 &<br>30/9        |
| NMC               | Repair of defective electronic equipment                                                                                                                                                                                          | September               |

**Table 5.1.** Activities in the field and the NORSAR Maintenance Center during 1 April - 30 September 1996.

## 6 Documentation Developed

Fyen, J. & T. Kværna (1996): Status and plans for implementing algorithms at the GSETT-3 IDC, Semiannual Tech. Summary, 1 April - 30 September 1996, NORSAR Sci. Rep. 1-96/97, NORSAR, Kjeller, Norway.

Kværna, T. (1996): Tuning of processing parameters for Global Threshold Monitoring at the IDC, Semiannual Tech. Summary, 1 April - 30 September 1996, NORSAR Sci. Rep. 1-96/97, NORSAR, Kjeller, Norway.

Kværna, T. & F. Ringdal (1996): Generalized beamforming, phase association and threshold monitoring using a global seismic network, in Husebye, E.S. and A.M. Dainty (eds.), *Monitoring a Comprehensive Test Ban Treaty*, Kluwer Academic Publ., Netherlands, 447-466.

Mykkeltveit, S. & U. Baadshaug (1996): Status Report: Norway's participation in GSETT-3. Semiannual Tech. Summary, 1 April - 30 September 1996, NORSAR Sci. Rep. 1-96/97, NORSAR, Kjeller, Norway.

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Ringdal, F., E.O. Kremenetskaya, V. Asming, I. Kuzmin, S. Evtuhin, & V. Kovalenko (1996): Study of the calibration explosion on 29 September 1996 in the Khibiny Massif, Kola Peninsula, Semiannual Tech. Summary, 1 April - 30 September 1996, NORSAR Sci. Rep. 1-96/97, NORSAR, Kjeller, Norway.

Semiannual Technical Summary, 1 October 1995 - 31 March 1996, NORSAR Sci. Rep. 2-95/96, Kjeller, Norway.

## 7 Summary of Technical Reports / Papers Published

### 7.1 Status Report: Norway's participation in GSETT-3

#### *Introduction*

A fairly detailed account of Norway's participation in GSETT-3 during January 1995 - June 1996 was given in Mykkeltveit & Baadshaug (1996). The present contribution is essentially an update of that report, but offers in addition some material on use of the AutoDRM protocol in conjunction with the change of status on 1 October 1996 of the Spitsbergen array from a primary to an auxiliary station in GSETT-3.

#### *Norwegian GSETT-3 stations and communications arrangements*

From the second half of 1993, Norway has provided continuous data from three GSETT-3 primary array stations: ARCESS, NORESS and Spitsbergen. The location and configurations of these three stations are shown in Fig. 7.1.1. ARCESS and NORESS are 25-element arrays with identical geometries and an aperture of 3 km, whereas the Spitsbergen array has 9 elements within a 1-km aperture. All three stations have a broadband three-component seismometer at the array center.

Data from these three stations are transmitted continuously and in real time to NOR\_NDC. The NORESS data transmission uses a dedicated 64 Kbits/s land line, whereas data from the other two arrays are transmitted via satellite links of capacity 64 Kbits/s and 19.2 Kbits/s for the ARCESS and Spitsbergen arrays, respectively.

The NORESS array has been used in GSETT-3 as a temporary substitute for the NORSAR teleseismic array (also shown in Fig. 7.1.1; station code NOA), awaiting a complete technical refurbishment of the latter. This effort has now been completed, and starting 30 August 1996, data from the NORSAR array have been transmitted continuously to the IDC. The NORESS array will, however, be retained as a GSETT-3 primary station at least until such time that the NORSAR array data are fully used in the IDC operational processing cycle. We are cooperating with the IDC on the task of preparing for the processing of NORSAR data at the IDC, and the status of this effort is given in Section 7.2 of this report.

On 1 October 1996 numerous changes were made worldwide to the GSETT-3 network. The purpose of these coordinated changes was to bring the GSETT-3 network in line with the seismic component of the International Monitoring System (IMS) to the extent possible. As the Spitsbergen array is an auxiliary station in IMS, this station changed its status from primary to auxiliary in GSETT-3 on that date. This involved terminating the continuous forwarding of SPITS data to the IDC and making data from this station available to the IDC on a request basis via the AutoDRM protocol (Kradolfer, 1993; Kradolfer, 1996). Initial experience on the use of AutoDRM for SPITS is reported below.

#### *Uptimes and data availability*

Figs. 7.1.2 - 7.1.4 show the monthly uptimes for the three Norwegian GSETT-3 primary stations ARCESS, NORESS and Spitsbergen, respectively, for the period January -

September 1996, given as the hatched (taller) bars in these figures. These barplots reflect the percentage of the waveform data that are available in the NOR\_NDC tape archives for each of these three stations. The downtimes inferred from these figures thus represent the cumulative effect of field equipment outages, station site to NOR\_NDC communication outages and NOR\_NDC data acquisition outages. Some of the larger downtimes are due to specific reasons, as follows:

- The NORESS hub facility was hit by lightning on 12 July, resulting in serious damage to a number of electronic components. Repairs were completed on 27 July.
- The Spitsbergen array was down almost continuously between 10 March and late June, due to damage to the battery bank at the array site, caused by overcharging by the wind-mill system.

Figs. 7.1.2-7.1.4 also give the data availability for these three stations as reported by the IDC in the IDC Station Status reports. The main reason for the discrepancies between the NOR\_NDC and IDC data availabilities as observed from these figures is the difference in the ways the two data centers report data availability for arrays: Whereas NOR\_NDC reports an array station to be up and available if at least one channel produces useful data, the IDC uses weights where the reported availability (capability) is based on the number of actually operating channels.

It is of interest to compare NOR\_NDC and IDC data availabilities, based on identical definitions of this term. This has been done in Fig. 7.1.5 for data from the ARCESS array. To produce this figure, we retained the above NOR\_NDC definition of data availability, and then queried the IDC database for the existence therein of *any* (one or more channels) ARCES data from the period January - September 1996. The result, as shown in Fig. 7.1.5, is that (with the exception of a discrepancy in June) the loss of data between the NOR\_NDC diskloops and the IDC database is very modest indeed. This shows that the data reformatting and forwarding routines running at NOR\_NDC (the AlphaRead/-Send suite of programs) with associated hardware, the link between NOR\_NDC and the IDC, and the data acquisition software and hardware at the IDC are all reasonably stable and well-operating elements of a complicated data acquisition arrangement.

### ***Initial experience with the AutoDRM protocol***

NOR\_NDC's AutoDRM has been operational since November 1995 (Mykkeltveit & Baadshaug, 1996).

Between November 1995 and the network changes on 1 October 1996, only 207 requests from external users were processed.

After SPITS changed station status from primary to auxiliary, the request load increased sharply, and for the month of October 1996, the NOR\_NDC AutoDRM responded to 12338 requests for SPITS waveforms from two different accounts at the IDC: 9555 response messages were sent to the "pipeline" account and 2783 to "testbed".

The number of requests sent from the IDC were compared to responses returned from NOR\_NDC. The NOR\_NDC AutoDRM only logs requests after they have been pro-

cessed. Should a request for some reason get lost before processing has finished, it will not appear in any NOR\_NDC AutoDRM log-files. The incoming request mail will, however, be present in the log files of the NOR\_NDC central mailhost.

At the IDC, 9662 requests for SPITS data are logged as sent from the "pipeline" account.

For each of these, a corresponding response is logged at NOR\_NDC, except for 107 requests. They were all sent on 30 October 1996, between 01:35:43 and 15:47:51. No incoming mail from "pipeline" was logged at the NOR\_NDC mailhost during this interval.

Mail from other accounts at the IDC did get logged at the NOR\_NDC mailhost, so we have reason to believe that the 107 missing requests were lost before they ever reached NOR\_NDC.

In conclusion, it seems that all request messages which have reached the AutoDRM from the "pipeline" account at the IDC have been answered. No error messages have been found in the AutoDRM log-files. Apparently, all requests have been properly formatted and the requested data intervals have been inside the NOR\_NDC diskloops.

The total volumes of the response messages for October 1996, are:

- 157 MB in 9555 messages to "pipeline",
- 40 MB in 2783 messages to "testbed".

### ***NDC automatic processing and data analysis***

These tasks have proceeded in accordance with the descriptions given in Mykkeltveit and Baadshaug (1996). For the period July - September 1996, NOR\_NDC derived information on 1832 supplementary events in northern Europe and submitted this information to the Finnish IDC as the NOR\_NDC contribution to the joint Nordic Supplementary (Gamma) Bulletin, which in turn is forwarded to the IDC. These events are plotted in Fig. 7.1.6. As can be seen in this figure, the seismic activity in and around Spitsbergen was particularly high during this period.

### ***Data forwarding for GSETT-3 stations in other countries***

NOR\_NDC continues to forward data to the IDC from GSETT-3 primary stations in several countries. These currently include FINESS (Finland), GERESS (Germany) and Sonseca (Spain). In addition, communications for the GSETT-3 auxiliary station at Nilore, Pakistan, are provided through a VSAT satellite link between NOR\_NDC and Pakistan's NDC in Nilore. Data from the Hagfors array (HFS) in Sweden were provided continuously through NOR\_NDC until 1 October 1996, on which date this station changed its status in GSETT-3 from primary to auxiliary, in accordance with the status of HFS in IMS. From 1 October 1996, the IDC obtains HFS data through requests to the AutoDRM server at NOR\_NDC (in the same way requests for Spitsbergen array data are now handled, see above).

### ***Future plans***

NOR\_NDC will continue the efforts towards improvements and hardening of all critical data acquisition and data forwarding hardware and software components, so that future requirements related to operation of IMS stations can be met to the maximum extent possible.

NOR\_NDC will continue to contribute data to the IDC in the context of the GSETT-3 experiment for as long as that experiment will last. It is now foreseen that the CTBT PrepCom with its Provisional Technical Secretariat will be established in Vienna in 1997, and that this new organization will take over the responsibility for activities like the GSETT-3 experiment once it becomes technically capable of doing so. We then envisage continuing the provision of data from Norwegian IMS stations without interruption to the appropriate structure that will be established for this in Vienna.

**S. Mykkeltveit**

**U. Baadshaug**

### ***References***

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Mykkeltveit, S. & U. Baadshaug (1996): Norway's NDC: Experience from the first eighteen months of the full-scale phase of GSETT-3. *Semiann. Tech. Summ.*, 1 October 1995 - 31 March 1996, NORSAR Sci. Rep. No. 2-95/96, Kjeller, Norway.

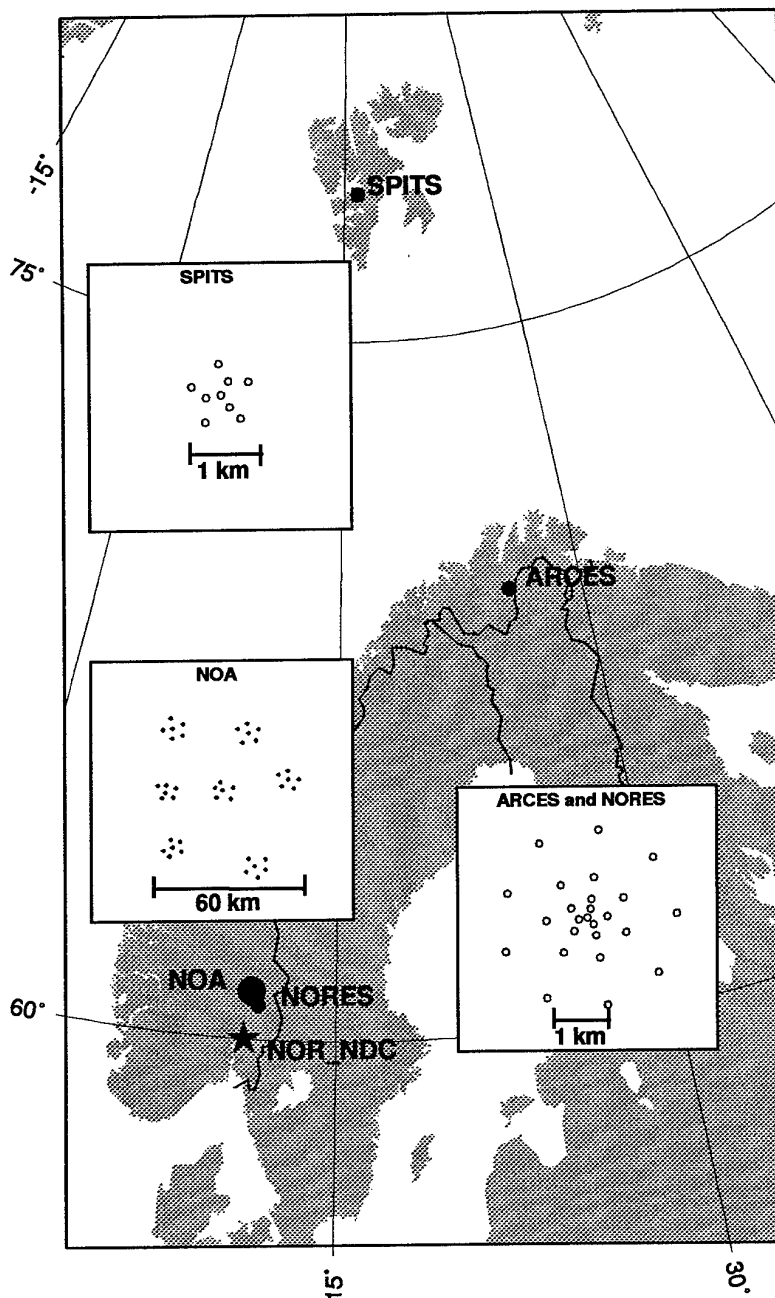


Fig. 7.1.1. The figure shows the locations and configurations of the three Norwegian GSETT-3 primary array stations with station codes NORES, ARCES and SPITS. The data from these stations are transmitted continuously and in real time to the Norwegian NDC (NOR\_NDC) and then on to the GSETT-3 IDC. The figure also shows the location of the teleseismic NORSAR array (with station code NOA), which is soon to be fully used in GSETT-3 as a primary station.

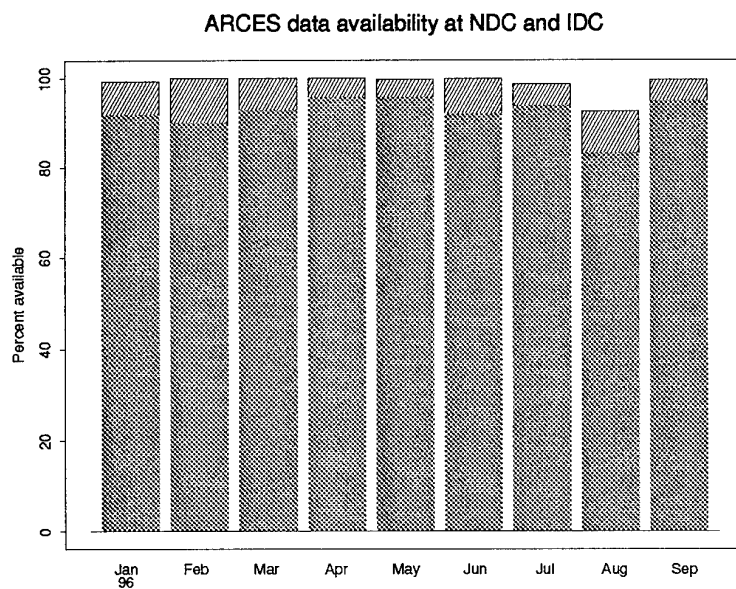


Fig. 7.1.2. The figure shows the monthly availability of ARCESS array data for the period January - September 1996 at NOR\_NDC and the IDC. See the text for explanation of differences in definition of the term "data availability" between the two centers. The higher values (hatched bars) represent the NOR\_NDC data availability.

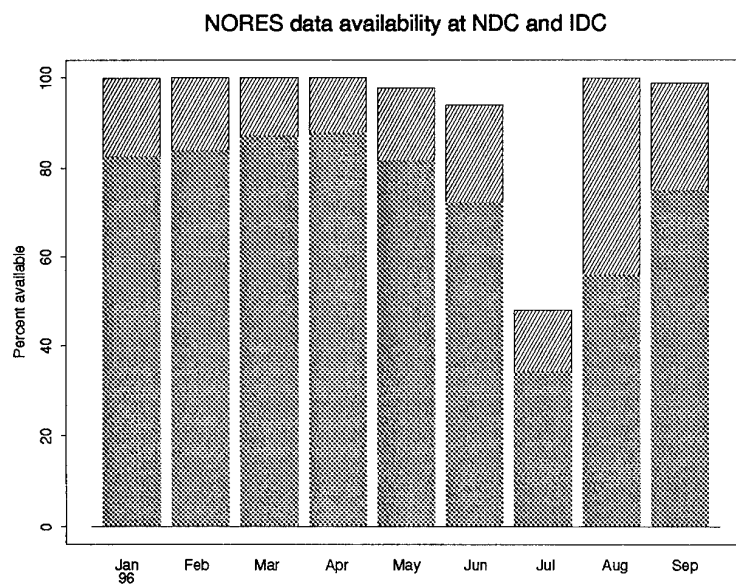


Fig. 7.1.3. The figure shows the monthly availability of NORESS array data for the period January - September 1996 at NOR\_NDC and the IDC. See the text for explanation of differences in definition of the term "data availability" between the two centers. The higher values (hatched bars) represent the NOR\_NDC data availability.

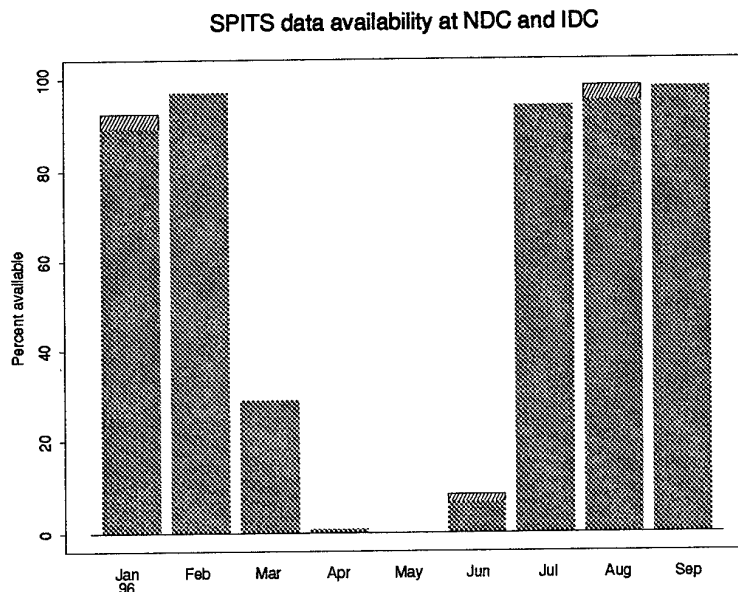


Fig. 7.1.4. The figure shows the monthly availability of Spitsbergen array data for the period January - September 1996 at NOR\_NDC and the IDC. See the text for explanation of differences in definition of the term "data availability" between the two centers. The higher values (hatched bars) represent the NOR\_NDC data availability.

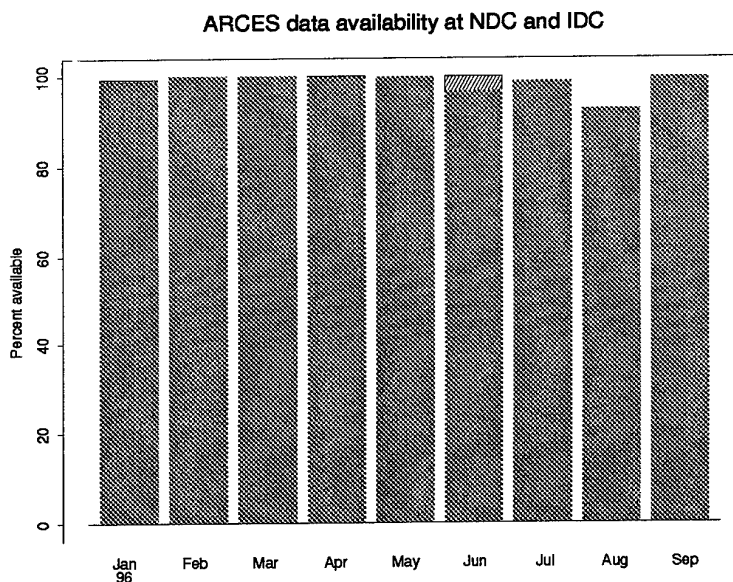


Fig. 7.1.5. The same as Fig. 7.1.2, except that the definition of the term "data availability" at the IDC has been changed to be identical to that used by NOR\_NDC. The higher values (hatched bars; difference only observable here for June) represent the NOR\_NDC data availability.

## Reviewed Gamma Events

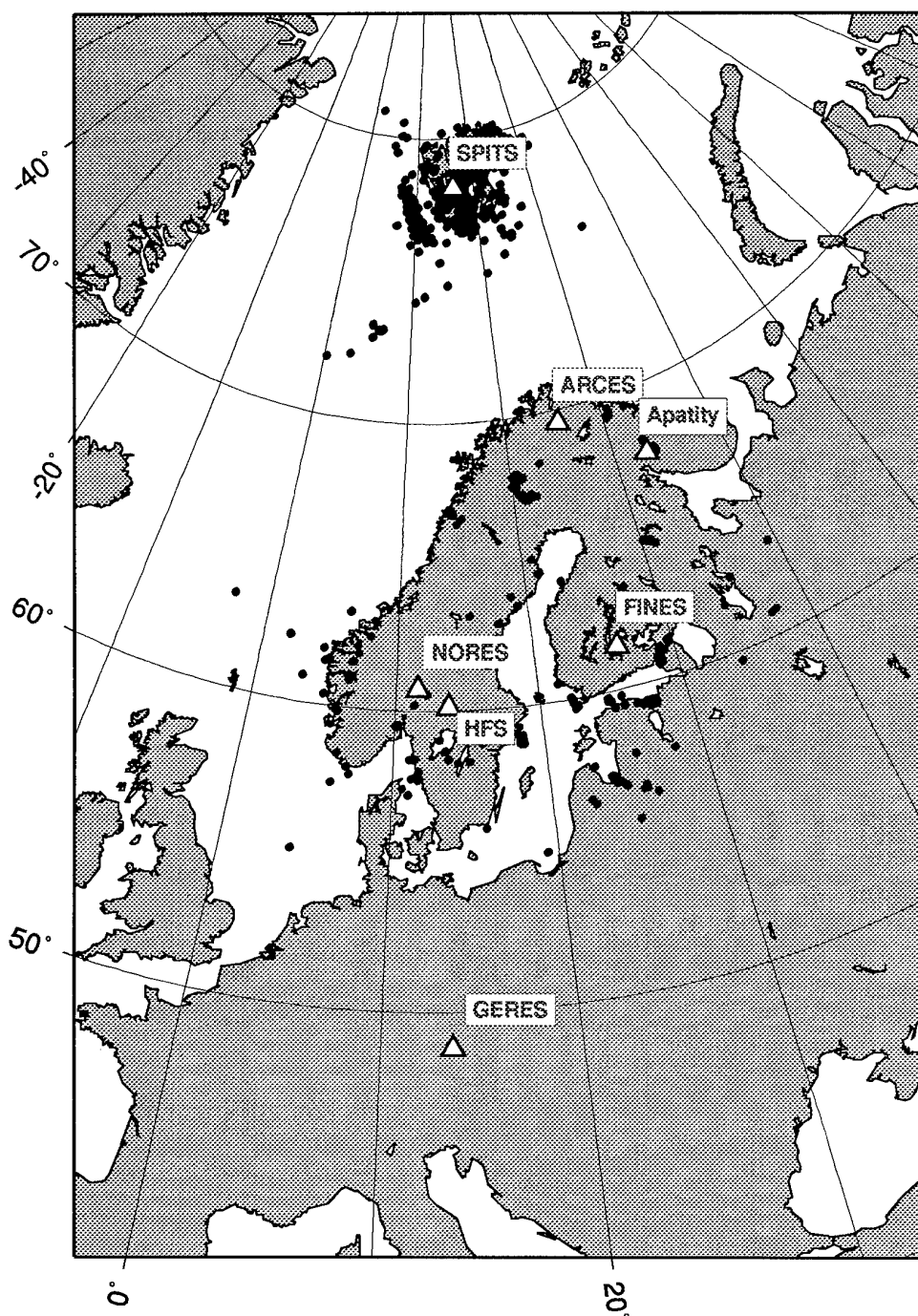


Fig. 7.1.6. The map shows the 1832 events in and around Norway contributed by NOR\_NDC during July-September 1996 as Supplementary (Gamma) data to the IDC, as part of the Nordic Supplementary data compiled by the Finnish NDC. The map also shows the seismic stations used in the data analysis to define these events.

## 7.2 Status and plans for implementing algorithms at the GSETT-3 IDC

### *Introduction*

Research and development efforts at NORSAR have for quite some time focused on methods and procedures that could be useful in the data processing carried out at the GSETT-3 IDC. These efforts have given results in terms of new knowledge, ideas, advice and recommendations that have been communicated to the IDC, and also results in terms of products, like the prototype Threshold Monitoring system delivered to the IDC in October 1994, and a modified DFX for large array processing delivered in June 1996.

For our FY96 R&D effort for ARPA, we have focused on integration of NORSAR knowledge emerging from our research program into the Detection and Feature Extraction (DFX) software. Our ability to operate DFX, define problems and implement solutions came as a result of close cooperation with DFX developers at SAIC, San Diego. The study of the DFX software and its structure has continued, and we are now able to operate the IDC version at our data processing center, using on-line data from e.g. the large NORSAR teleseismic array.

### *NORSAR large array data at the IDC*

As of September 1, 1996, NORSAR array data have been continuously transmitted to the IDC. Upon request from the IDC, we changed the naming of the NORSAR array on October 2, 1996. The naming convention is now:

- |       |                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NOA   | Denotes the large-aperture NORSAR array. Will enter the IDC bulletin as station name for phase readings. Will be used for requests for data for all stations within the array.                                                                                                                                                                                                                     |
| NB200 | Reference station name for NORSAR array beamforming. Center site of subarray NB2, which has stations NB200, NB201, NB202, NB203, NB204 and NB205. A request for NB2 will mean data from all stations in subarray NB2. A request for NB200 will mean data from station NB200 only. Station name NB2 has been used as reference for the entire NORSAR array from October 1, 1976 to October 2, 1996. |
| NAO00 | Center site of subarray NAO, which has stations NAO00, NAO01, NAO02, NAO03, NAO04 and NAO05. A request for NAO will mean data from all stations in subarray NAO. A request for NAO00 will mean data from station NAO00 (center instrument) only. Station name NAO was used as reference for the entire NORSAR array up to October 1, 1976.                                                         |

The complete list of station names for NORSAR are now:

NB200, NB201, NB202, NB203, NB204, NB205, subarray NB2.  
 NAO00, NAO01, NAO02, NAO03, NAO04, NAO05, subarray NAO.  
 NBO00, NBO01, NBO02, NBO03, NBO04, NBO05, subarray NBO.  
 NC200, NC201, NC202, NC203, NC204, NC205, subarray NC2.

NC300, NC301, NC302, NC303, NC304, NC305, subarray NC3.  
NC400, NC401, NC402, NC403, NC404, NC405, subarray NC4.  
NC600, NC601, NC602, NC603, NC604, NC605, subarray NC6.

The subarray names are registered ISC codes. The station NC602 is co-located with station NRA0 of the NORESS array.

The main components of SPV (Short Period Vault) sites are one Teledyne Browne 20171-0104 seismometer with sensitivity 650 Volts/meter/second, one Teledyne Browne Brick amplifier with gain 39.8, one Science Horizons AIM24-1 digitizer with gain 10, and one Trimble GPS receiver. The seismometers are emplaced in 132 mm boreholes of depth 3.5 meter for 22 sites and 6 - 12 m for 13 sites. (7 of the SP seismometers are in the subarray LPV (Long Period Vault)). Other electronic components include items such as 9600 baud synchronous modem, battery, battery charger and lightning protection. Communication to each subarray Central Terminal Vault, CTV, is achieved through buried cables. These buried cables also carry 60 Volts DC for providing power to the SPVs, and are up to 14 km in length.

The stations NAO01, NBO00, NB201, NC204, NC303, NC405 and NC602 have in addition to the short period vertical seismometer one three-component broadband seismometer installed in the Long Period Vault, LPV. The main components of the LPV are (in addition to one SPV system): one Teledyne Browne KS54000P-0105 "Posthole" seismometer with sensitivity 5000 Volts/meter/second, one Science Horizons AIM24BB-3 digitizer and one Trimble GPS receiver. In addition there are other electronics as within the SPVs. The LPV is situated close to a CTV which has lightning protection, modems and a Science Horizons CIM II which communicates with 7 AIM digitizers and the NORSAR Data Processing Center (NDPC) at Kjeller.

The array diameter is approximately 60 km, and each subarray diameter is in the range 7-10 km. The data are transmitted to the NDPC using 7 individual leased telephone lines. Some delay in data transmission may occur which means that parts of the array data might arrive at later times. "Later" means, in this context a delay from 10 seconds up to 2 hours after real-time.

The transmission of data to the IDC is achieved by use of the Science Horizons dl2alpha program and the IDC's AlphaSend program. An inspection of the operations data base at the IDC has shown that, occasionally, minor gaps in data are observed at the IDC even in cases when data are present at NDPC. The cause of this discrepancy is, however, not known at present.

### ***NORSAR array processing at the IDC testbed***

Following a period of intensive software development and testing, a new version of DFX was delivered to SAIC, San Diego, on 18 June 1996. This version accommodates the NORSAR large array processing as described in NORSAR Sci. Rep. 2-95/96.

Testbed operation of this version for NOA data was initiated on October 9, 1996.

The initial results from NOA processing demonstrated that a change in parameter setting needs to be done. Due to large beamforming time delays introduced for the large-aperture NOA array, the detection triggers for each signal will span much larger time intervals as compared to smaller arrays. The parameters controlling the triggering of signals by the DFX detection algorithm has been studied, and new parameters for station NOA will be suggested.

The general impression from the first week of DFX operation on NOA data, compared to local NDPC detection processing, is that all real signals are detected and that the slowness vector estimates are consistent with those resulting from the NDPC processing. The number of false triggers due to spikes and data gaps are significantly reduced as compared to the NDPC processing.

Although the DFX masking process effectively removes bad data, we still see a need for an operator-initiated masking process. We suggest that a database table is defined that contains:

|         |                                                                                      |
|---------|--------------------------------------------------------------------------------------|
| sta     | Station name                                                                         |
| chan    | Channel name                                                                         |
| time    | Start time for abnormal channel status                                               |
| endtime | End time for abnormal channel status                                                 |
| status  | Descriptive code for abnormal channel status. E.g. channel masked during processing. |
| commid  | Comment id for description of status.                                                |

The table should be maintained by the IDC operator in cooperation with the NDC station operator. It would be a manageable effort to use this information within DFX for channel masking.

### ***NORSAR processing algorithms***

The new algorithm used for large array slowness vector estimation is the DFX function "*compute-beamform-fk*" which is described in Fyen (1996a, 1996b).

### ***Future plans for NORSAR processing.***

The current detection recipe for NOA has 180 beams. This number has been kept unchanged to minimize the need for computing power during testbed operation. As soon as the NOA station processing has proven to be working satisfactorily, we will supply a new beam set with a larger number of beams.

Experiments with individual subarray processing have been conducted, and initial results show that due to large amplitude differences across the array, improved detectability can be obtained compared to the full array beam. Within this framework, the NORESS array, which is located within the NOA array, could be processed as a subarray. The problem is how to reduce individual subarray detections to one detection representing the NOA array, and then make a decision on what array configuration and method to use for slowness vector estimation. The challenge is to submit high quality arrivals for the IDC phase associa-

tion algorithm (GA) and not to confuse the GA process with several subarray detections for the same event. Efforts to solve this problem will continue.

### ***Threshold Monitoring at the IDC testbed***

During a visit to the IDC in the time period Aug. 20-23, the Threshold Monitoring (TM) system was installed on the testbed. The DFX program was configured to do the STA calculations for each of the available stations, using the extended functionality provided by NORSAR. The programs for subsequent calculations of network magnitude thresholds were installed in the so-called Delta-pipeline, operating with a time delay of 10-12 hours behind real-time. Since then, the processing has been running without technical problems, confirming the robustness of the TM system with respect to continuous operation. Initially a couple of bugs were detected in the configuration of DFX, but these were soon corrected.

A common baseline beam deployment was used for STA calculation of data from all available arrays. For details, see Fyen et al, 1996. In order to obtain more precise estimates of the magnitude thresholds, we have started an effort of tuning the beam deployments for each of the primary stations of the IMS network, see section 7.3 of this report.

During the next reporting period, we will complete the tuning of the IMS primary network. After this we will technically and seismologically verify the results for threshold monitoring using the full IMS primary network, assist in transferring the TM system into the operational system at the IDC, and develop adequate products with associated graphical displays for making the output from the TM system available to the international community.

**J. Fyen**

**T. Kværna**

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### 7.3 Tuning of processing parameters for Global Threshold Monitoring at the IDC

#### *Introduction*

Detailed presentations of the Global Threshold Monitoring System developed for the IDC have been given in several of the NORSAR Semiannual Technical Summaries (Kværna et al., 1994a; Kværna et al., 1994b; Ringdal et al., 1995). To optimize the overall performance of the system, we have in this reporting period focused on tuning of the processing parameters and the beam deployments for the different stations of the IMS primary network, see Fig. 7.3.1. This has been done by requesting event segments from the IDC followed by detailed analysis of several events for each of the stations.

Generic global attenuation and travel-time curves form the basis for the calculation of network magnitude thresholds. As is well known, the attenuation curves are accompanied with significant uncertainties. For example, studies made on P-wave amplitude variability (Veith and Clawson, 1972; Lilwall, 1986; Ringdal and Fyen, 1979) indicate a standard deviation of about 0.4 magnitude units. This uncertainty is, however, accounted for in the calculation of magnitude thresholds.

In order to obtain optimized and realistic magnitude thresholds there are also other uncertainty factors that need to be addressed. These are:

- The use of STA envelopes as a representation of  $\log(A/T)$
- The effect of beamforming, filtering and different instrument responses on the seismic amplitude
- The effect of each target point representing a finite geographical area, and mis-steering of the array beams

These factors will be addressed in the following where we present the results from the tuning of the array station ASAR (Alice Springs, Australia).

#### *Event selection*

For each station it is important to have available a data set that is representative for the different types of P-phases usually observed. For the assessment of seismic magnitude thresholds the most significant variables are the dominant signal frequencies, the signal loss due to beamforming and mis-steering of the beams, and the characteristics of the seismic noise field. The signal variables are usually strongly dependent on the source-receiver distance, and we have therefore decided to collect data from events located at different distance ranges. High SNR signals are needed for the assessment of signal loss due to mis-steering of the beams, and we have found that data from about 10 events would allow us to derive reasonably representative processing parameters. Information on the events used for tuning of ASAR are given in Table 7.3.1.

### *Prefiltering*

For magnitude estimation at the IDC, a 3rd order Butterworth filter with a passband between 0.8 and 4.5 Hz is applied to the data prior to the estimation of the signal amplitude and period. To resemble the procedure used for  $m_b$  calculation at the IDC, we will also apply the same baseline filter to the data prior to the generation of STA envelopes. For some stations, this passband may, however, be contaminated by high noise amplitudes, e.g., due to local noise sources or to the broadband characteristics of the instrument.

Another factor to consider is the frequency content of the different kinds of signals (local, regional, teleseismic and core phases). We should also have in mind that the global P-wave attenuation relationship (e.g. Veith and Clawson, 1972) is derived from instruments with a peak response around 1 Hz, and that we do not know the validity of this relation for signals with high dominant frequencies, like many local and regional P-phases.

Our approach to a possible adjustment of the filter setting is that we will need very strong arguments to change the filter parameters.

Ideally we would like there to be a close correspondence between the most energetic frequency range of the signal and the frequency range providing the highest SNR. In this way we could prefilter the data in a passband that ensured both correct magnitude thresholds during event intervals as well as optimum performance during noise conditions. This is, however, not the usual situation for **ASAR**. A typical example is given in Fig. 7.3.2, where we have analyzed a P-phase from an event at a distance of 33.6 degrees. The highest SNR is found between 2 and 3 Hz, whereas the largest A/T value is measured between 1 and 1.5 Hz.

The same characteristics are also illustrated in Fig. 7.3.3, where we compare the dominant signal frequency measured on the filtered beams providing the highest SNR, with the dominant frequency used for the estimation of event magnitude. The data set is **ASAR** P-phase information given in the database associated with the IDC Reviewed Event Bulletin (REB) for the year 1996. This comparison clearly shows that the highest SNR is usually found at higher frequencies than those providing the largest A/T value. Also notice the absence of REB events located within 10 degrees of **ASAR**.

From analysis of the 10 **ASAR** events and the statistics shown in Fig. 7.3.3, we have found no strong arguments for changing the parameters of the prefilter. For the 10 events, we have also manually measured the maximum A/T on both unfiltered and filtered (0.8-4.5 Hz) data. Except for the largest event of  $m_b$  5.6, the correspondence was good, and  $\log(A/T)$  was on the average about 0.05  $m_b$  units lower after prefiltering, see Fig. 7.3.4.

For the  $m_b$  5.6 event,  $\log(A/T)$  was measured 0.69  $m_b$  units lower after prefiltering, indicating that the main signal energy is found below the lower cutoff. When looking at the narrowband  $\log(A/T)$  measurements of Fig. 7.3.5, we clearly see this behavior where the largest A/T is measured at about 0.5 Hz. For estimation of event magnitudes, the 0.8-4.5 Hz prefiltering will obviously give rise to errors. But for threshold monitoring we are assessing the **upper** magnitude limit of possible seismic events that might have occurred in a given area, and are therefore almost always focusing on magnitude levels close to the

background noise level. For events at such magnitude levels, we do not expect signals to have the main energy below the lower cutoff of the filter. We therefore argue that even though large events may have the main energy below 0.8 Hz, this will have very little influence on the calculation of magnitude thresholds.

### *The use of STA envelopes as a representation of $\log(A/T)$*

If we assume that an instrument response is flat to velocity, and that the length of the short-term-average (STA) includes a full cycle of a sinusoidal signal, we have the following relation between the STA and the amplitude (A) and period (T) of the signal:

$$\frac{A}{T} = \frac{\pi}{2} \cdot \text{calib} \cdot \text{STA} \quad (1)$$

where *calib* is the calibration constant at the reference period.

The continuous calculation of STA traces of filtered beams forms the basis for the calculation of magnitude thresholds. For the 10 ASAR events, we have in Fig. 7.3.6 compared the manually measured maximum A/T values with the corresponding values of STA, both measured on data bandpass filtered between 0.8 and 4.5 Hz. The STA length was 1 second. For this small data set there is good correspondence, and the  $\log(A/T)$  values have a mean bias of 0.04  $m_b$  units relative to the  $\log(\text{STA})$  values. This serves to confirm the validity of using the continuous STA traces as a basis for the calculation of magnitude thresholds.

### *Signal loss due to beamforming*

As seen from Figs. 7.3.2 and 7.3.5, beamforming of teleseismic P-phases using the sensors of the ASAR array provide significant SNR improvement without significantly reducing the signal amplitudes, at least for frequencies below 2 Hz. For higher frequencies, signal decorrelation starts to cause reduction of the beam amplitudes. The signal loss referred to in the following is defined as:

$$\text{Signal loss} = \text{Beam STA} / \text{Average STA of the individual sensors} \quad (2)$$

where the STA was taken to be the maximum within 8 seconds after the signal onset.

When calculating the total signal loss due to beamforming in the fairly wide 0.8 - 4.5 Hz frequency band, it is clear that this loss is dependent on the dominant frequency range of the signal. For teleseismic events, we generally expect that the higher frequencies have been attenuated such that the main signal energy is found at lower frequencies, which again would imply little signal loss. For local and regional events, see Fig. 7.3.7, the major signal energy is typically found above 2 Hz, and a higher signal loss is expected.

Due to the large variation in signal spectra, we can only operate with approximate a priori estimates of the signal loss, but it will be reasonable to categorize the expected signal loss into bins of source-receiver distances. Fig. 7.3.8 shows the signal loss due to beamforming of the 10 ASAR events. For distances above 30 degrees we find the signal loss to be within 0.5 dB, and for distances between 15 and 30 degrees a maximum signal loss of 3.2 dB is observed. For distances below 15 degrees we have so far no data, but for signals with dom-

inant frequencies approaching 4.5 Hz, we expect that signal losses up to 4 dB may be found for the full ASAR array configuration.

From this small data set it would be reasonable to set the expected signal loss for events above 30 degrees to about 0.3 dB. For distances between 15 and 30 degrees, the average is a bit less than 2 dB. Below 15 degrees we have no data, so we have to look for more data or use information from other arrays to obtain an estimate of the expected signal loss.

### ***Beam deployment and signal loss due to mis-steering***

When deploying a beam set for processing of array data, we often require the signal loss due to mis-steering of the beams to be less than a given value, e.g. 3 dB. If we know the approximate value of the slowness mis-steering (s/km) corresponding to the 3 dB signal loss, we can derive the steering parameters (azimuth and slowness) of the necessary beam deployment.

When analyzing the ASAR events, we have calculated the signal loss due to mis-steering for data filtered between 0.8 and 4.5 Hz. Fig 7.3.9 shows the steering points used in this analysis, with values relative to the observed slowness and azimuth of the event. Figs. 7.3.10 and 7.3.11 show two examples of signal loss plotted as a function of the absolute value of the mis-steering for two events at 15.9 and 33.6 degrees distance, respectively.

The expected signal loss due to mis-steering is dependent on the frequency range of the main signal energy, which again shows a strong dependency on the source-receiver distance. As previously suggested, we have categorized the data into two bins, one for the distance interval 15-30 degrees, and another for 30-180 degrees.

Fig. 7.3.12 gives the average signal loss curve for the 4 events in the distance interval 15-30 degrees. After smoothing, the signal loss for the correct beam steering is 1.56 dB, and additional 3 dB signal loss is found for a mis-steering of 0.036 s/km. In order to deploy beams for events in the distance interval 15-30 degrees, we find in the IASP91 travel-time table that we expect the slowness to fall within the range 8.85 s/deg. to 13.63 s/deg. For the purpose of deploying the minimum number of beams required to cover a given slowness area, we have developed a semi-automatic procedure. The result is shown in Fig. 7.3.13 where the area between the two bold circles represent the slowness range for the 15-30 degrees distance interval, now in units s/km. We initially found that complete coverage within the 3 dB level could be achieved with deployment of 12 beams, but by extending the beam deployment to 17 beams and moving the steering points to larger slowness, the same beams could also be used for monitoring the distance range 2-15 degrees. The radii of the small circles is 0.036 s/km, corresponding to the expected mis-steering associated with the 3 dB signal loss.

Fig. 7.3.14 gives the average signal loss curve for the 6 events in the distance interval 30-180 degrees. After smoothing, the signal loss for the correct beam steering is as low as 0.16 dB, and additional 3 dB signal loss is found for a mis-steering of 0.041 s/km. As seen from the figure there is some spread in the observations, and in particular one event is less sensitive to mis-steering, primarily due to low dominant signal frequencies. The standard deviation associated with the 3 dB level is about 0.1  $m_b$  units. For the distance interval 30-

180 degrees we expect the slowness to fall within the range 0.0 - 8.85 s/deg, illustrated by the disc within the bold circle of Fig. 7.3.15. In order to ensure complete coverage within the 3 dB level (0.041 s/km), 7 beams were necessary, represented by the centers of the small circles.

For the distance interval below 15 degrees, we have so far no data in our tuning set. From analysis of local and regional events at the ILAR array ( in Alaska, USA), which has approximately the same configuration as ASAR, we have found it reasonable to assume the signal loss to be 30% more sensitive to mis-steering than for events between 15 and 30 degrees, i.e., slowness associated with the 3 dB signal loss is reduced by 30% down to 0.025 s/km. If we exclude P-phases from surface events within 2 degrees, there is very little difference between the theoretical slowness at 2 and 15 degrees. The slowness range is from 13.63-13.75 s/deg., illustrated by the small area between the bold circles of Fig. 7.3.16. By using the same 17 beams as for the 15-30 degrees interval, but now with smaller 3 dB circles, we see from Fig. 7.3.16 that complete coverage is ensured for the 2-15 degrees slowness interval.

### *Geographical grid spacing and time/azimuth/slowness tolerances*

In our current implementation of the Threshold Monitoring system we have divided the Earth's surface into 2562 grid points, where each grid point covers a target area with a radius of about 2.7 degrees. In threshold monitoring there is a trade-off between the size of the target area and the tolerances of the parameter values used in the threshold computations. With a given grid, it is necessary to make the tolerances of each aiming point compatible with the grid spacing. An illustration of the need for introducing azimuth tolerances is given in Fig. 7.3.17, now for a global grid system with 162 points. From this figure we can see that the necessary azimuth tolerance will increase with decreasing distance to the aiming point.

If we are deploying a beam with a slowness and azimuth corresponding to the coordinates of the center of a target area, it is necessary to allow for some mis-steering such that every point within the target area is covered. We have in Fig. 7.3.18.a plotted the calculated maximum mis-steering (s/km) for each of the 2562 grid points, versus the distance to the grid points. When comparing the maximum mis-steering of each target region with the signal loss for events between 30 and 180 degrees (Fig. 7.3.14), we find that the mis-steering associated with the grid spacing cause much less than 1 dB signal loss. In the legend of Fig. 7.3.18a we have given the station-target distances where we find that the mis-steering associated with the grid spacing cause 1, 3, 5, 7 and 9 dB signal loss when using the relation between signal loss and mis-steering representative for events between 30 and 180 degrees.

In Fig. 7.3.18.b we have done the same calculations, but now for events between 15 and 30 degrees. The relation between signal loss and mis-steering for events between 15 and 30 degrees is given in Fig. 7.3.12. From the legend of Fig. 7.3.18.b we read that the mis-steering introduced to cover the target regions will correspond to 1 dB signal loss at a station-target distance of 17 degrees, and about 1.5 dB at 15 degrees.

As previously outlined, we have no data for the distance interval below 15 degrees, but if we assume that the signal loss for events between 2 and 15 degrees is 30% more sensitive to mis-steering than events between 15 and 30 degrees, we get the numbers given in the legend of Fig. 7.18.c. This tells us that we need to compensate for a signal loss of 3 dB at 13.3 degrees, 5 dB at 9.87 degrees, 7 dB at 7.9 degrees and 9 dB at 6.6 degrees. If we look at the beamforming SNR improvement of the event at 15.9 degrees distance (Fig. 7.3.7), we find a gain of about 9 dB. For events at closer distances than 15.9 degrees we do not expect this number to increase. This would imply that for distances within 6-7 degrees, the signal loss attributed to the mis-steering needed to cover the target regions (9 dB) will cancel the SNR improvement (9 dB) gained through beamforming.

Under the assumption that the 2-15 degrees model for the relation between signal loss and mis-steering is reasonable, we would for targets within about 7 degrees distance use the STA traces from a single array channel as the basis for calculating magnitude thresholds. When using a single array channel, the problem of signal loss vanishes, and there is no need to take into account such effects in the processing. For target distances closer than 7 degrees, the use of STA traces from a single channel would give better performance than using STAs from a beam based on the full ASAR configuration.

An alternative to using the data from a single channel, would be to use a smaller sub-configuration of the ASAR array for beamforming. In this way the signal loss would become less sensitive to mis-steering, and it could make sense to use STAs from beams also for a distance interval within 7 degrees. Such a decision would also have to take into account the fact that fewer array sensors provide less SNR improvement by beamforming.

### **Conclusions**

When estimating the processing parameters for a given station for use in the Threshold Monitoring system, there are a couple of principles that we should have in mind:

- We want to be conservative with respect to estimating the upper magnitude thresholds, such that we should avoid using too optimistic values.
- At the same time we should be aware that the generic global attenuation relationship has an attributed uncertainty of about  $0.4 m_b$  units, and that using average parameter estimates with an associated uncertainty of, e.g.,  $0.05 m_b$  units has little influence on the overall performance of the system.

We will in the following summarize the findings from the tuning analysis of the ASAR array:

- *Prefiltering*

There seems to be no problem with the 0.8-4.5 Hz prefiltering of the ASAR array data, see Fig. 7.3.4. After excluding the large  $m_b$  5.6 event, we did observe an average reduction in the estimated  $\log(A/T)$  values of  $0.05 m_b$  units after prefiltering. This should be taken into account in the parametrization of ASAR.

- *The relation between  $\log(A/T)$  and  $\log(\pi/2 \cdot \text{calib} \cdot \text{STA})$*

There is good correspondence between the manual signal measurements of  $\log(A/T)$  and the automatic estimates of  $\log(\pi/2 \cdot \text{calib} \cdot \text{STA})$  when measured on 0.8-4.5 Hz pre-filtered data, see Fig. 7.3.6. The automatic STA measurement had a small reduction of 0.04  $m_b$  units relative to the manual A/T measurement, and this will be accounted for in the parametrization.

- *Signal loss by beamforming*

For teleseismic events we found very little reduction in the signal amplitudes when beamforming with steering delays corresponding to the estimated azimuth and slowness of the observed P-phases, and as seen from Fig. 7.3.8, an average value of 0.25 dB was found.

In the distance range 15-30 degrees, the average signal loss for the 4 events was 1.7 dB, but there was a relatively large scatter in the observations. In order to be conservative with the estimation of magnitude thresholds, we will increase this number to 2.5 dB in the parametrization.

For the distance interval 7-15 degrees, we have no data in our tuning set, but from experience with analysis of ILAR events, we will increase the expected signal loss in the 15-30 degree distance range by 30%, such that the number becomes 3.25 dB.

For the distance range within 7 degrees, we will derive the magnitude thresholds from a single array channel, and we will therefore have no signal loss due to beamforming.

- *Signal loss by mis-steering of the beams*

Average curves for the relation between mis-steering of the beams and the reduction of signal amplitude are given in Fig. 7.3.12 (15-30 degrees) and in Fig. 7.3.14 (30-180 degrees). These will be used in the processing of the ASAR data.

For the distance interval 7-15 degrees, we use the curve for the 15-30 degrees distance range, but increase the sensitivity to mis-steering by 30%.

The problem of mis-steering is avoided for the distance range within 7 degrees where we use data from a single array channel

- *Beam deployment*

Plots of the beam deployments for the different distance ranges are given in Figs. 7.3.13, 7.3.15 and 7.3.16. Details on the beamforming steering parameters are summarized in Table 7.3.2

With the information provided above at hand, the program for calculation of network magnitude thresholds will automatically include additional variables like the STA sampling rate, size of the target regions and the distribution of the beam deployment.

For quality control of the ASAR processing parametrization we plan to inspect a few time intervals with magnitude thresholds based on ASAR data alone, and check that the results are in agreement with general seismological knowledge.

We have in this contribution discussed in great detail the different aspects of the tuning process of the ASAR array for use in the Global Threshold Monitoring system at the IDC.

For tuning of the remaining stations of the IDC primary network, we plan to present only the final results as outlined above in this chapter.

**T. Kværna**

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Table 7.3.1. Information on the 10 events used for tuning for the Threshold Monitoring Parameters at the ASAR array.

| Station | Orid   | Lat      | Lon       | Depth | Origin time         | Ndef | M <sub>b</sub> | Delta   | Phase | SNR    | Azim   | Vel  |
|---------|--------|----------|-----------|-------|---------------------|------|----------------|---------|-------|--------|--------|------|
| ASAR    | 808519 | -12.8037 | 121.5608  | 0.0   | 1996:263:11.44.08.5 | 12   | 4.3            | 15.930  | Pn    | 111.91 | 310.65 | 9.2  |
| ASAR    | 808685 | -6.0600  | 128.9550  | 321.2 | 1996:263:18.45.07.5 | 15   | 3.5            | 18.142  | P     | 291.60 | 347.64 | 9.7  |
| ASAR    | 808530 | -4.0314  | 135.6428  | 0.0   | 1996:263:12.17.34.0 | 12   | 4.4            | 19.593  | P     | 224.45 | 7.20   | 10.3 |
| ASAR    | 817516 | 0.9085   | 126.7151  | 25.8  | 1996:273:09.00.45.2 | 48   | 4.8            | 25.408  | P     | 114.15 | 343.33 | 18.2 |
| ASAR    | 808621 | -19.6428 | 169.8287  | 0.0   | 1996:263:14.04.38.2 | 14   | 4.4            | 33.573  | P     | 249.52 | 86.78  | 12.5 |
| ASAR    | 808505 | -25.3101 | 179.8348  | 487.3 | 1996:263:21.05.28.6 | 50   | 4.3            | 41.676  | P     | 394.12 | 95.32  | 14.2 |
| ASAR    | 815191 | -17.5973 | -178.8668 | 626.8 | 1996:271:16.47.43.8 | 9    | 3.5            | 44.455  | P     | 602.50 | 87.28  | 13.2 |
| ASAR    | 817504 | 51.6327  | 161.2944  | 26.6  | 1996:272:17.07.05.4 | 50   | 4.7            | 78.740  | P     | 208.29 | 16.79  | 20.2 |
| ASAR    | 809239 | -52.9173 | 9.8323    | 0.0   | 1996:264:17.37.05.8 | 38   | 5.6            | 89.622  | P     | 40.08  | 205.56 | 24.3 |
| ASAR    | 805509 | 11.5426  | -85.3205  | 194.0 | 1996:262:17.34.22.2 | 75   | 5.0            | 140.847 | PKhKP | 67.30  | 107.20 | 34.8 |

**Table 7.3.2. Information on the ASAR beam deployment used for global threshold monitoring.**

| No | Distance range | Type   | Config | Vel  | Azi   | 3dB   | Filter  |
|----|----------------|--------|--------|------|-------|-------|---------|
| 1  | 0-7            | Single | AS12   | -    | -     | -     | 0.8-4.5 |
| 2  | 7-15           | Beam   | ASAR   | 8.96 | 0.0   | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 3  | 7-15           | Beam   | ASAR   | 8.96 | 21.2  | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 4  | 7-15           | Beam   | ASAR   | 8.96 | 42.4  | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 5  | 7-15           | Beam   | ASAR   | 8.96 | 63.5  | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 6  | 7-15           | Beam   | ASAR   | 8.96 | 84.7  | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 7  | 7-15           | Beam   | ASAR   | 8.96 | 105.9 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 8  | 7-15           | Beam   | ASAR   | 8.96 | 127.1 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 9  | 7-15           | Beam   | ASAR   | 8.96 | 148.2 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 10 | 7-15           | Beam   | ASAR   | 8.96 | 169.4 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 11 | 7-15           | Beam   | ASAR   | 8.96 | 190.6 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 12 | 7-15           | Beam   | ASAR   | 8.96 | 211.8 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 13 | 7-15           | Beam   | ASAR   | 8.96 | 232.9 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 14 | 7-15           | Beam   | ASAR   | 8.96 | 254.1 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 15 | 7-15           | Beam   | ASAR   | 8.96 | 275.3 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 16 | 7-15           | Beam   | ASAR   | 8.96 | 296.5 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 17 | 7-15           | Beam   | ASAR   | 8.96 | 317.6 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |
| 18 | 7-15           | Beam   | ASAR   | 8.96 | 338.8 | 0.025 | 0.8-4.5 |
|    | 15-30          | -      | -      | -    | -     | 0.036 | 0.8-4.5 |

| No | Distance range | Type | Config | Vel   | Azi   | 3dB   | Filter  |
|----|----------------|------|--------|-------|-------|-------|---------|
| 19 | 30-180         | Beam | ASAR   | 13.58 | 26.6  | 0.041 | 0.8-4.5 |
| 20 | 30-180         | Beam | ASAR   | 13.58 | 153.4 | 0.041 | 0.8-4.5 |
| 21 | 30-180         | Beam | ASAR   | 13.58 | 206.6 | 0.041 | 0.8-4.5 |
| 22 | 30-180         | Beam | ASAR   | 13.58 | 333.4 | 0.041 | 0.8-4.5 |
| 23 | 30-180         | Beam | ASAR   | 15.18 | 90.0  | 0.041 | 0.8-4.5 |
| 24 | 30-180         | Beam | ASAR   | 15.18 | 270.0 | 0.041 | 0.8-4.5 |
| 25 | 30-180         | Beam | ASAR   | Inf   | 0.0   | 0.041 | 0.8-4.5 |

The fields of the table are the following:

**Distance range:** Station-target distance range (in degrees) for which the STA data from the given beam should be used to derive the magnitude thresholds.

**Type:** Type of STA data to be used, a beam or a single channel.

**Config:** Configuration used for beamforming, or name of the single channel.

**Vel:** Apparent velocity of the beam.

**Azi:** Azimuth of the beam.

**3dB:** Expected mis-steering (in s/km) corresponding to 3 dB signal loss.

**Filter:** Prefilter applied to the data (3rd order Butterworth)

## IMS PRIMARY SEISMIC STATIONS

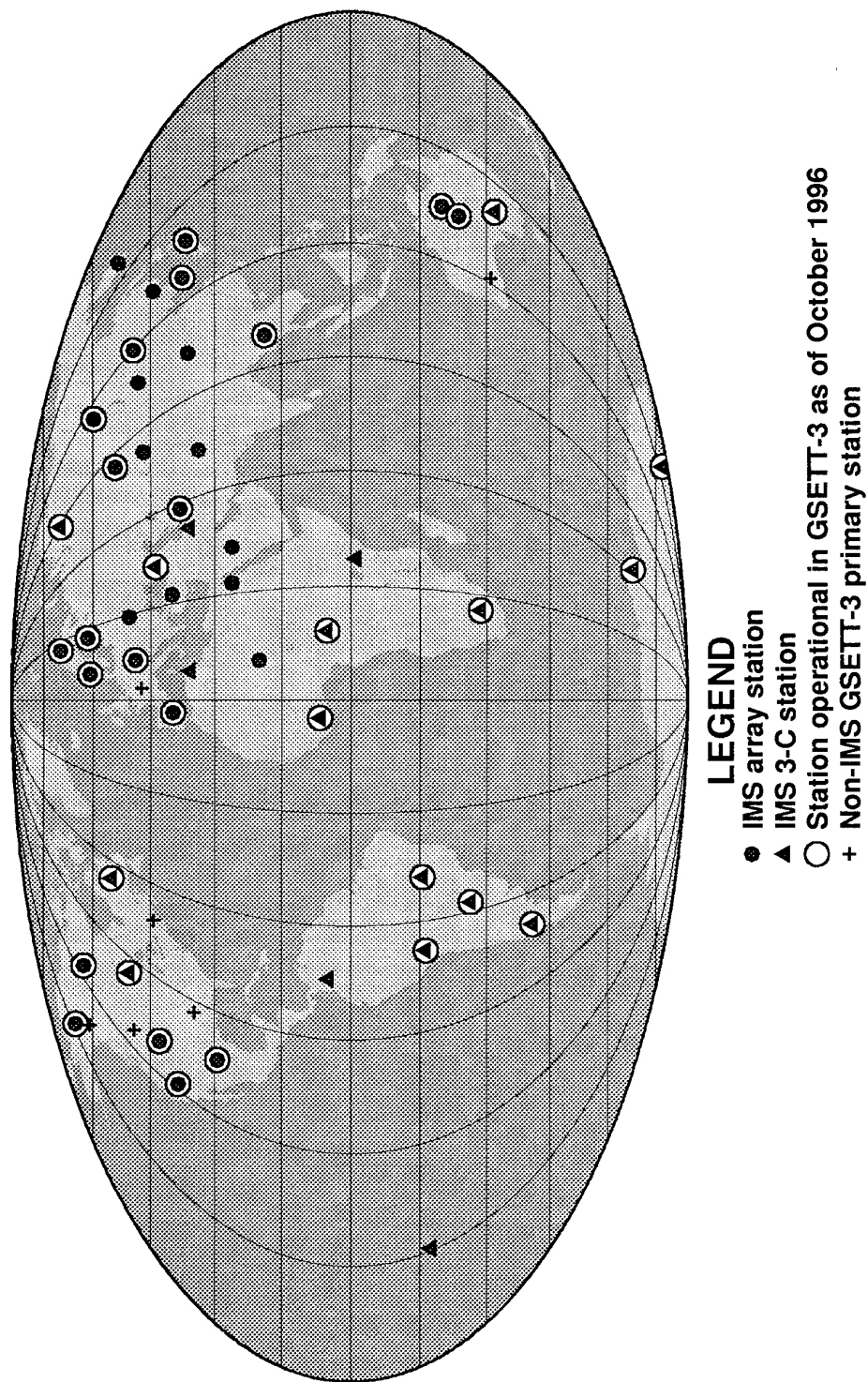


Fig. 7.3.1. Global map of the stations in the IMS primary network.

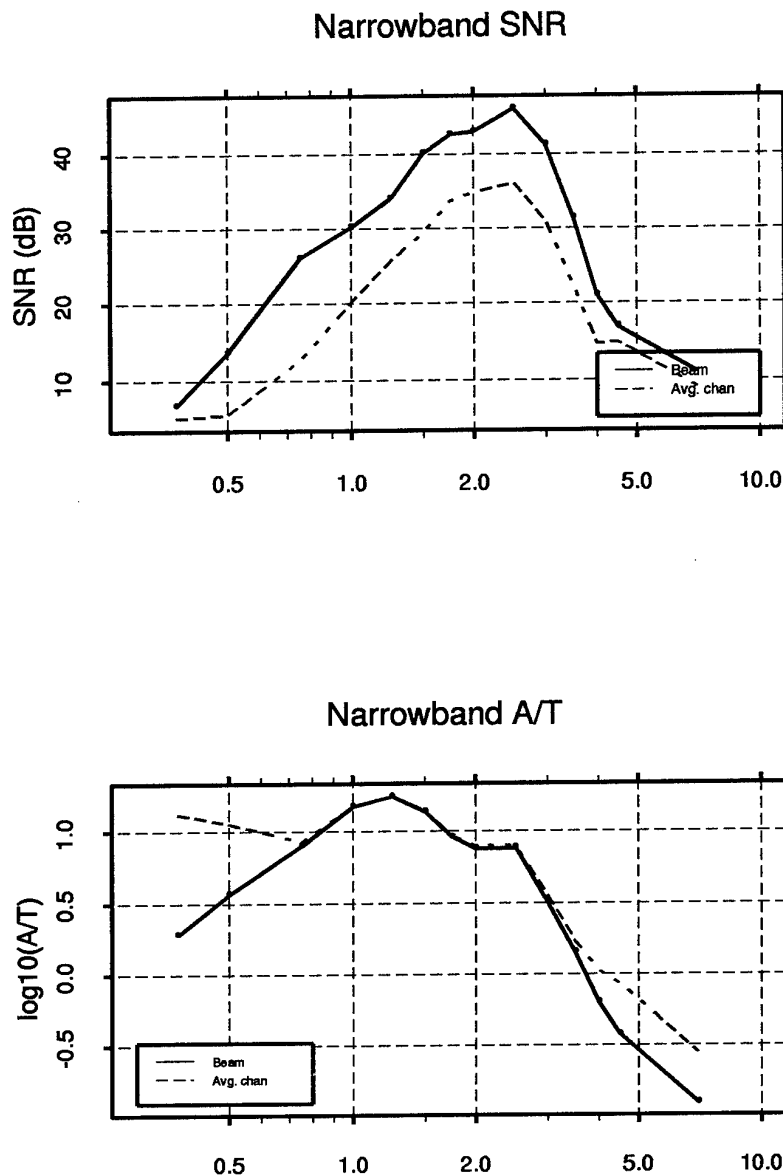


Fig. 7.3.2. The upper part of the figure shows the maximum SNR of the signal from an event at 33.6 degrees distance (no. 5 in Table 7.3.1) measured in a series of narrow filters, where the x-axis corresponds to the center of the filter bands.

The filters were the following given in Hz: 0.25-0.50, 0.25-0.75, 0.50-1.00, 0.75-1.25, 1.00-1.50, 1.25-1.75, 1.50-2.00, 1.75-2.25, 2.0-3.0, 2.5-3.5, 3.0-4.0, 3.5-4.5, 4.0-5.0, 6.0-8.0.

The solid line represents the SNR of the beam and the dashed line represents the average SNR of the array channels. The difference between the two curves can be interpreted as the SNR gain by beamforming.

The lower part of the figure shows the maximum A/T (nm/s) of the narrowband filtered data, measured within 8 seconds of the signal onset. Again the solid line represents the beam, and the dashed line represents the average of the array channels. For the part of the frequency range where the signal is above the background noise level, in this case above 0.75 Hz, the difference between the two curves can be interpreted as the signal loss by beamforming.

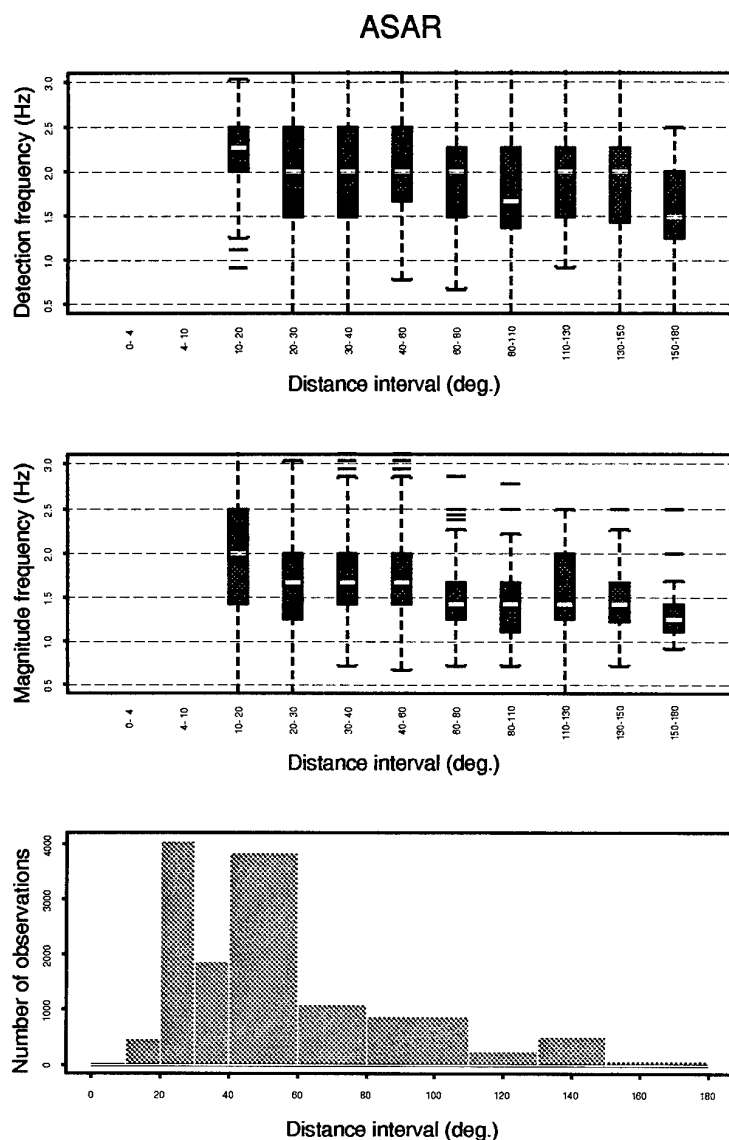


Fig. 7.3.3. The upper part of the figure shows the dominant signal frequencies measured on the filtered beams providing the highest SNR. The data set is **ASAR** P-phase information given in the database associated with the IDC Reviewed Event Bulletin. For each distance bin, the box represents the span between the 1st and 3rd quartile of the data, and the line in the middle is plotted at the median value. The whiskers extend to  $1.5 \times (\text{inter quartile distance})$ , and observations falling outside this range are given by separate lines. For each distance bin, this plot should thus give us an idea about the frequency range where we would expect the highest SNR.

The middle part of the figure shows the same type of statistics, but now for the dominant frequencies used in the estimation of event magnitude. Notice that the array beams used in the estimation of  $m_b$  have been prefiltered between 0.8 and 4.5 Hz. This plot should give us an idea about the frequency range where we would expect the highest signal amplitudes.

The lower part of the figure shows the number of observations in each distance bin.

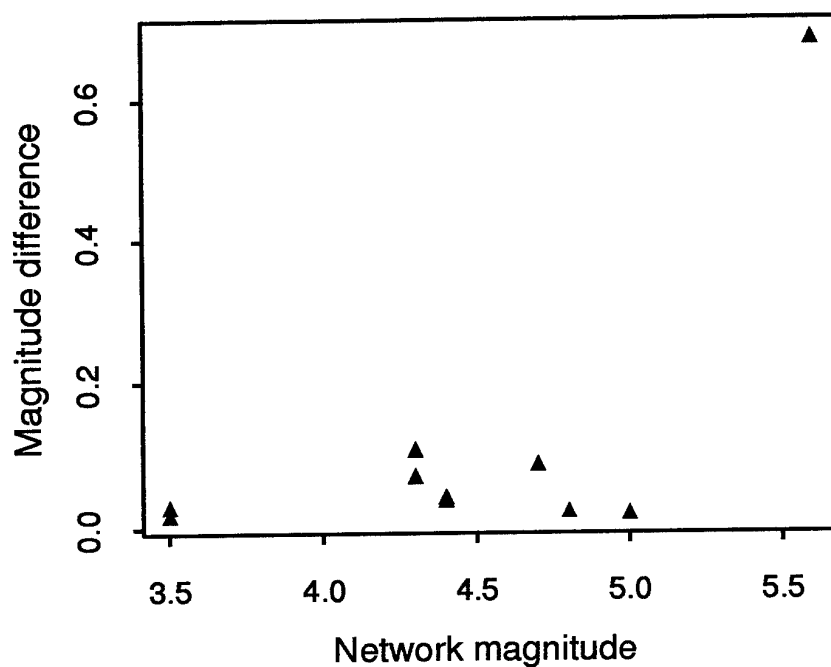


Fig. 7.3.4. For the 10 ASAR events given in Table 7.3.1, we have manually measured the maximum  $A/T$  (amplitude and period) on both unfiltered and filtered (0.8-4.5 Hz) data. The magnitude difference,  $\log(A/T)_{\text{unfiltered}} - \log(A/T)_{\text{filtered}}$ , is plotted versus the network magnitude of the events. Except for the largest event of  $m_b$  5.6, the correspondence was good, and  $\log(A/T)$  was on the average about 0.05  $m_b$  units lower after prefiltering.

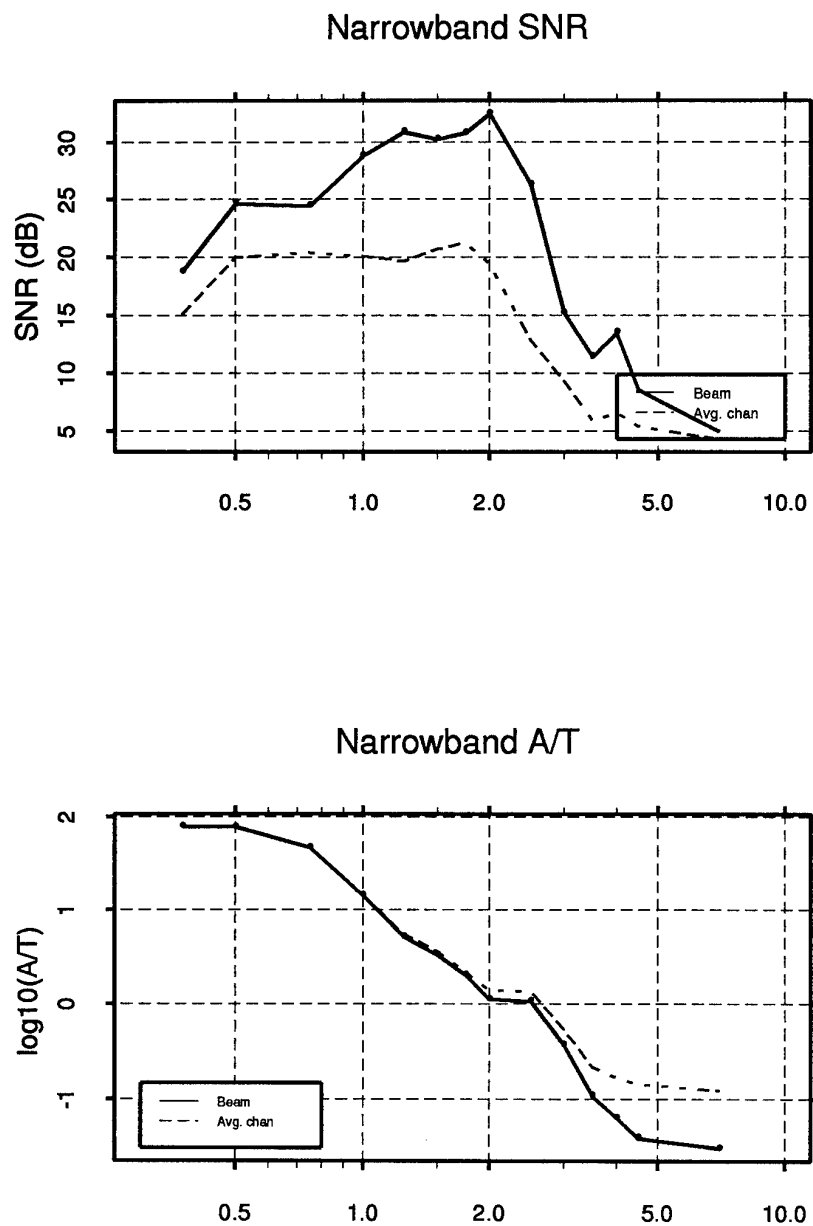


Fig. 7.3.5. Narrowband SNR and narrowband A/T for the  $m_b$  5.6 event (event no. 9 of Table 7.3.1). For details on the plot and data analysis see Fig. 7.3.2. Notice that the largest values of  $\log(A/T)$  are found for frequencies below 0.8 Hz, whereas the highest SNR is measured between 1 and 2.5 Hz.

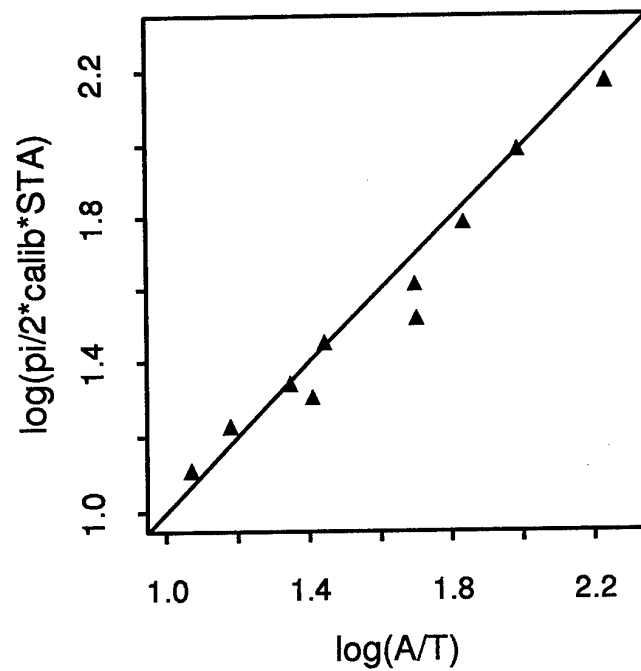


Fig. 7.3.6. This figure shows the relation between the manually measured  $\log(A/T)$  values and the corresponding values of  $\log(\frac{\pi}{2} \cdot \text{calib} \cdot \text{STA})$ , where *calib* is the calibration constant at the reference period.  $\log(A/T)$  is for this small data set 0.04 units higher than  $\log(\frac{\pi}{2} \cdot \text{calib} \cdot \text{STA})$ .

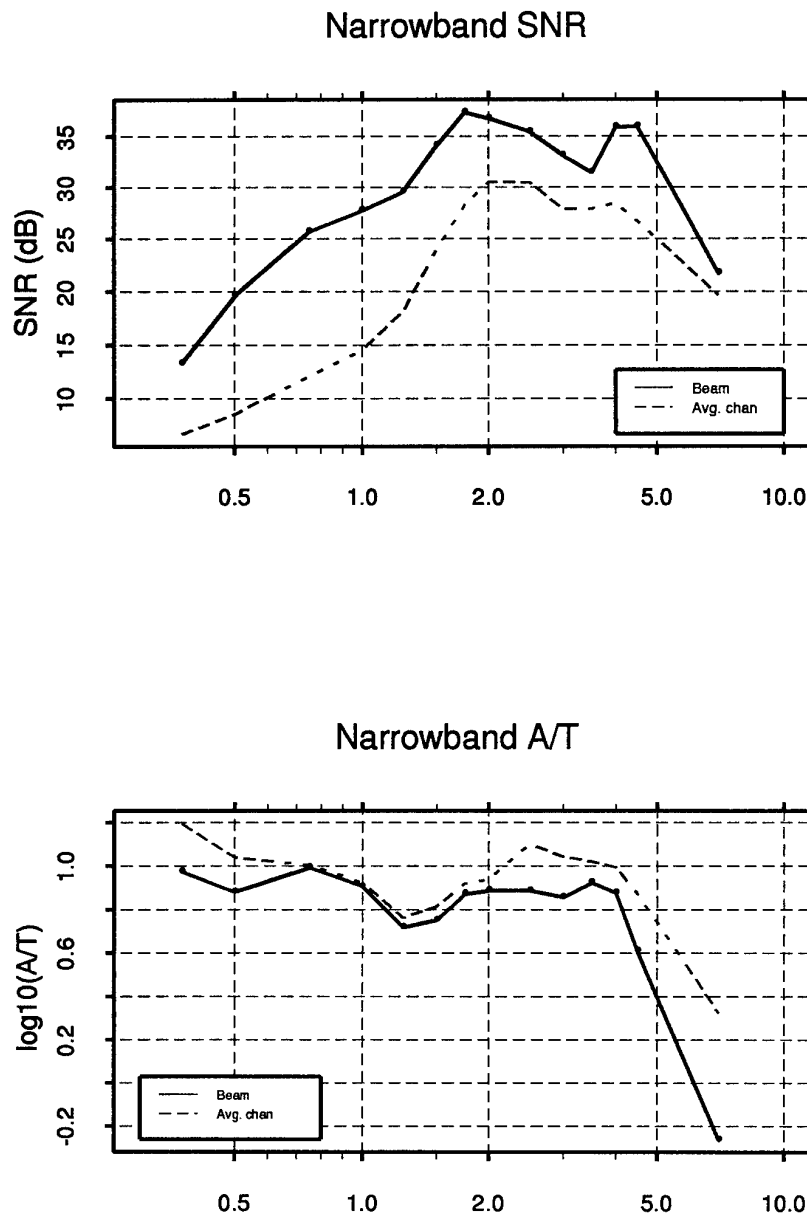


Fig. 7.3.7. Narrowband SNR and narrowband A/T for the regional event at 15.9 degrees distance (event no. 1 of Table 7.3.1). For details on the plot and data analysis see Fig. 7.3.2. Notice the relatively high signal energy up to 4 Hz, as shown on the lower panel of the plot.

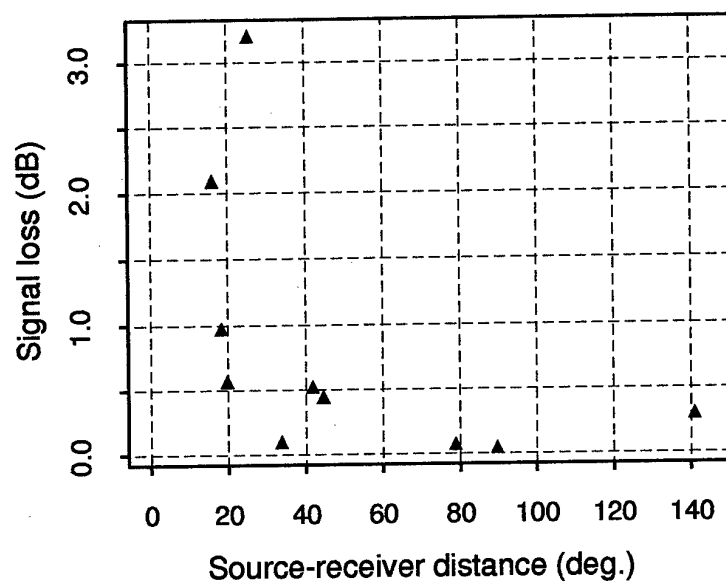


Fig. 7.3.8. Signal loss in the 0.8-4.5 Hz passband after beamforming of the 10 ASAR events given in Table 7.3.1. The beamforming steering parameters are taken from f-k analysis in a 5.5 second window starting 0.5 seconds ahead of the P-phase onset.

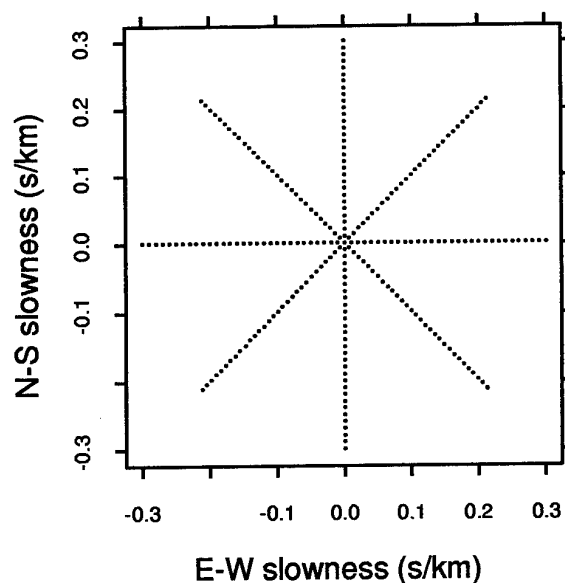


Fig. 7.3.9. This diagram represents the beamforming steering points used for the assessment of signal loss due to mis-steering of the beams. The values are relative to the observed azimuth and slowness of the events. The reason for conducting the analysis using such a pattern of steering points is to obtain representative estimates of signal loss also for arrays with a non-circular configuration like WRA and YKA.

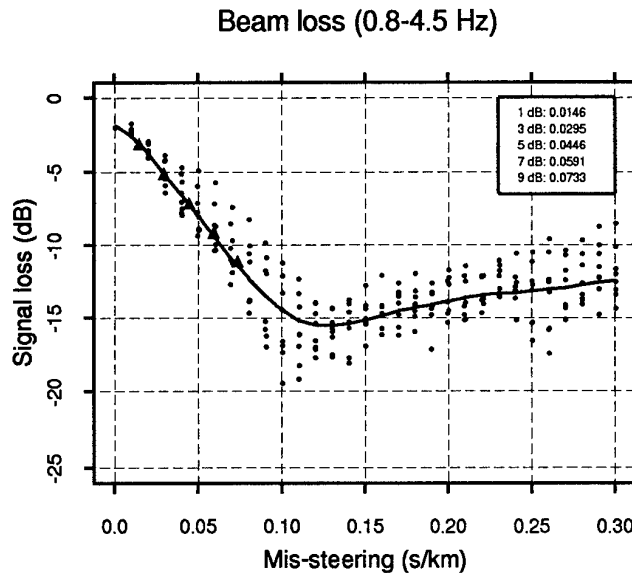


Fig. 7.3.10. Signal loss in the 0.8-4.5 Hz passband of the event at  $15.9^\circ$  distance (event no. 1 of Table 7.3.1) plotted as a function of the absolute value (s/km) of the mis-steering of the beams. The mis-steering points correspond to those shown in Fig. 7.3.9. The smoothed line is calculated using the S-plus function **supsmu**. The signal loss with no mis-steering is calculated to 2.1 dB and the smoothed values of mis-steering (s/km) corresponding to additional 1, 3, 5, 7 and 9 dB signal loss are given in the legend of the figure, as well as indicated by filled triangles on the plot.

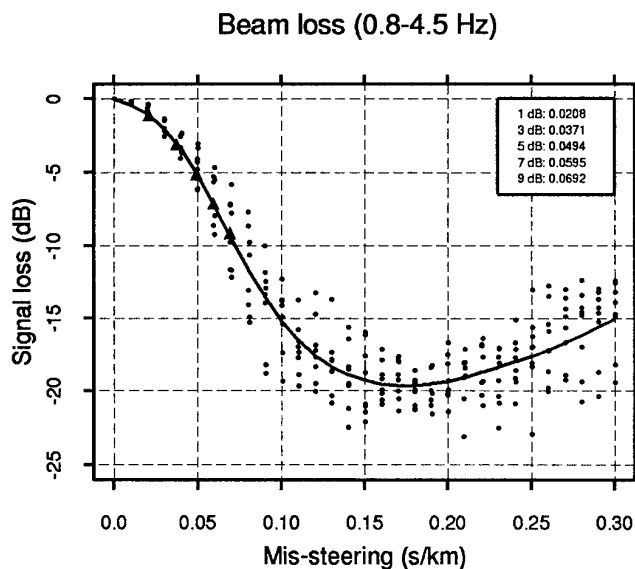


Fig. 7.3.11. Signal loss in the 0.8-4.5 Hz passband of the event at  $33.6^\circ$  distance (event no. 5 of Table 7.3.1) plotted as a function of the absolute value (s/km) of the mis-steering of the beams. The signal loss with no mis-steering is calculated to 0.1 dB and the smoothed values of mis-steering (s/km) corresponding to additional 1, 3, 5, 7 and 9 dB signal loss are given in the legend of the figure.

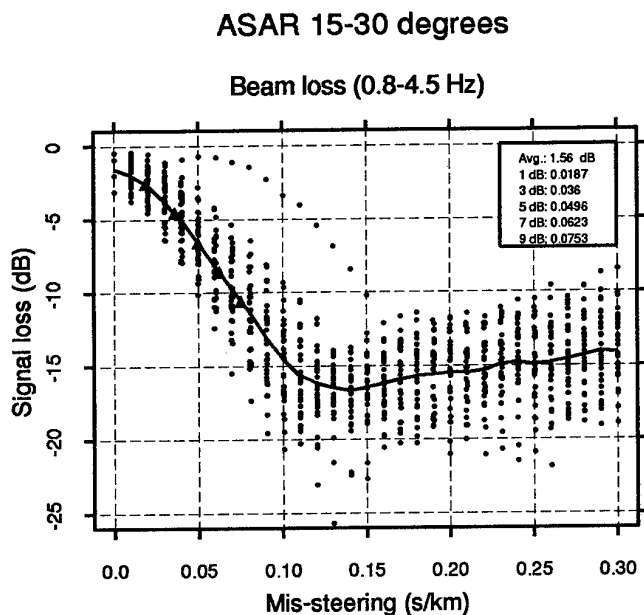


Fig. 7.3.12. Average loss in the 0.8-4.5 Hz passband of the events in the distance interval 15-30° plotted as a function of the absolute value (s/km) of the mis-steering of the beams. The smoothed estimate of signal loss with no mis-steering is calculated to 1.56 dB and the smoothed values of mis-steering (s/km) corresponding to additional 1, 3, 5, 7 and 9 dB signal loss are given in the legend of the figure.

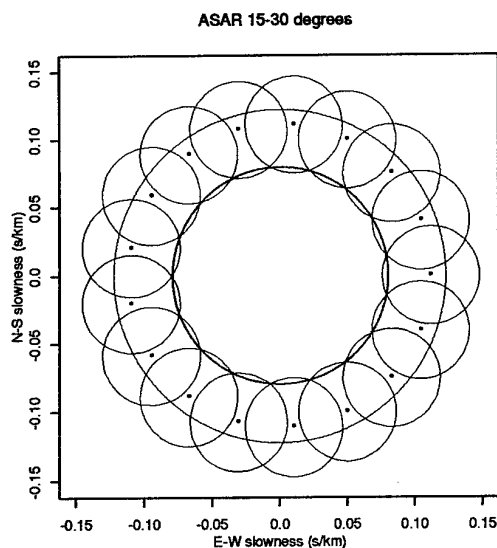


Fig. 7.3.13. Beam deployment for threshold monitoring of events between 15 and 30 degrees distance. The area between the two bold circles corresponds to the expected slowness range according to the IASP91 travel-time table for P-phases from surface events between 15 and 30 degrees. In order to ensure complete coverage within the 3 dB level, it was necessary to deploy only 12 beams. But by extending the beam deployment to 17 beams, and moving the steering points to larger slownesses, the same beam deployment could be used for processing of the 2-15 degrees interval. The steering points of the 17 beams are given by the centers of the small circles. The radii of the small circles are 0.036 s/km, corresponding to the expected mis-steering associated with the 3 dB signal loss (see Fig. 7.3.12).

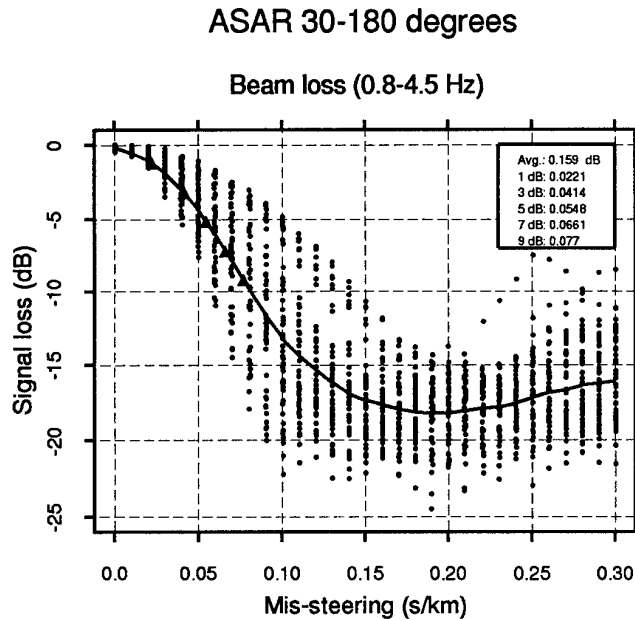


Fig. 7.3.14. Average loss in the 0.8-4.5 Hz passband of the events in the distance interval 30-180° plotted as a function of the absolute value (s/km) of the mis-steering of the beams. The signal loss with no mis-steering is calculated to 0.16 dB and the smoothed values of mis-steering (s/km) corresponding to additional 1, 3, 5, 7 and 9 dB signal loss are given in the legend of the figure.

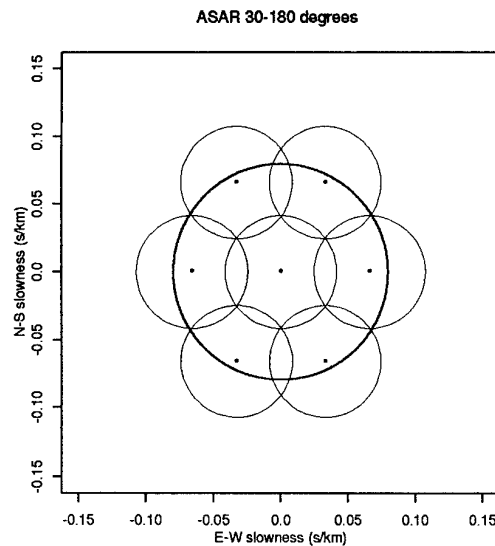


Fig. 7.3.15. Beam deployment for threshold monitoring of events in the distance interval 30-180 degrees. The area within the bold circle corresponds to the expected slowness range according to the IASP91 travel-time table for P-phases from surface events in this distance interval. In order to ensure close to complete coverage within the 3 dB level, it was necessary to deploy 7 beams, represented by the centers of the small circles. The radii of the small circles are 0.041 s/km, corresponding to the expected mis-steering associated with the 3 dB signal loss (see Fig. 7.3.14).

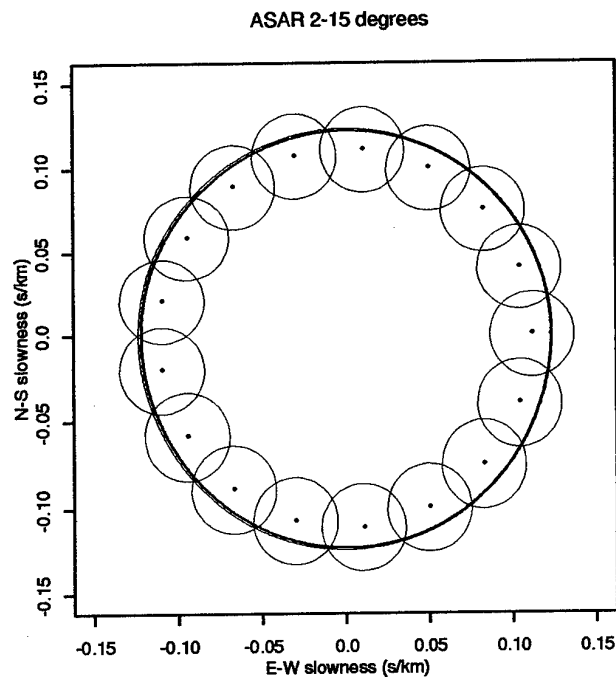


*Fig. 7.3.16. Estimated beam deployment for threshold monitoring of events between 2 and 15 degrees distance, assuming a 30% increase in signal loss due to mis-steering relative to events between 15 and 30 degrees. The small area between the two bold circles corresponds to the expected slowness range according to the IASP91 travel-time table for P-phases from surface events between 2 and 15 degrees. By extending the beam deployment for the 15-30 degrees interval to 17 beams and moving the steering points to larger slowness, the same beam deployment could be used for processing of the 2-15 degrees interval. The estimated radii of the small circles are 0.025 s/km, which is 30% smaller than for events within the 15-30 degrees distance range.*

## Distance 37.5 deg Radius 11 deg

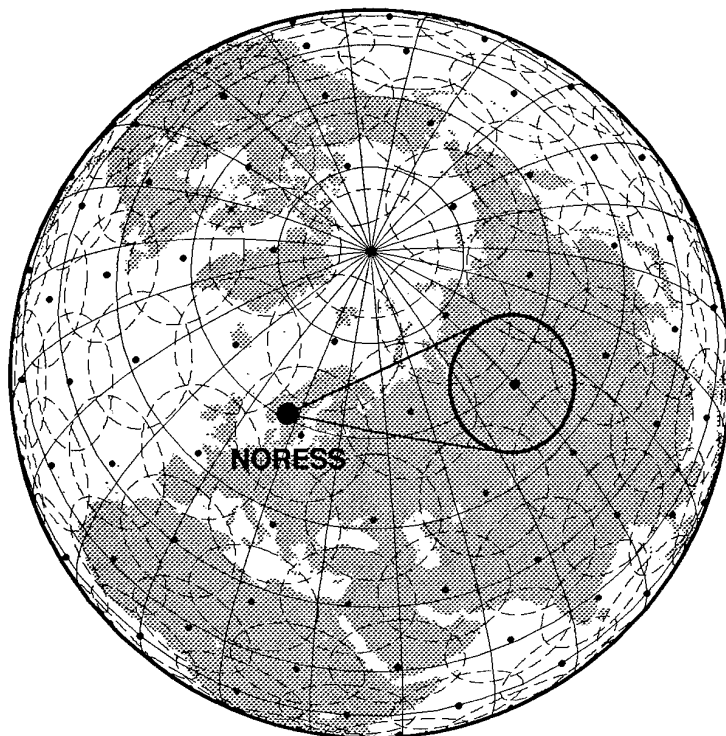


Fig. 7.3.17. Example of a global grid system for threshold monitoring. In order to ensure complete coverage of the Earth's surface, each grid point represents a circular target area. As illustrated on the figure, hypothetical events from a given target area (in this case the highlighted) will span a given range of azimuths, slowness and travel-time when recorded at a given station (in this case NORESS). If we at NORESS deploy a beam with steering parameters corresponding to the center of the highlighted target area, we will need to allow for some mis-steering to cover the entire target area. This mis-steering will generally increase with decreasing distance to the grid points. In order to obtain realistic network magnitude thresholds, the signal loss caused by this mis-steering needs to be taken into account.

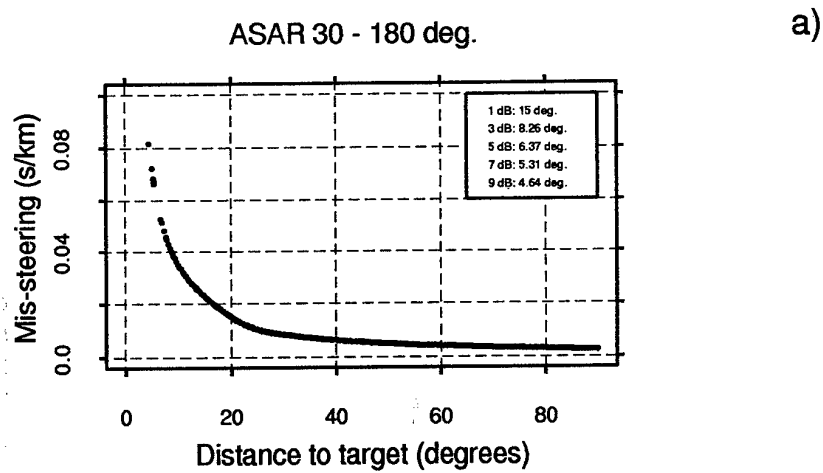


Fig. 7.3.18a. Maximum mis-steering (in s/km) associated with the 2562 globally distributed grid points used in the Threshold Monitoring at the IDC, plotted versus the distance from ASAR to each of the grid points. Grid points more distant than 90 degrees have not been plotted. The legend provides information on the station-target distances for which the mis-steering causes 1, 3, 5, 7 and 9 dB signal loss when using the relation between signal loss and mis-steering representative for events between 30 and 180 degrees (see Fig. 7.3.14). Notice that for distance above 30 degrees, the mis-steering necessary to compensate for the area of the target regions causes significantly less than 1 dB signal loss.

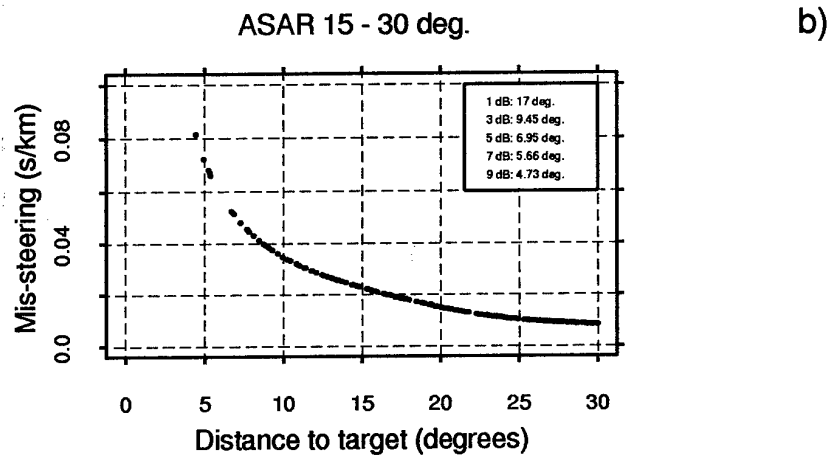


Fig. 7.3.18b. Same as Fig. 7.3.18a, but now for grid points between 15 and 30 degrees. For information on the relation between mis-steering and signal loss, see Fig. 7.3.12. Notice that for the distance interval under discussion (15-30 degrees), the mis-steering necessary to compensate for the area of the target regions causes 1 dB signal loss at 17 degrees distance, and about 1.5 dB at 15 degrees.

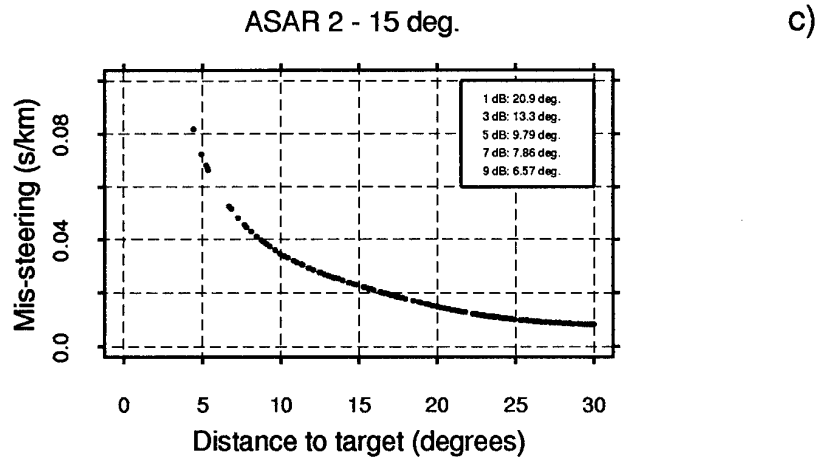


Fig. 7.3.18c. Same as Fig. 7.3.18a, but now for grid points between 2 and 15 degrees. The basis for the relation between mis-steering and signal loss are the values derived for events between 15 and 30 degrees, see Fig. 7.3.12, but now assuming a 30% increase in the sensitivity to mis-steering. Under this assumption we read from the legend that for the distance interval under discussion (2-15 degrees), the mis-steering necessary to compensate for the area of the target regions causes 3 dB signal loss at 13.3 degrees, 5 dB at 9.8 degrees, 7 dB at 7.9 degrees and 9 dB at 6.6 degrees.

## 7.4 Study of low-magnitude seismic events near the Novaya Zemlya nuclear test site

### *Introduction*

The seismic component of the envisaged CTBT International Monitoring System (IMS) has for some years been nearly complete in Fennoscandia and adjacent regions. This means that the projected capabilities of the monitoring system in these areas can be assessed with basis in actually observed performance of the regional array network in Northern Europe. In particular, the capabilities of this network are representative when it comes to monitoring low magnitude seismic events, since such events would not usually be detectable at teleseismic distances. Thus, even though additional high-quality teleseismic stations in other regions are planned to be included in the IMS network at a later date, the capabilities of the global network to detect and locate small events in the region surrounding Fennoscandia will remain largely unchanged.

Of particular interest is to evaluate the performance of the regional network for seismic events in Novaya Zemlya. These islands comprised one of the two main USSR nuclear test sites for many decades, and became, after the breakup of the USSR, the only designated nuclear testing grounds in the Russian Federation.

This paper provides a brief overview of the history of underground nuclear testing at Novaya Zemlya, with a discussion of the seismic recordings both by the global network and the regional array network in Fennoscandia. This is followed by a discussion in some detail of seismic events at Novaya Zemlya other than the announced nuclear explosions. We focus in particular on some recent, low-magnitude events, for which an excellent coverage of regional arrays has been available.

This paper makes mainly use of seismic stations actually envisaged for the IMS. However, we also use supplementary data from other stations when appropriate, and also make an assessment of the potential contributions of such supplementary data in a CTBT monitoring context.

### *Station network*

The network of regional arrays used in this study is shown in Fig. 7.4.1 and has been described in previous NORSAR Semiannual Technical Summaries. It comprises in general small-aperture arrays, supplemented by the large NORSAR array which has been in operation since 1970. For events occurring before 1985, the NORSAR data have been the main source of information on small events at Novaya Zemlya, whereas for later years, the regional network has provided a significant improvement in monitoring capability for this region.

The first regional array, NORESS, was established in southern Norway in 1984, and has formed the standard for later development of such arrays worldwide, both with regard to array geometry, instrumentation and processing techniques. While NORESS and ARCESS (in northern Norway) were configured with as many as 25 SP sensor sites deployed over an area of 3 km in diameter, most of the arrays constructed later have been

somewhat smaller. Thus, the FINESS array has 16 sites and about half the aperture of NORESS, whereas there are 9 sites within an area 1 km in diameter for the arrays at Spitsbergen and Apatity. The recently installed Amderma array is an example of a microarray (Kværna and Ringdal, 1992), comprising 4 SP sites, with a 3-component seismometer in the center, and an aperture of only about 100 m.

All of the arrays in the regional network, with the exception of Amderma, have telemetry to the NORSAR data center at Kjeller. This enables continuous automatic detection processing to be made, supplemented by interactive analysis of the detected signals. The resulting regional bulletins complement the bulletins produced at the GSETT-3 IDC, and provide a useful reference for evaluation and calibration purposes. NORSAR has produced such regional bulletins since 1989.

The regional processing algorithms in use at the NORSAR Data Center comprise the following steps:

- Automatic single array processing, using a suite of bandpass filters in parallel, and a beam deployment that covers both P and S type phases for the region of interest.
- An STA/LTA detector applied independently to each beam, with broadband f-k analysis for each detected phase in order to estimate azimuth and phase velocity.
- Single-array phase association for initial location of seismic events, and also for the purpose of chaining together phases belonging to the same event, so as to prepare for the subsequent multiarray processing.
- Multi-array event detection, using the Generalized Beamforming approach (Ringdal and Kværna, 1989) to associate phases from all stations in the regional network, and thereby provide automatic network locations for events in all of northern Europe.

The processing steps described above result in an automated bulletin that is made available on-line via the Internet. Experience over the past several years has demonstrated that the procedure described above is extremely efficient, and is furthermore "complete" in the sense that it provides an exhaustive search of all possible phase combinations that could correspond to real events. The processing steps described above have now been adopted, with appropriate modifications, at the IDC for global processing, and are also gaining use for other networks.

### ***Seismic events at Novaya Zemlya***

#### *Confirmed underground nuclear explosions*

A comprehensive list of nuclear explosions in the former USSR has recently been published by Russian authorities (Mikhailov et al, 1996). Table 7.4.1 lists the 42 announced underground explosions that have taken place from 1964 through 1990 at these testing grounds. The table contains comments on the detection of these explosions by the global network of seismograph stations. As can be seen, all of the larger explosions have been well recorded teleseismically, and have been listed in the bulletins of the International Seismological Centre (ISC) and the US National Earthquake Information Service (NEIS). In those cases where two explosions have been carried out simultaneously, only one entry is listed in the global bulletins.

One of the explosions, on 27 July 1972, has not been detected by the global network. We have reviewed the automatic NORSAR detection list for this particular day, and found no detection that could correspond to a Novaya Zemlya explosion. This indicates that the explosion must have been very small, probably below  $m_b$  3.0, which is the approximate detection threshold of the automatic processing at NORSAR. Since the raw data for this day has not been retained, we have not been able to go back and use optimized processing techniques to try to detect this event by more specialized methods than those applied routinely, and we are therefore not in a position to provide a more precise upper limit on the magnitude of this event. Nevertheless, the large scaled depth of this explosion ( $>400\text{m}/(\text{kt})^{1/3}$  according to Russian sources) suggests that it went off at a yield significantly below the planned yield.

The magnitudes listed in Table 7.4.1 are station-corrected  $m_b$ , most of them from Lilwall and Marshall (1986). For events not listed in their paper, we have calculated  $m_b$  in a way consistent with their estimates, using either world-wide data or NORSAR recordings.

#### *Other detected seismic events*

Very few Novaya Zemlya seismic events apart from the nuclear explosions listed in Table 7.4.1 have been detected by the available station network over the past 25 years. A list of such events, detected either by the global network, by NORSAR or by the regional array network described above, is given in Table 7.4.2. Below, we comment briefly on some of these events, while others will be discussed in more detail in the subsequent sections.

The events in 1973-74, which were all near the southern Novaya Zemlya test site, are thought to be aftershocks of the very large underground nuclear explosions (several megatons yield) at that time. A detailed description of the aftershocks for the first 4 hours following the explosion on 27 October 1973 has been published by Israelson, Slunga and Dahlman (1974).

The event on 1 August 1986 has been analyzed by Marshall, Stewart and Lilwall (1989), who found that this event could be confidently classified as an earthquake at a depth of 24 km. This is the only confirmed, teleseismically recorded, earthquake that is known from this region. In fact, Marshall et al (1989) in their analysis of the 1 August 1986 Novaya Zemlya earthquake, noted that all previous teleseismically detected signals from this region appear to have been resulting from nuclear tests or post-test tectonic activity such as cavity collapses and aftershocks.

It is interesting to note that all of the events in Tables 7.4.1 and 7.4.2 with magnitude 4.0 and higher have been reported in the ISC bulletin, while almost none below this threshold have been listed. This performance is generally consistent with the expected teleseismic detection capability of the global network, which, according to the estimates by Ringdal (1986) would be approximately  $m_b=4.0$  at the 90 per cent level for the Novaya Zemlya region.

#### *NORSAR P-wave recordings of selected events*

The large-aperture NORSAR array is situated about 20 degrees from Novaya Zemlya, and has an excellent detection capability for events from this area. The recorded waveforms

are usually complex and very high-frequency due to the short epicentral distance and triplication effects caused by heterogeneities in the upper mantle. The signal amplitude variation across the array is quite large, which is a feature attributed to upper mantle focusing effects that is generally typical for signals recorded at this array, at regional as well as teleseismic distances (Ringdal and Husebye, 1982).

A study of such focusing effects for Novaya Zemlya events has been carried out by Ringdal (1990). Fig. 7.4.2 shows the typical amplitude pattern at NORSAR for events from the northern test site. The amplitudes vary by an amount corresponding to more than one magnitude unit, with the strongest signals recorded at subarrays 02C and 03C. In particular, the site at 03C01 has very high amplitudes, even compared to other sites in the same subarray. The amplitude pattern across 02C is much more consistent. Fig. 7.4.3 illustrates the variability in signal shapes and amplitude levels for one of the events in the data base.

In practice, detectability is determined by the signal-to-noise ratio in the "best" frequency band. For NORSAR recordings of Novaya Zemlya events, the filter band of 2.5-4.5 Hz is close to optimum, and because of the amplitude variations described above, the "best" single sensor or subarray has a SNR comparable to or higher than the full array beam. Thus, the focusing effects can be exploited to obtain improved detectability.

Figs. 7.4.4 and 7.4.5 give comparisons of NORSAR P-wave recordings of 3 small events in the data base, one of which is a nuclear explosion. A comparison of the waveforms reveals no significant differences in signal shapes, except for such differences that could be attributed to local (near-source) geology and seismic noise interference, and thus indicates that all of these events are likely to be of a similar source nature. Presumably, the two unknown events are chemical explosions conducted at the test site.

The examples given previously show that seismometers located at sites with favorable receiver effects can be exploited to provide improved detectability, and indicate that signals well below magnitude 3.0 could be detected, using an appropriate high-frequency filter, at a single NORSAR sensor or subarray. Nevertheless, the traditional detection algorithms employed at NORSAR require detection on an array beam in order to provide a location estimate, and high-frequency filters have not been routinely applied in the past. In practice, the actual detection capability of NORSAR, as represented by events listed in the NORSAR bulletin, is estimated to approximately  $m_b = 3.0$  for the Novaya Zemlya region. For the years 1970-1990, the list of detected events provided in Tables 7.4.1 and 7.4.2 can therefore be expected to be nearly complete at  $m_b$  3.0 and above.

#### ***Recent events recorded by the regional network***

As earlier mentioned, the capabilities for monitoring Novaya Zemlya have significantly improved in recent years, with the installation of a high-quality regional array network in Fennoscandia and adjacent regions.

On 31 December, 1992, the regional array system detected and located a small seismic event ( $m_b=2.7$ ) near the northern Novaya Zemlya test site. This event has been extensively analyzed by the nuclear monitoring community (see e.g. Ryall, 1993). The general con-

sensus in these analyses was that the event could not be confidently classified as either an earthquake or explosion, based on the available data.

On 13 June 1995, the GSETT-3 IDC reported a small seismic event ( $m_b=3.4$ ) near Novaya Zemlya, Russia. The estimated epicenter in the REB was  $75.32^\circ\text{N}$ ,  $54.85^\circ\text{E}$ , placing the event approximately 100 km west of the islands, but the location error ellipse was rather large and an onshore location could not be excluded. The event was re-analyzed by Ringdal (1996), who located the event near the shore of the northern Novaya Zemlya island, but still at a significant distance from the test site.

On 13 January 1996, the ARCESS and Spitsbergen arrays detected a small seismic event ( $m_b=2.4$ ) close to the epicenter of the 13 June 1995 event. Although both stations were participating in the GSETT-3 experiment at the time, the IDC did not report the event, presumably because it did not satisfy the criteria imposed to form an event.

It might be of interest to comment briefly on the performance of the automatic detector algorithms employed at the NORSAR data center for such small events. As an example, Table 7.4.3 shows the automatic detection log for the Spitsbergen array during the time periods of the 13 June 1995 and 13 January 1996 events. It can be seen that several phases with consistent azimuths are detected in each case, and that the estimated velocities can be readily used to assign phase type (P or S) to each detection. Note in particular the interfering phase for the 13 January event — this is discussed later in the text.

These three seismic events recorded since 1990 are of special interest in a seismic monitoring context, since they can serve to illustrate the capabilities and limitations of the envisaged International Monitoring System. In the following we present an analysis of these events in some detail, with comparisons to previously recorded underground nuclear explosions at Novaya Zemlya.

#### *Location of the three events since 1992*

Fig. 7.4.6 shows our epicentral locations, with error ellipses, of the events of 31 December 1992, 13 June 1995 and 13 January 1996. The figure also shows the approximate geographical extent of the Novaya Zemlya nuclear testing grounds.

As is well known, the 31 December 1992 event was quite close to the test site, and our error ellipse does not exclude a possible on-site location. We note that analysis of this event by other authors has given a smaller error ellipse in some cases (with no overlap with the test site). However, as appropriately noted by both Ryall (1993) and Israelson (1993), there are many unknown factors in the regional calibration for this area, and arrival times are difficult to compare between large and small events, due to the emergent onset of regional phases. It should also be noted that a key station like Spitsbergen has no recordings for known nuclear explosions that could be used for calibration purposes.

The analysis of the 13 June 1995 event has been based on recordings obtained at the three regional arrays Spitsbergen, ARCESS, and Amderma in the distance range 7-10 degrees, whereas we have used only ARCESS and Spitsbergen for locating the 13 January 1996 event. Figs. 7.4.7 and 7.4.8 show filtered Spitsbergen records (4-8 Hz) of a P-beam, an S-

beam and one vertical sensor from each of these two events, and it is seen that both the Pn and Sn phases can be clearly identified. We have not been able to observe any Lg phase for these event at Spitsbergen or ARCESS, probably due to the Lg blockage associated with thick sedimentary layers below the Barents Sea as noted in numerous earlier studies. At Amderma, a low frequency Lg phase could be observed for the 13 June 1995 event (Ringdal, 1996), but we have not made use of it in this study.

The events of 13 June 1995 and 13 January 1996 appear to have occurred at approximately the same place, and can with high confidence be located near the coast of the northern Novaya Zemlya islands. Without question, these two events were located at a considerable distance from the northern testing grounds.

### *Waveform comparisons*

It is interesting to compare the waveform characteristics of the small events discussed above to previous nuclear explosions at Novaya Zemlya. In particular it would be of interest to see whether or not it might be possible to "screen out" such events in an automatic screening procedure as envisaged in the CTBT protocol. While we have not at this stage attempted to develop specific screening criteria, there are some obvious comparisons that could be applied to get an indication of how such a procedure might work. We will briefly address this issue in the following.

We have made waveform comparisons of the 5 most recent events at Novaya Zemlya using the ARCESS array. The reason for selecting ARCESS is that this is the only station for which we have high SNR recordings of both the three recent small events and of previous known nuclear explosions. Fig. 7.4.9 shows, as a representative example, ARCESS data from the D4 sensor filtered in a 4-8 Hz band for five events: 13 January 1996, 13 June 1995, 31 December 1992, 24 October 1990 and 4 December 1988 (the latter two being confirmed nuclear explosions).

From Fig. 7.4.9 we note first of all the large differences in SNR as indicated by the amplitude scaling in front of each trace. This is of course due to the differences in event size — the two confirmed nuclear explosions being 2-3 magnitude units larger than the other events. The P-to-S ratios are of particular interest. The S phase is relatively much stronger for the three smaller events, although there is some difference also between the two nuclear explosions.

In Fig. 7.4.10, which shows the same sensor filtered in a high-frequency band (8-16 Hz), the difference in P/S ratio between the two nuclear and the three unknown events is even more pronounced. However, it is premature to draw any firm conclusions about the source type from these observations. First of all, the inherent variability in P/S ratio for the same source type is unknown, and the significance of the observed differences in these ratios is therefore not possible to assess. Moreover, source scaling may be a factor in explaining this difference.

We also note from these two figures that the P/S ratios of the 13 January 1996, 13 June 1995 and the 31 December 1992 events are quite similar in both frequency bands. (The P-S time difference is slightly larger for the former two events because of a greater station-

to-event distance.) Again, however, we cannot confidently state that these three events are of the same source type, but the short period data shown are certainly consistent with such a hypothesis.

### *Magnitudes*

In view of the different P/S ratios shown earlier for the five events, their relative magnitudes, as estimated from ARCESS data, would show a different pattern if we use P-phases or S-phases (or S coda phases) for magnitude estimation purposes. We have chosen to use the P-phase in this study and Fig. 7.4.11 shows the P-beam in the 2-4 Hz filter band at ARCESS for the 5 events discussed above. The resulting magnitude ( $m_b$ ) values are listed in Table 7.4.4.

Our reason for selecting the 2-4 Hz band is that this band is close to the frequencies used at teleseismic distances for  $m_b$  computation. In fact, small-aperture arrays in shield areas (such as NORESS and ARCESS) usually have their best teleseismic SNR in this filter band or a band close to it. We note, however, that for events at regional distances, it might sometimes be necessary to choose a higher filter passband, especially for small events with little or no "low frequency" signal energy. This would, because of source-scaling effects, cause a shift towards relatively higher magnitudes for smaller events, when comparing them to larger events with the same filter.

To illustrate this point, we can consider the two filters previously shown (Figs. 7.4.9 and 7.4.10) for ARCESS, and assess the relative sizes of the P-waves in these filter bands. We have found it reasonable to use the single sensor (D4) displayed in these figures, rather than the array beam, in order to avoid beamforming loss at these high frequencies. We use the peak amplitudes of P in each filter band as representative of the relative  $m_b$  values. The relative magnitude increase for the smaller events at high frequencies is up to 0.5  $m_b$  units, as is reflected in the  $m_b$  values listed in Table 7.4.4. This confirms that calculation of magnitudes at regional distances can easily result in ambiguous values. The frequency range of the recorded signal must be given special consideration, and must probably be compensated for by some empirical formula.

Finally, we have looked at the surface waves for the events recorded by the regional network. Once more, the ARCESS array is the most useful reference system. Not unexpectedly, it has been impossible for us to detect surface waves from the two smallest events (31 Dec 92 and 13 Jan 96), but the event of 13 June 95 is large enough to be of interest in this connection. Ringdal (1996) showed narrow-band filtered long period recordings (0.04-0.06 Hz or 17-25 seconds) for the ARCESS center sensor for the two events 24 October 1990 and 13 June 1995. The surface waves for the first event were clearly seen, and the  $M_s$  is estimated to 3.5 using Marshall and Basham's (1972) formula. The surface waves of the 13 June 1995 event were marginal, but appeared to just exceed the background noise. The corresponding  $M_s$  for this event would be 2.4, using the same formula.

While the  $M_s:m_b$  is an effective discriminant at teleseismic distances, its performance in the regional range is not generally proven (recall that the distance from ARCESS to the two events is 10-11 degrees). The values for 13 June 1995 ( $m_b=3.5$ ,  $M_s=2.4$ ) would seem to place this event in an intermediate category between the "expected" earthquake popula-

tion and explosion population, but an appropriate reference data base is not available for this region. It should also be noted that these single-station magnitudes (in particular the  $M_s$  value) have a fair amount of uncertainty. Thus, the  $M_s:m_b$  data cannot conclusively be used to identify the 13 June 1995 event, but a reasonable screening criterion based on  $M_s:m_b$  would probably point out this event as a candidate for more extensive analysis. For the two smallest events ( $m_b$  below 3.0), surface waves are not possible to extract with the available station data, and  $M_s:m_b$  is therefore not applicable.

#### *Some comments on the location of the 13 January 1996 event*

The location of the Novaya Zemlya event of 13 January 1996 has been the subject of considerable debate among seismologists, as discussed in the paper by van der Vink and Wallace (1996). To our knowledge, location estimates for this event range from several tens of kilometers west of our location to as much as 100 kilometers away. We will briefly discuss some of the uncertainties that in our opinion have led to these widely diverging estimates.

We first note that this event has been particularly difficult to locate precisely. In fact, the event serves well to illustrate that very careful analysis is required in order to avoid large location errors when using a sparse network. The problems in this case are twofold:

1. With only two arrays available and poor azimuthal resolution, the application of properly calibrated travel-time curves becomes essential.
2. At one of the arrays (Spitsbergen) there is an interfering local signal immediately preceding the S phase of the Novaya Zemlya event, thus causing problems in reading the S onset.

In the following, we comment briefly on these two points.

#### *Effects of uncalibrated travel-time curves*

There are several regional travel-time curves available for the Fennoscandian-Barents region, and Figure 7.4.12a) compares the model used at NORSAR to the IASPEI 1991 model. The figure shows Sn-Pn times as a function of epicentral distance (zero depth), and illustrate the typical systematic bias that could be introduced at a distance of 9-10 degrees if uncalibrated travel-time curves are used. It is seen that this bias alone can cause an error in the distance estimate from a given station of about 60 km. It might be noted that for the 13 January 1996 event, the distance relative to Novaya Zemlya is largely governed by the S-P time of the Spitsbergen array. Thus the application of an uncorrected model to locate this event would result in a location estimate close to 60 km offshore, even if the correct phase readings are made.

#### *Effects of the interfering phase at Spitsbergen*

It appears that the S-phase at the Spitsbergen array is preceded by an interfering high-frequency local P-phase, probably originating from an earthquake on the North Atlantic Ridge near 80N, 9E. This is illustrated in Fig. 7.4.13, which shows one sensor trace (B2) filtered in different frequency bands, together with array f-k analysis results. The first arriving phase has a P-type apparent velocity and an azimuth toward the northwest, and the spectral characteristics of this phase are very different from the real S-phase that has an

onset about 5 seconds later. As can be seen, the f-k results from this second phase show an S-velocity and an azimuth toward east, in the direction of Novaya Zemlya.

Moreover, we have analyzed recordings from the IRIS station at Kings Bay (KBS), which is situated about 130 km northwest of the Spitsbergen array, and which thus should be closer to the interfering event. This analysis has in fact indicated the presence of both a P and an S phase consistent with such a local event.

It is of course quite a coincidence that this local phase appears just before the S phase of the 13 January 1996 event, but extensive analysis seems to confirm unambiguously that this is in fact the case. It might be noted that local signals are very common at the Spitsbergen array, occurring at a rate of typically several hundred per day, from various azimuths.

With this interpretation, combined with our regional velocity model, the resulting location is at the NZ coast, quite close to the 13 June 1995 event, as previously shown in this paper.

Figure 7.4.12b) illustrates the combined effects of using an uncalibrated velocity model and picking an early arrival (due to the local phase) at the Spitsbergen array. The resulting mislocation would be about 100 km, and this explains the reasons for the very diverging location estimates obtained by different seismologists for the 13 January 1996 event.

An important point resulting from this case study is that locating small events using a sparse network can easily cause ambiguous and sometimes very diverging results, even when the data are analyzed by experts. Awareness of such possible differences in interpretation will be important in a future CTBT monitoring regime.

### **Conclusions**

The Novaya Zemlya region is a low-seismicity area, with only one earthquake clearly identified over the past 30 years. This is in spite of the fact that this area is well covered with regard to seismic stations at both teleseismic and regional distances. Thus, the detection capability of the global network has been estimated at close to  $m_b$  4.0 for Novaya Zemlya. Since 1970, the NORSAR array has provided a detection capability near  $m_b$  3.0. Currently, the detection capability for this area is near  $m_b$  2.5, due to the excellent regional array network that has been developed for CTBT monitoring.

Examples have shown that events of magnitude well below 3.0 can be not only detected, but also located with good accuracy (estimated uncertainty 20-30 km) using the present regional network. However, this capability is by no means matched by the capability to identify detected events as either earthquakes or underground explosions. Even identifying the earthquake of 1 August 1986 ( $m_b=4.3$ ) was not easy, and required extensive work before a positive identification could be made (Marshall et. al., 1989).

This study has shown that the calculation of body-wave magnitudes at regional distances needs to take into account the bias effects caused when using high-frequency filters. In fact, a positive bias of up to 0.5 magnitude units is introduced in the examples shown here, when comparing a 4-8 or 8-16 Hz filter band to a "teleseismic" 2-4 Hz band.

The 13 June 1995 event provides a particularly interesting case study for the Novaya Zemlya region. It highlights the fact that even for this well-calibrated region, where

numerous well-recorded underground nuclear explosions have been conducted, it is a difficult process to reliably classify a seismic event of approximate  $m_b$  3 1/2. It is also shown that supplementary data from a national network can provide useful constraints on event location, especially if the azimuthal coverage of the monitoring network is inadequate. It is clear from this study that more research is needed on regional travel-time calibration, regional signal characteristics and application of  $M_s$ : $m_b$  at regional distances. In applying the latter criterion, it would be particularly useful to estimate an upper confidence limit on  $M_s$  for events with marginal or non-detected surface waves.

## F. Ringdal

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**Table 7.4.1: List of the 42 underground nuclear explosions conducted at Novaya Zemlya during 1964-1990, as published by Mikhailov et al (1996). Seismic information is taken mostly from ISC or NEIS bulletins, supplemented by  $m_b$  values from Lilwall and Marshall (1986).**

| No    | Date     | Time (GMT) | Lat  | Lon  | Depth | mb   | Comment      |
|-------|----------|------------|------|------|-------|------|--------------|
| 1     | 64-09-18 | 7:59:57.8  | 73.3 | 55.4 | 0     | 4.20 |              |
| 2     | 64-10-25 | 7:59:58.8  | 73.5 | 53.7 | 0     | 4.82 |              |
| 3-4   | 66-10-27 | 5:57:57.7  | 73.4 | 54.9 | 0     | 6.47 | Double       |
| 5-6   | 67-10-21 | 4:59:58.4  | 73.4 | 54.4 | 0     | 5.99 | Double       |
| 7     | 68-11-07 | 10:02:05.3 | 73.4 | 54.9 | 0     | 6.11 |              |
| 8-9   | 69-10-14 | 7:00:06.2  | 73.4 | 54.8 | 0     | 6.18 | Double       |
| 10    | 70-10-14 | 5:59:57.1  | 73.3 | 55.1 | 0     | 6.77 |              |
| 11    | 71-09-27 | 5:59:55.2  | 73.4 | 55.1 | 0     | 6.63 |              |
| 12    | 72-07-27 |            | 71.0 | 54.0 |       |      | No detection |
| 13    | 72-08-28 | 5:59:56.5  | 73.3 | 55.1 | 0     | 6.46 |              |
| 14    | 73-09-12 | 6:59:54.3  | 73.3 | 55.2 | 0     | 6.96 |              |
| 15    | 73-09-27 | 6:59:58.0  | 70.8 | 53.9 | 0     | 5.83 |              |
| 16    | 73-10-27 | 6:59:57.4  | 70.8 | 54.2 | 0     | 6.90 |              |
| 17    | 74-08-29 | 9:59:55.5  | 73.4 | 55.1 | 0     | 6.54 |              |
| 18    | 74-11-02 | 4:59:58.0  | 70.8 | 53.8 | 0     | 6.75 |              |
| 19    | 75-08-23 | 8:59:57.9  | 73.4 | 54.6 | 0     | 6.55 |              |
| 20-21 | 75-10-18 | 8:59:56.3  | 70.8 | 53.7 | 0     | 6.70 | Double       |
| 22    | 75-10-21 | 11:59:57.3 | 73.4 | 55.1 | 0     | 6.59 |              |
| 23    | 76-09-29 | 2:59:57.4  | 73.4 | 54.8 | 0     | 5.77 |              |
| 24    | 76-10-20 | 7:59:57.7  | 73.4 | 54.6 | 0     | 4.89 |              |
| 25    | 77-09-01 | 2:59:57.5  | 73.4 | 54.6 | 0     | 5.71 |              |
| 26    | 77-10-09 | 11:00:00.3 | 73.6 | 53.2 | 0     | 4.51 |              |
| 27    | 78-08-10 | 7:59:57.7  | 73.3 | 54.8 | 0     | 6.04 |              |
| 28    | 78-09-27 | 2:04:58.2  | 73.4 | 54.7 | 0     | 5.68 |              |
| 29    | 79-09-24 | 3:29:58.3  | 73.4 | 54.7 | 0     | 5.80 |              |
| 30    | 79-10-18 | 7:09:58.3  | 73.3 | 54.8 | 0     | 5.85 |              |
| 31-32 | 80-10-11 | 7:09:57.0  | 73.4 | 55.0 | 0     | 5.80 | Double       |
| 33    | 81-10-01 | 12:14:56.8 | 73.3 | 54.8 | 0     | 5.91 |              |
| 34    | 82-10-11 | 7:14:58.2  | 73.4 | 54.6 | 0     | 5.52 |              |
| 35    | 83-08-18 | 16:09:58.6 | 73.4 | 54.9 | 0     | 5.84 |              |
| 36    | 83-09-25 | 13:09:57.7 | 73.3 | 54.5 | 0     | 5.71 |              |
| 37    | 84-08-26 | 3:30:00.0  | 74.1 | 53.8 | 0     | 3.80 | NORSAR only  |
| 38    | 84-10-25 | 6:29:57.7  | 73.4 | 55.0 | 0     | 5.77 |              |

| No | Date     | Time (GMT) | Lat  | Lon  | Depth | mb   | Comment |
|----|----------|------------|------|------|-------|------|---------|
| 39 | 87-08-02 | 1:59:59.8  | 73.3 | 54.6 | 0     | 5.71 |         |
| 40 | 88-05-07 | 22:49:58.1 | 73.4 | 54.4 | 0     | 5.52 |         |
| 41 | 88-12-04 | 5:19:53.0  | 73.4 | 55.0 | 0     | 5.79 |         |
| 42 | 90-10-24 | 14:57:58.1 | 73.4 | 54.7 | 0     | 5.60 |         |

**Table 7.4.2: List of additional seismic events at Novaya Zemlya from ISC bulletins, supplemented by NORSAR and regional array data.**

| No | Date     | Time (GMT) | Lat  | Lon  | Depth | mb  | Source         |
|----|----------|------------|------|------|-------|-----|----------------|
| 1  | 73-10-27 | 7:52:25.8  | 71.0 | 52.6 | 0     | 4.5 | ISC            |
| 2  | 73-10-27 | 8:03:58.2  | 71.0 | 52.7 | 0     | 4.5 | ISC            |
| 3  | 73-10-27 | 8:09:36.0  | 70.7 | 53.4 | 0     |     | ISC            |
| 4  | 73-10-27 | 8:21:21.8  | 71.0 | 52.6 | 0     | 4.6 | ISC            |
| 5  | 73-10-27 | 8:56:04.0  | 71.7 | 50.7 | 0     | 4.0 | ISC            |
| 6  | 73-10-27 | 9:13:51.3  | 71.2 | 51.8 | 0     | 4.6 | ISC            |
| 7  | 74-07-07 | 16:11:02.0 | 70.9 | 52.7 | 0     |     | ISC            |
| 8  | 74-07-22 | 1:32:21.5  | 70.7 | 53.5 | 0     |     | ISC            |
| 9  | 74-11-02 | 5:22:38.0  | 70.8 | 53.8 | 0     |     | ISC            |
| 10 | 78-11-15 | 8:30:00.0  | 73.4 | 55.0 | 0     | 3.6 | NORSAR         |
| 11 | 86-08-01 | 13:56:37.8 | 73.0 | 56.7 | 24    | 4.3 | Marshall et al |
| 12 | 87-08-25 | 14:00:00.0 | 74.1 | 54.6 | 0     | 3.2 | NORSAR         |
| 13 | 92-12-31 | 9:29:24.0  | 73.6 | 55.2 | 0     | 2.7 | Reg. arrays    |
| 14 | 95-06-13 | 19:22:37.9 | 75.2 | 56.7 | 0     | 3.5 | Reg. arrays    |
| 15 | 96-01-13 | 17:17:23.0 | 75.2 | 56.7 | 0     | 2.4 | Reg. arrays    |

**Table 7.4.3: Excerpts of Spitsbergen array automatic detection log corresponding to the times of two events discussed in the text (13 June 95 and 13 January 96). Note the interfering phase on 13 January, marked as \*).**

|             | Station | DPX    | Arrival_time   | Beam | SNR    | Vel   | Azi    | Phase |
|-------------|---------|--------|----------------|------|--------|-------|--------|-------|
| 13 Jun 1995 | SPI     | 911511 | 164:19.24.54.3 | S083 | 363.10 | 7.40  | 98.70  | Pn    |
|             | SPI     | 911513 | 164:19.24.57.8 | S021 | 5.40   | 6.10  | 95.80  | Px    |
|             | SPI     | 911514 | 164:19.25.02.1 | S077 | 9.30   | 7.30  | 94.00  | Px    |
|             | SPI     | 911515 | 164:19.25.04.7 | SI05 | 5.60   | 7.60  | 100.10 | Px    |
|             | SPI     | 911518 | 164:19.25.06.7 | SI04 | 3.20   | 7.60  | 94.80  | Px    |
|             | SPI     | 911523 | 164:19.26.38.1 | SI05 | 8.70   | 3.20  | 87.10  | Sn    |
|             | SPI     | 911525 | 164:19.26.41.9 | S076 | 8.10   | 3.80  | 89.80  | Sx    |
|             | SPI     | 911526 | 164:19.26.42.4 | S097 | 7.80   | 4.20  | 95.40  | Sx    |
| 13 Jan 1996 | SPI     | 620810 | 013:17.19.38.6 | S073 | 25.20  | 7.80  | 98.90  | Pn    |
|             | SPI     | 620813 | 013:17.19.42.3 | S084 | 9.60   | 7.10  | 97.20  | Px    |
|             | SPI     | 620816 | 013:17.19.43.0 | S058 | 5.80   | 7.20  | 94.40  | Px    |
|             | SPI     | 620818 | 013:17.19.47.9 | S074 | 6.70   | 7.00  | 97.30  | Px    |
|             | SPI     | 620820 | 013:17.21.17.3 | S066 | 4.60   | 12.00 | 306.90 | *)    |
|             | SPI     | 620821 | 013:17.21.24.3 | SI05 | 6.30   | 3.70  | 84.40  | Sn    |
|             | SPI     | 620823 | 013:17.21.26.8 | S075 | 5.50   | 3.90  | 83.80  | Sx    |

**Table 7.4.4: Magnitudes ( $m_b$  and  $M_s$ ) measured at ARCESS for the five events discussed in the text. The  $m_b$  values (2-4 Hz) have been normalized using  $m_b=5.6$  of the 24 October 1990 event as a reference, and the effect of choosing two higher frequency bands is also shown.**

|                            | ARCESS $m_b$ | "High-frequency" $m_b$ |         | ARCESS $M_s$ |
|----------------------------|--------------|------------------------|---------|--------------|
|                            | 2-4 Hz       | 4-8 Hz                 | 8-16 Hz | (20 s)       |
| 4 Dec 1988                 | 5.67         | 5.65                   | 5.71    | -            |
| 24 Oct 1990<br>(reference) | 5.60         | 5.60                   | 5.60    | 3.5          |
| 31 Dec 1992                | 2.75         | 3.16                   | 3.34    | -            |
| 13 Jun 1995                | 3.54         | 3.88                   | 3.85    | 2.4          |
| 13 Jan 1996                | 2.40         | 2.62                   | 2.81    | -            |

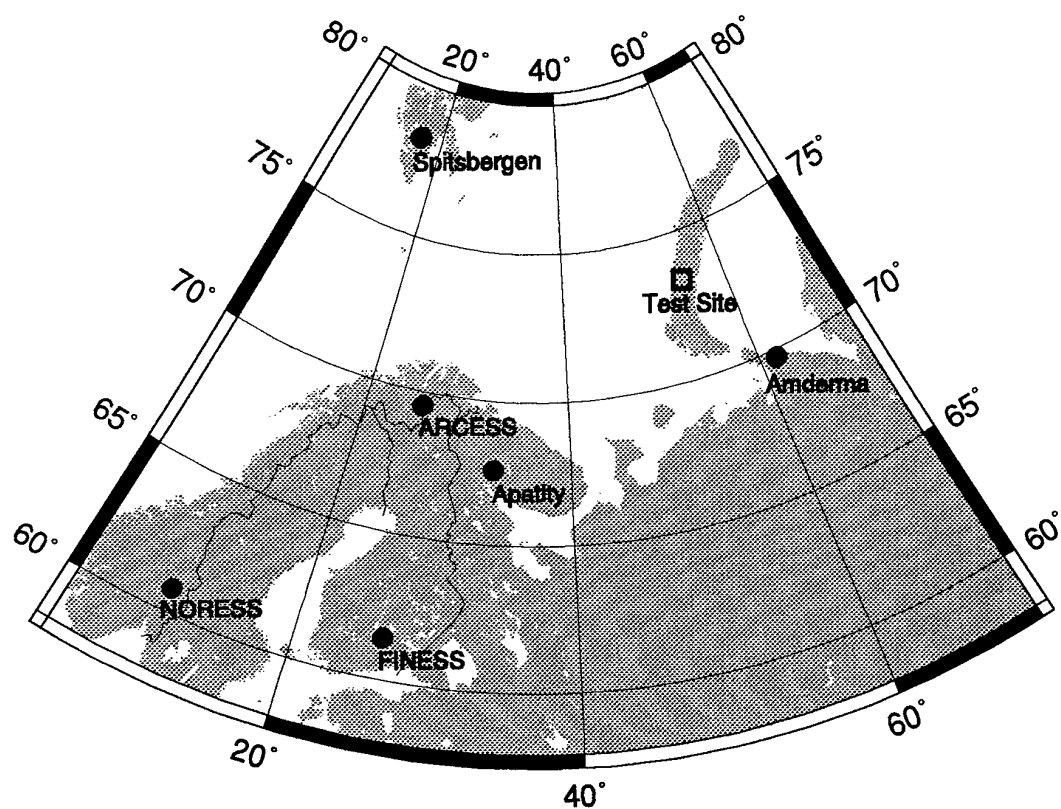


*Fig.7.4.1. Map showing the locations of regional arrays in Northern Europe. The location of the northern Novaya Zemlya nuclear test site is also shown.*

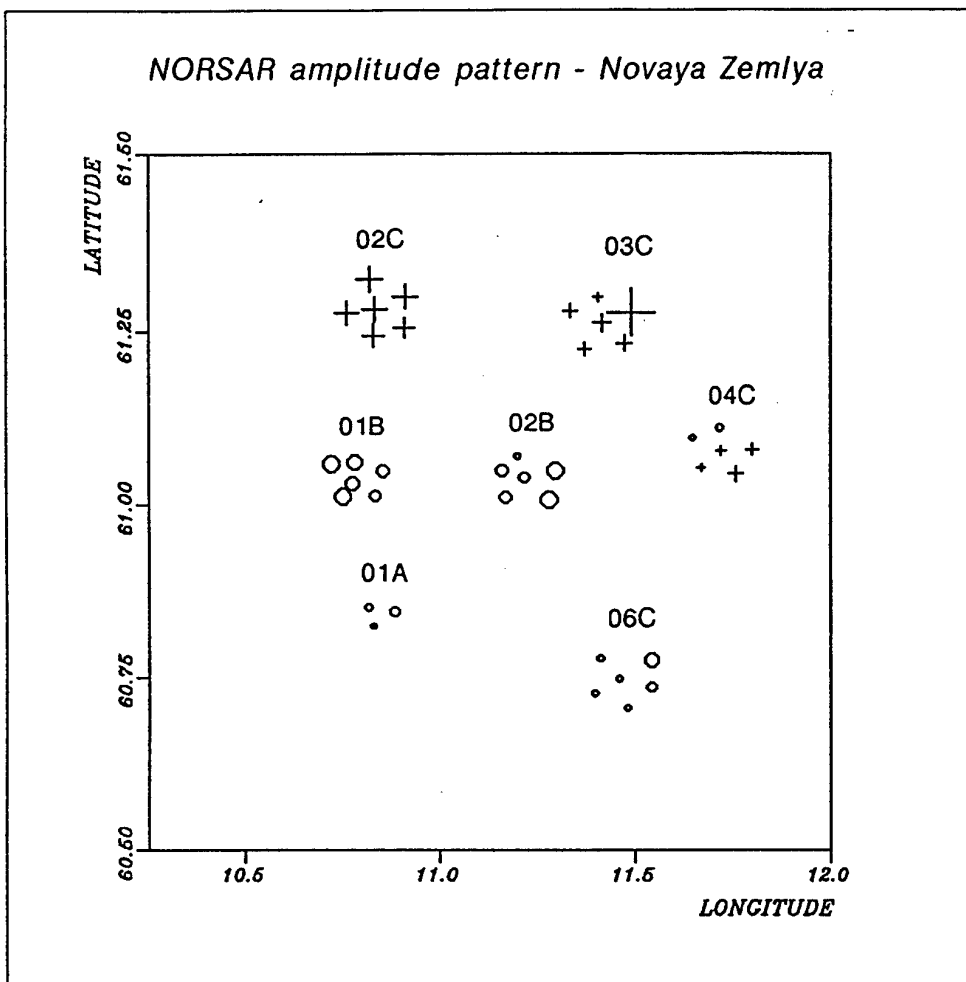


Fig. 7.4.2. Typical P-wave amplitude pattern across the NORSAR array for seismic events from the northern Novaya Zemlya test site. The symbols represent magnitude bias relative to average NORSAR  $m_b$ . Plusses indicate positive values, and the symbol size is proportional to the size of the bias. Note the high bias for all sites within subarray 02C, and the especially high bias value at 03C01. The range of the bias values is from +0.9 (03C01) to -0.3 (01B05).

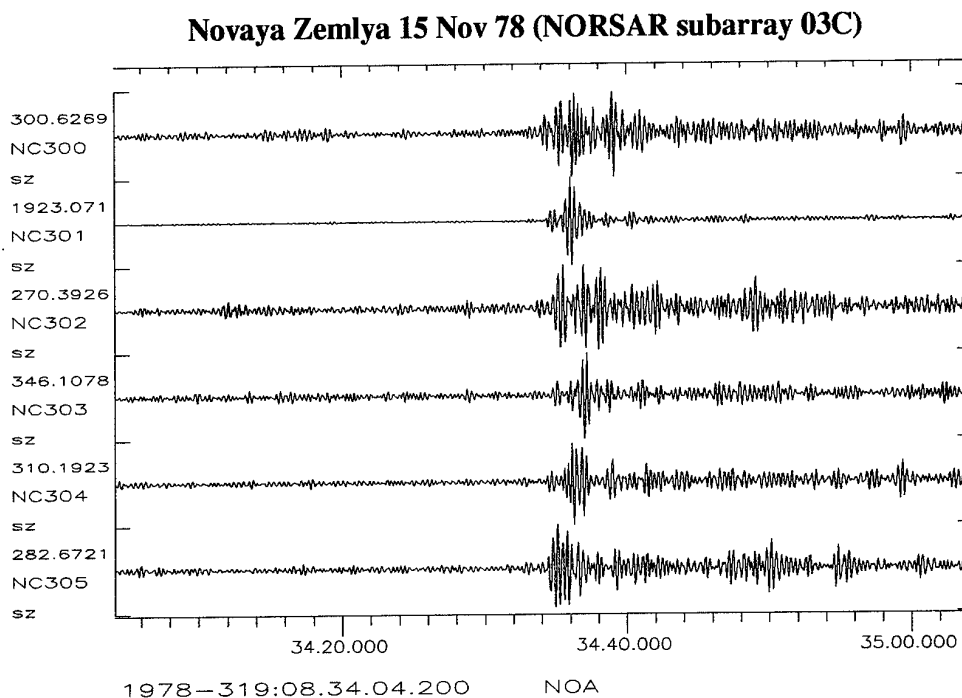
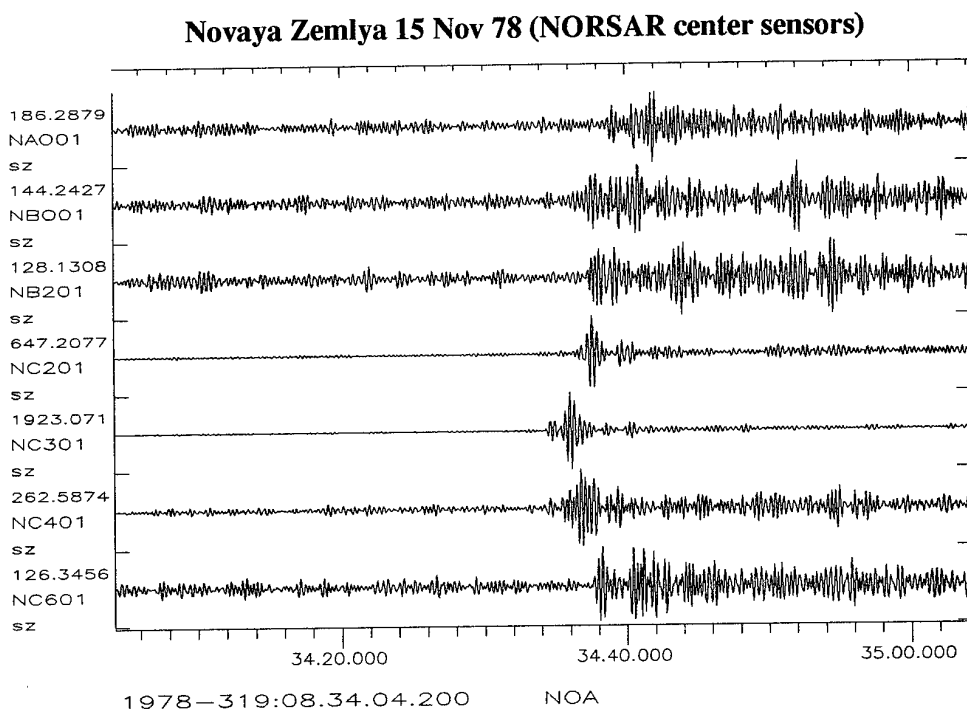
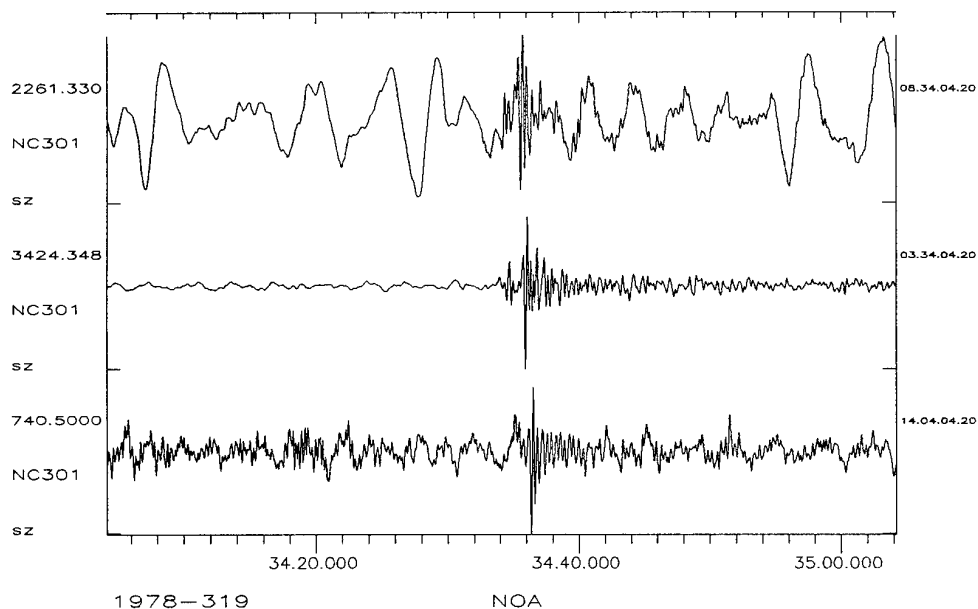


*Fig. 7.4.3a and b. Recordings of a Novaya Zemlya event (15 Nov 78) at the center sites of the NORSAR subarrays (top) and at all sites of subarray 03C (bottom). Data have been filtered in the band 2.5-4.5 Hz, and scaling factors are shown to the left of each trace. Note the large variations in amplitudes, signal shapes and signal-to-noise ratios.*

### NORSAR 03C01 data for 3 Novaya Zemlya events (unfiltered)



### NORSAR 03C01 data for 3 Novaya Zemlya events (2.5-4.5 Hz)

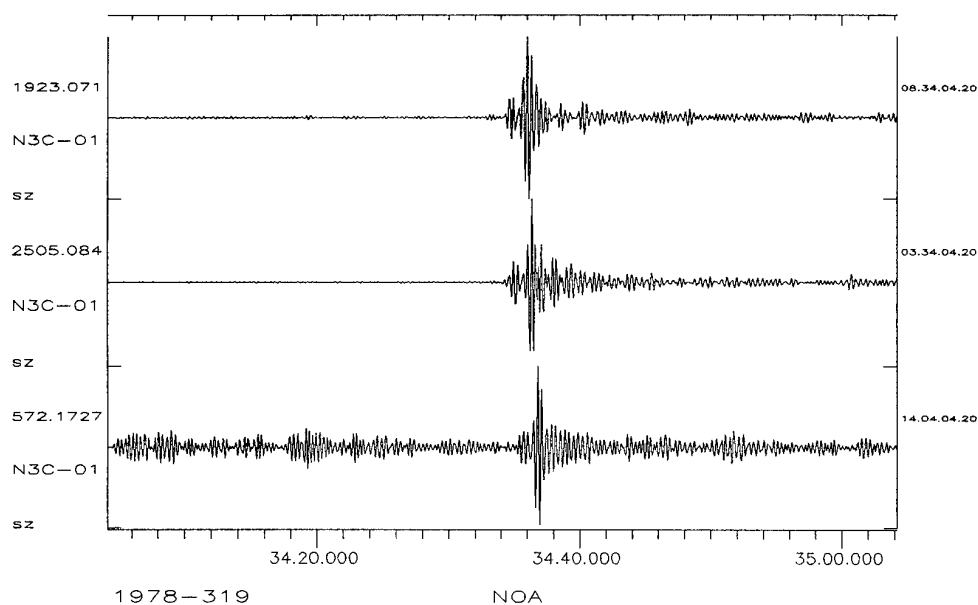


*Fig. 7.4.4 a and b. Comparison of recordings at NORSAR site 03C01 for three low-magnitude events near the northern Novaya Zemlya test site (from top to bottom 15 Nov 78, 26 Aug 84 and 25 Aug 87). Data are shown unfiltered (top) and in the 2.5-4.5 Hz passband (bottom). One of these (the middle trace, 26 Aug 84) is a confirmed nuclear explosion. Note the similarity of the three event recordings.*

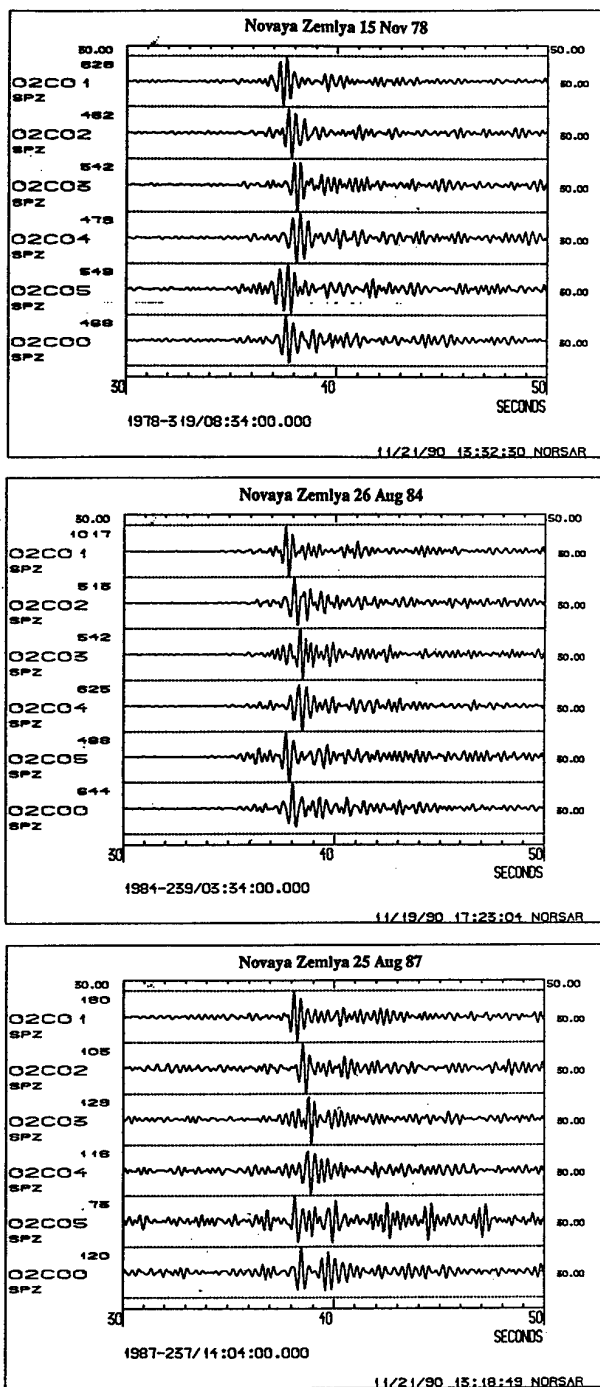


Fig. 7.4.5. Comparison of the same three events as displayed in Fig. 7.4.4, showing the recordings across a NORSAR subarray (02C). The signal patterns are very similar, with slight differences between the events that could be explained by a combination of local (near-source) scattering and interference of background seismic noise.

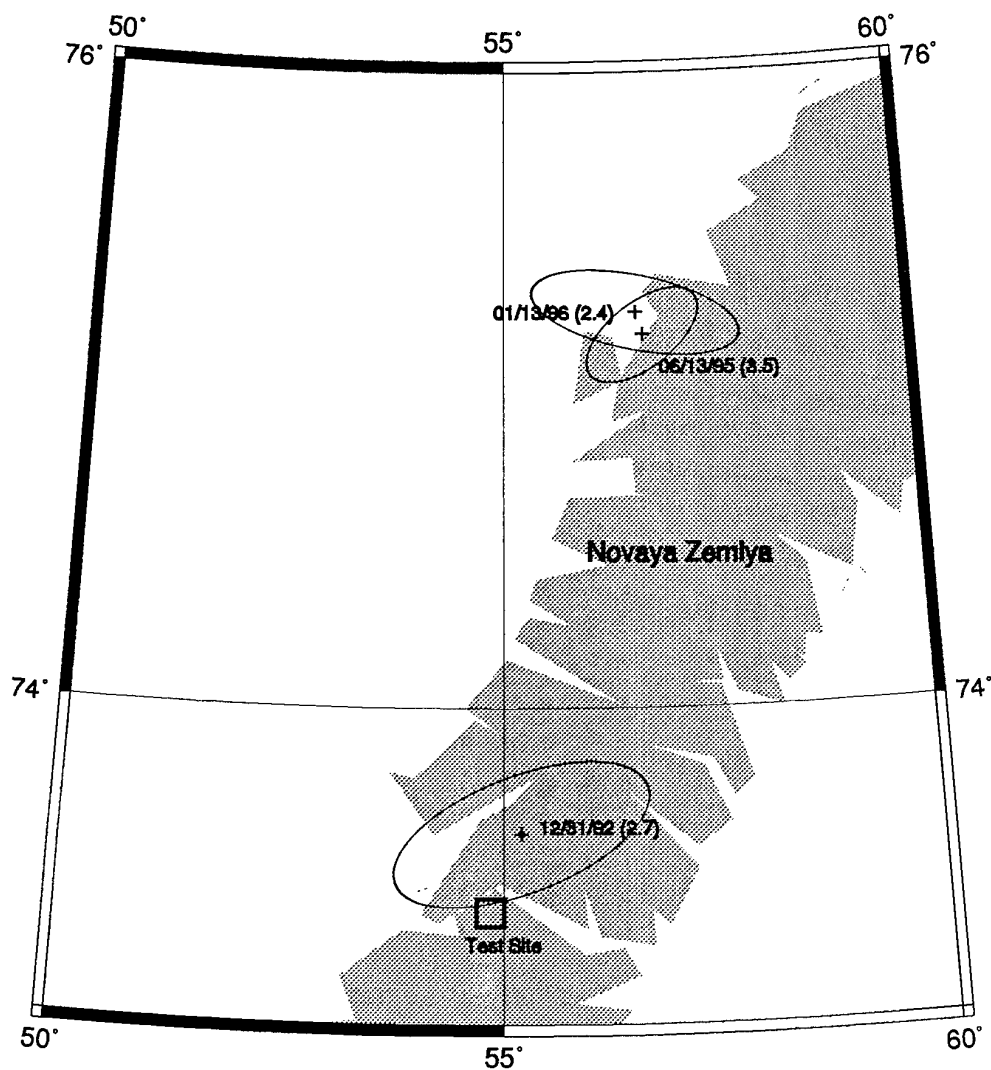


Fig. 7.4.6. NORSAR's location estimates of the three small events at Novaya Zemlya detected since 1992. The error ellipses (90% confidence) are based on assumed prior uncertainties in the regional travel-time tables and onset time readings, and must be taken as only a tentative indication of the actual epicentral accuracy.

## Novaya Zemlya 13 Jun 1995 — Spitsbergen

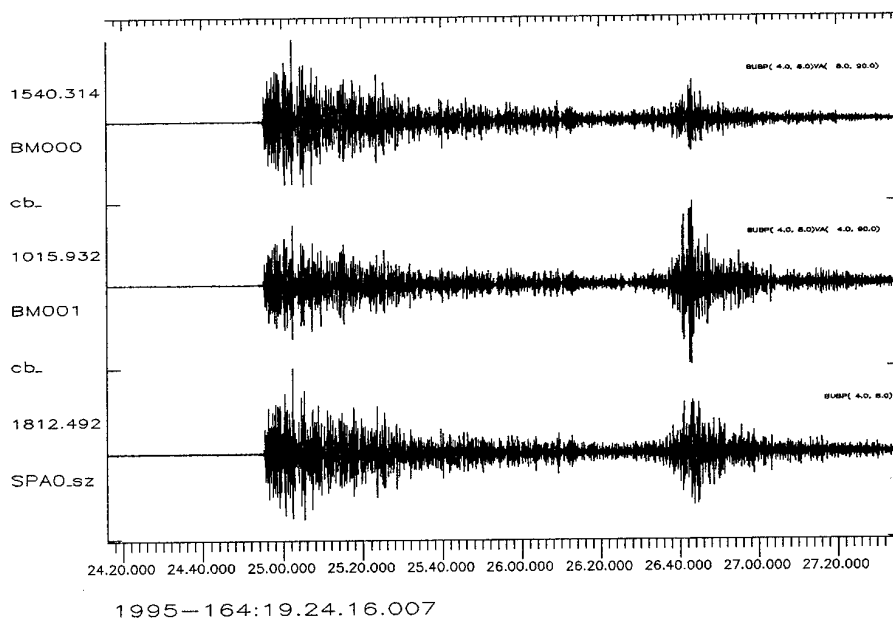


Fig. 7.4.7. Recordings by the Spitsbergen array of the event of 13 Jun 95. The traces represent (from top to bottom) an array beam steered with P-velocity toward the epicenter, an array beam with S-velocity and the array center sensor, each filtered in the band 4-8 Hz.

## Novaya Zemlya 13 Jan 1996 — Spitsbergen

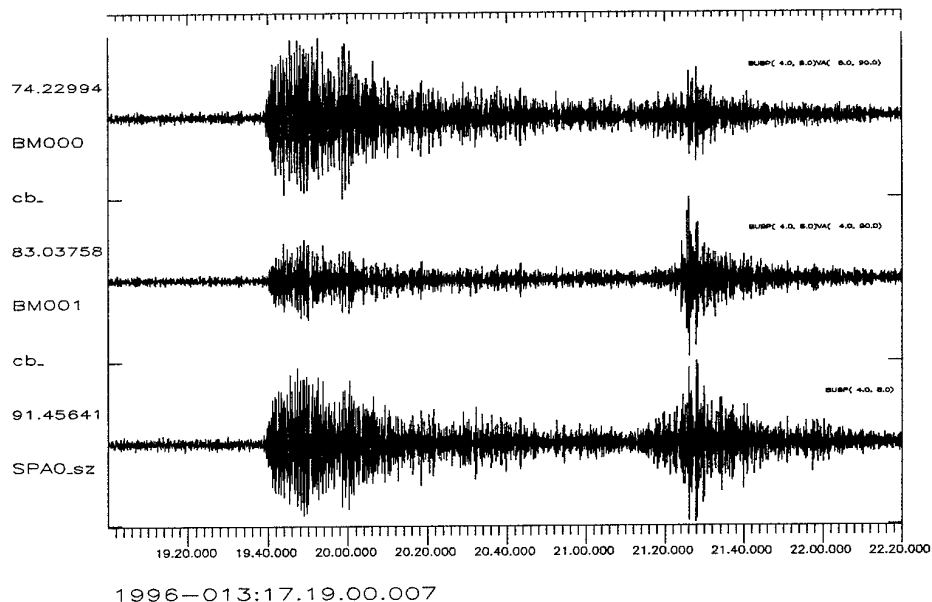


Fig. 7.4.8. Recordings by the Spitsbergen array of the event of 13 Jan 96. The traces represent (from top to bottom) an array beam steered with P-velocity toward the epicenter, an array beam with S-velocity and the array center sensor, each filtered in the band 4-8 Hz. Note the similarity to Fig. 7.4.7.

## ARCESS data for 5 Novaya Zemlya events (4-8 Hz)

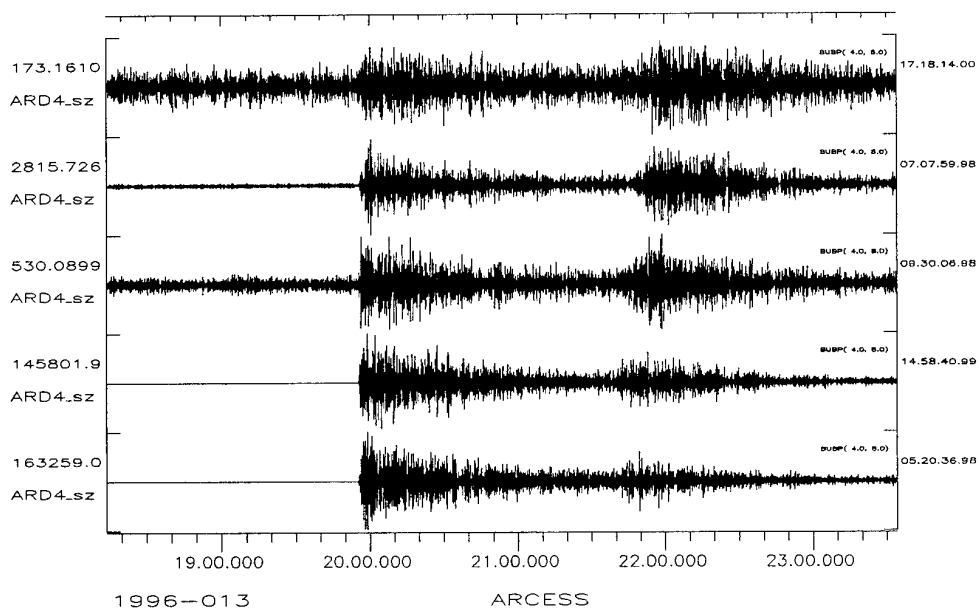


Fig. 7.4.9. Bandpass filtered recordings (4-8 Hz) of the ARCESS D4 sensor for 5 Novaya Zemlya events. From top to bottom: 13 Jan 96, 13 Jun 95, 31 Dec 92, 24 Oct 90 and 4 Dec 88. Note the variations in P/S ratios.

## ARCESS data for 5 Novaya Zemlya events (8-16 Hz)

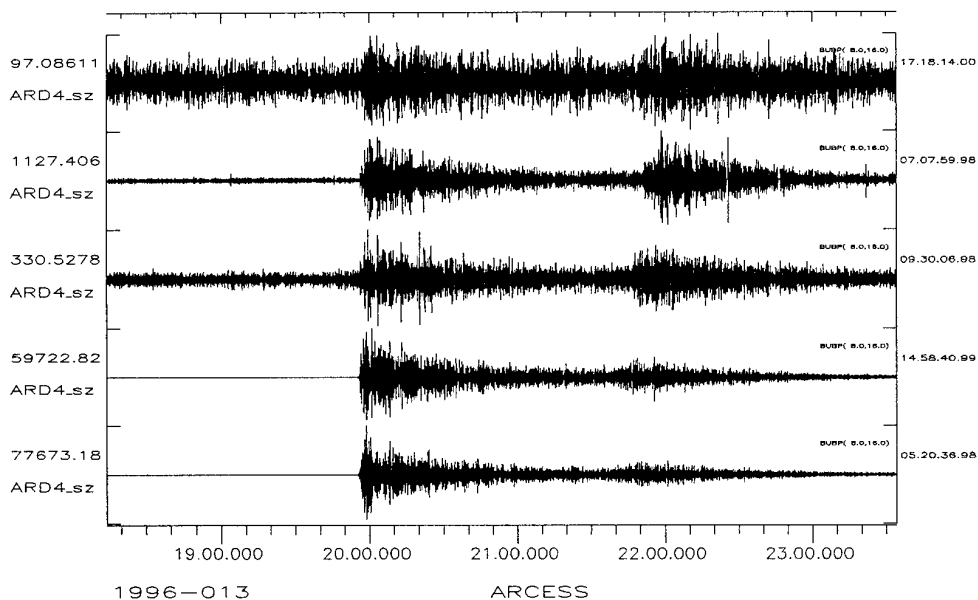


Fig. 7.4.10. Same as Fig. 7.4.9, but for the 8-16 Hz filter band.

## ARCESS P-beams for 5 Novaya Zemlya events (2-4 Hz)

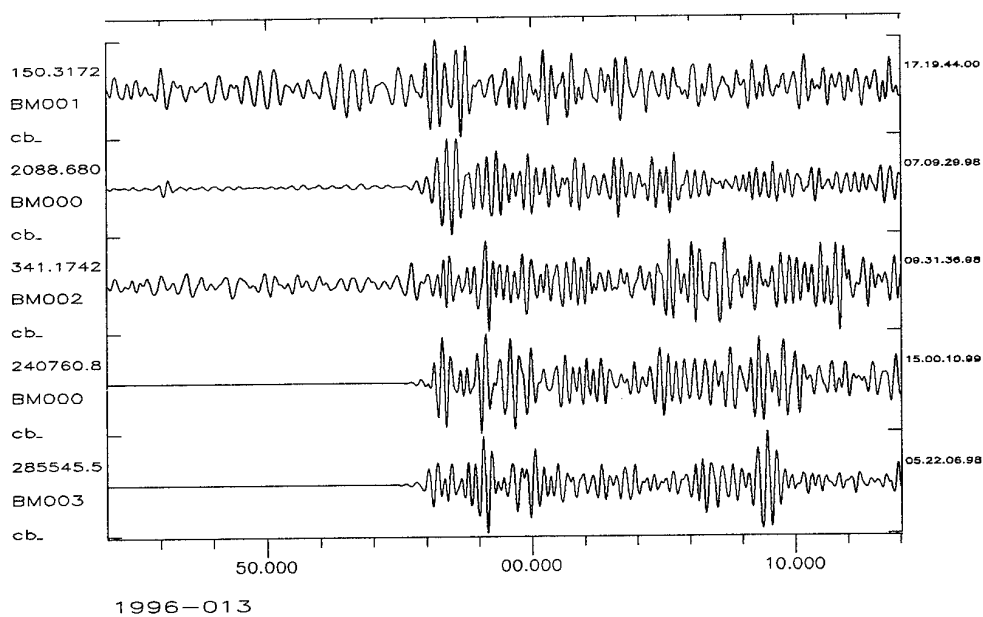


Fig. 7.4.11. P-waves (ARCESS array beam) for five Novaya Zemlya events. From top to bottom: 13 Jan 96, 13 Jun 95, 31 Dec 92, 24 Oct 90 and 4 Dec 88. The data have been filtered in the 2-4 Hz band, which is not the best band for detection, but which provides consistency in magnitude estimates between large and small events. Scaling factors are shown to the left of each trace.

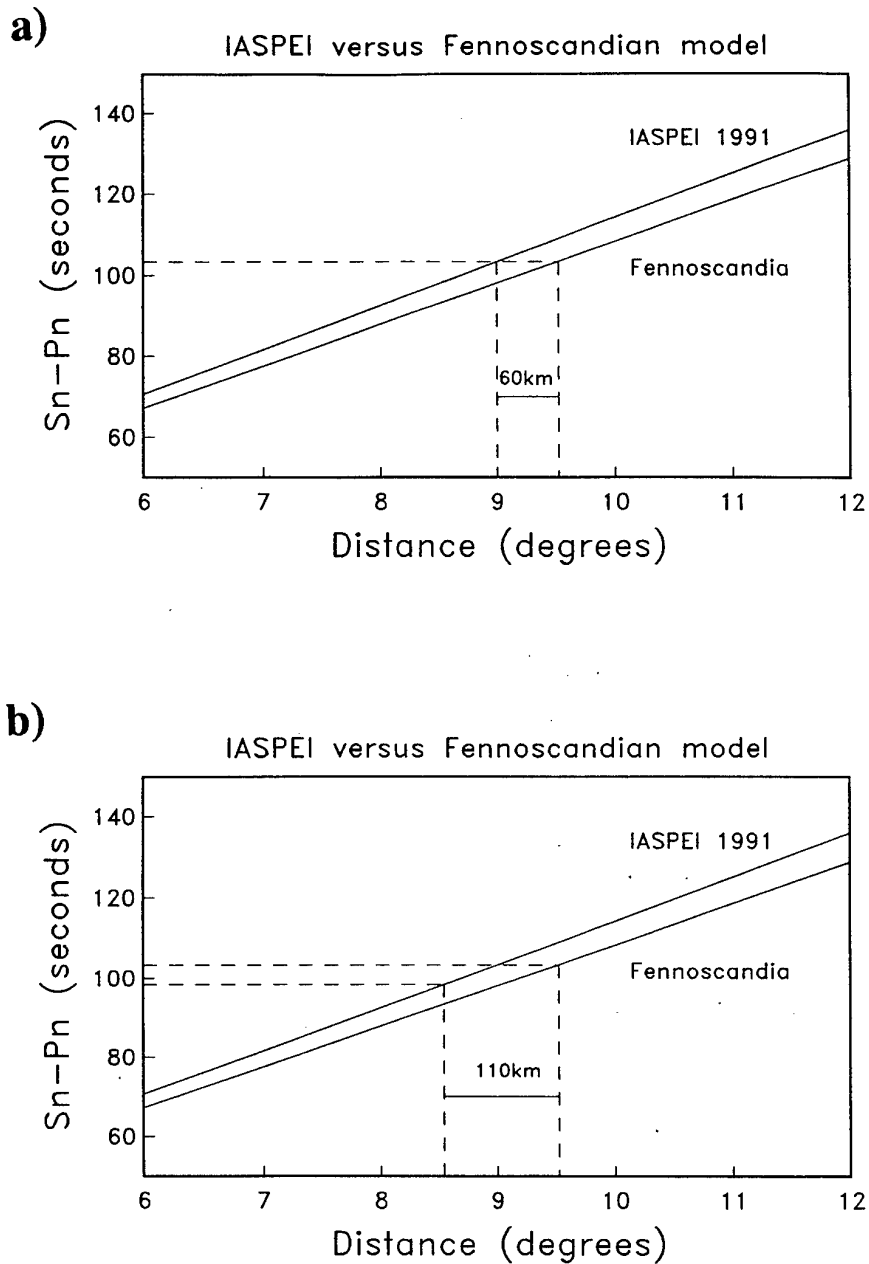


Fig. 7.4.12. Illustration of differences in epicentral distance estimates as discussed in the text:

- a) "Error" resulting from applying the IASPEI91 traveltime curves rather than the Fennoscandian model. The difference is about 60 km for the Spitsbergen array.
- b) Combined "error" resulting from applying an uncorrected model as well as reading the S-phase at Spitsbergen 5 seconds early. The location "error" in this case amounts to about 110 km.

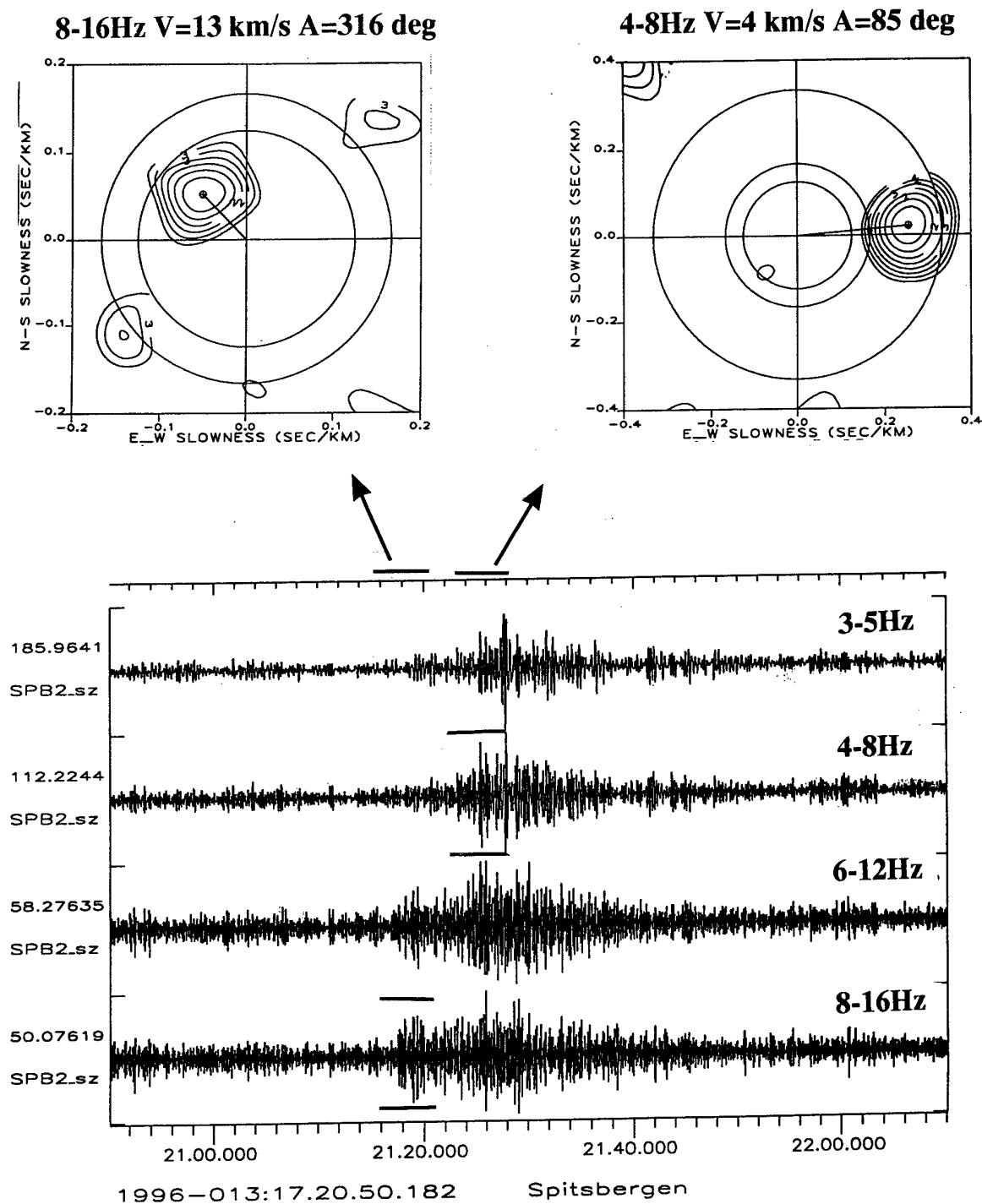


Fig. 7.4.13. Recordings of the January 13, 1996 event at the Spitsbergen B2 seismometer, in four different filter bands. Note the local P-phase preceding the S-phase from the Novaya Zemlya event. This P-phase has both a different f-k solution and different spectral characteristics compared with the S-phase following it.

## 7.5 Study of the calibration explosion on 29 September 1996 in the Khibiny Massif, Kola Peninsula

### *Introduction*

On 29 September, 1996, a 350 ton industrial explosion was carried out in the Kola Peninsula, Russia. The explosion was detonated in an underground mine in the Khibiny Massif, with coordinates 67.675N, 33.728E. The explosion was applied to provide data to calibrate the GSETT-3 network in this region.

The calibration experiment was carried out as a joint cooperative project between the Ministry of Defense of the Russian Federation and the Kola Regional Seismological Centre of the Russian Academy of Sciences. NORSAR participated in this experiment by providing seismic recordings as well as contributing to the data analysis. The explosion was recorded by several stations in the GSETT-3 network, all of them at regional distances. The event was listed in the Reviewed Event Bulletin (REB) of the IDC with coordinates 67.57N, 32.54E and a magnitude ( $M_L$ ) of 3.4.

In this paper we analyze available recordings of this explosion, with emphasis on recordings by stations at local distances. We further compare the signal characteristics to those of previously recorded underground explosions in the same mine. The IDC location estimates of this suite of explosions is compared to their true locations, and the differences are used to suggest a velocity model that is expected to largely eliminate systematic bias in the IDC location results for events in this region.

### *The Khibiny Massif*

The Khibiny Massif occupies a mountainous territory of 1327 square kilometers in the central part of the Kola Peninsula, northwestern Russia. The complex is part of the Kola Alkaline Province of the Baltic Shield. The eastern edge of Khibiny is only 5 km away from the Lovozero massif, therefore these massifs can be regarded as two parts of a single intrusive complex having similar ages. These alkaline intrusions consist of nearly the same rock types but differ in their internal structure.

The Khibiny massif intrudes in the contact zone between Archaean gneisses and Middle Proterozoic volcanic-sedimentary complexes. According to geophysical data and drilling, the outer edges of the massif are vertical down to a depth of 3 km. At deeper levels the western and southern edges plunge towards the center at an angle of 50-60 degrees. The eastern edge dips outwards at an angle of 80 degrees thus showing a possible joining with the Lovozero complex.

### *Khibiny Seismicity and Mining Activity*

The exploitation of the Khibiny apatite ores started in 1930 and since then about  $2.5 \cdot 10^9$  tons of the rock have been excavated from an area of about 10 sq. km. At the present time more than  $10^8$  tons of ore are extracted annually from three underground and three open-pit mines. The velocity of the uplift of the near-surface parts is of the order of 70 mm/year for some tunnels (Panasenkov and Yakovlev, 1983).

Seismic activity in the Khibiny Massif has shown a significant increase since 1980. Two main factors seem to be jointly contributing to this increased activity. One is the change in tectonic stress regime caused by the removal of large masses of rock, the second is an apparent earthquake triggering effect observed in connection with some of the explosions.

During the time period since 1980 the annual ore excavation at the Khibiny mines has increased from 19.1 to 46.5 million tons. A correspondence between the amount of annual ore extraction and the energy release of recorded earthquakes was demonstrated by Kremenetskaya and Trjapitsin (1995). They explained this effect as a result of the disruption of the natural geodynamic process in the area, causing a redistribution of crustal stresses which in turn has led to increased seismicity.

Kremenetskaya et. al.(1995) made a detailed study of the proposed triggering effect, and showed that underground explosions in Khibiny in many cases act as a direct trigger of rockbursts. Such triggering effects were demonstrated to take place when the depth of the mining exceeds 100 meters. Currently about 30% of all underground explosions have been found to trigger significant rockbursts, i.e., rockbursts that are detectable at a distance of at least 50 km. The triggered rockbursts usually occur within a few tens of seconds after the explosion. These studies did not reveal any similar triggering effect for open-pit mining explosions in Khibiny.

There are 6 mines in the Khibiny Massif (see Table 7.5.1). Mines 1, 2 and 3 have underground parts and quarries, whereas at mines 4, 5 and 6 there are open (quarry) explosions only. At mines 1 and 2 the underground and open (quarry) explosions take place on the same day, sometimes at very close times, (within several seconds or minutes). At mine 3 underground and open explosions are usually carried out on different days.

**Table 7.5.1: Reference numbers and coordinates of the Khibiny mines**

| Name        | Mine No | Latitude | Longitude |
|-------------|---------|----------|-----------|
| Kirovsk     | 1       | 67.670   | 33.729    |
| Yukspor     | 2       | 67.647   | 33.761    |
| Rasvumchorr | 3       | 67.631   | 33.835    |
| Central     | 4       | 67.624   | 33.896    |
| Koashva     | 5       | 67.632   | 34.011    |
| Nyurkпах    | 6       | 67.665   | 34.146    |

The underground explosions are single (ripple-fired) explosions with typical shot delays of 20-35 ms and typical total duration of a few hundred milliseconds.

The quarry explosions are made by separate charges situated at different places (distances up to 2 km) and the time interval between the individual explosions amounts to several tens of minutes.

Aggregate yield (total weight of explosive material) is typically:

- 15-400 t for underground explosions (mines 1,2,3, single (ripple-fired) charge);
- 0.5-50 t for quarry explosions at mines 1,2,3 (separate charges)
- 10-400 t for quarry explosions at mines 4,5,6 (separate charges)

The main source of information on types and yields of the explosions is the mine administration, whereas data on their times and magnitudes are taken from seismic recordings.

### ***The Station Network***

The regional seismic network in the Kola Peninsula currently comprises 7 seismic stations, as described by Kremenetskaya et. al. (1995). For the present study of the calibration explosion, only those stations with digitally recording equipment have been used. In addition, several stations in Fennoscandia recorded the calibration event, but we have only used data from the nearest station, the ARCESS array (distance about 400 km), in our analysis. All the station data are available both at NORSAR (Kjeller) and at KRSC (Apatity) via a dedicated satellite link connecting the two data centers. The stations are listed in Table 7.5.2, and a brief description is given in the following.

**Table 7.5.2: List of seismic stations used in this study**

| Name              | Latitude | Longitude |
|-------------------|----------|-----------|
| APZ9 (Broadband)  | 67.568N  | 33.388E   |
| PLQ               | 66.410N  | 32.750E   |
| ARCESS (Array)    | 69.534N  | 25.511E   |
| APA0 (HF element) | 67.603N  | 32.994E   |
| APA0 (Array)      | 67.603N  | 32.994E   |

The Apatity array was installed in late September 1992, approximately 17 km to the west of KRSC in Apatity, at the location indicated in Fig. 7.5.1. The seismometers are placed on two concentric rings plus one in the center, and the aperture is approximately 1 km. Sampling rate for the array elements is 40Hz. The center element contains in addition a 3-component high-frequency system, with sampling rate of 80Hz. Seismic data registered at the array site are digitized on-site and transmitted via three radio channels to Apatity, where an array controller of type NORAC receives, time-tags and stores the data. Timing is provided by a GPS receiver.

The Apatity station APZ9 is a 3-component Guralp broadband system installed in 1991 in the town of Apatity. The location relative to the Khibiny Massif is shown in Fig. 7.5.1. The data are digitized at a sampling rate of 40Hz and multiplexed with the array data before being stored on disk and magnetic tape.

The station PLQ is normally operated as an analog recording station, but for the purpose of this experiment, a 3-component digital system was installed at this site. Timing was provided by GPS, and the data sampling rate was 50 Hz.

The ARCESS array in northern Norway comprises 25 SP seismometers distributed in four concentric rings together with a center element. The array diameter is 3 km. Data are digitized on-site (sampling rate 40 Hz), time-tagged using a GPS clock and transmitted by satellite to the NORSAR Data Center at Kjeller.

### **Data**

According to information available at this time, the parameters for the calibration explosion were as follows:

Date: 29 September, 1996

Origin time: 06.05.46.2 (GMT)

Total charge size: 350 tons

Location: 67.675N, 33.728E (inside Mine 1)

The explosion was ripple-fired, in 18 separate stages and a time delay of 23 ms between each stage. Each stage of the explosion comprised 200 separate explosive charges in individual boreholes, detonated simultaneously. The total duration of the explosion was 400 ms, which is similar to, although slightly shorter, than the duration of usual mining explosions of comparable size.

The explosive charges were distributed over an area covering 70 by 95 meters, as illustrated in Fig. 7.5.2. This figure also shows the location of the calibration explosion relative to selected other large explosions in the same mine.

### **Waveform recordings**

Short period seismic recordings for the stations in the Kola Peninsula are shown in Figs. 7.5.3 through 7.5.6. These stations are all at local distances (less than 200 km) and the seismic phases P, S and Rg can be clearly identified. As is well known, the presence of the Rg phase is indicative of the shallow depth of the explosion, and Rg is in fact the largest amplitude phase on the seismogram. Fig. 7.5.7 shows a summary plot of the SPZ sensor trace for each of the stations used in this study.

We have calculated the signal-to-noise ratio (SNR) of the P-wave at each of the stations. Not unexpectedly, the SNR, which represents the maximum linear ratio STA/LTA, is highest (more than 1000) for the array beam at the Apatity array. However, even for the 3-component station PLQ (and also for the ARCESS array) the SNR exceeds 100.

In comparison, SNR for other GSETT-3 stations recording this event is at best around 10, even though these stations are also within a relatively short distance (about 10 degrees or less) from the epicenter. This emphasizes the usefulness of the local recordings, not only in terms of detectability, but perhaps more importantly: the onset time readings at these stations can be made with a far higher precision than for low-SNR stations at greater distances. This is part of the problem of location precision that will be further addressed below.

### *Automatic detection processing*

All of the arrays in the regional network, with the exception of PLQ, have telemetry to the NORSAR data center at Kjeller. This enables continuous automatic detection processing to be made, supplemented by interactive analysis of the detected signals. Such analysis is carried out both at NORSAR and at KRSC. The resulting regional bulletins complement the bulletins produced at the GSETT-3 IDC, and provide a useful reference for evaluation and calibration purposes. NORSAR has produced such regional bulletins since 1989.

The regional processing algorithms in use at the NORSAR Data Center comprise the following steps:

- Automatic single array processing, using a suite of bandpass filters in parallel, and a beam deployment that covers both P and S type phases for the region of interest.
- An STA/LTA detector applied independently to each beam, with broadband f-k analysis for each detected phase in order to estimate azimuth and phase velocity.
- Single-array phase association for initial location of seismic events, and also for the purpose of chaining together phases belonging to the same event, so as to prepare for the subsequent multiarray processing.
- Multi-array event detection, using the Generalized Beamforming approach (Ringdal and Kværna, 1989) to associate phases from all stations in the regional network, and thereby provide automatic network locations for events in all of northern Europe.

The processing steps described above result in an automated bulletin that is made available on-line via the Internet. Experience over the past several years has demonstrated that the procedure described above is extremely efficient, and is furthermore "complete" in the sense that it provides an exhaustive search of all possible phase combinations that could correspond to real events. The processing steps described above have now been adopted, with appropriate modifications, at the IDC for global processing, and are also gaining use for other networks.

The automatic bulletin produced by the NORSAR Generalized Beamforming for the Kola calibration event is shown in Table 7.5.4. As can be seen, a total of 25 phases from the regional array network have been associated to this event, with 13 phases used in the automatic location process. The resulting location (67.75N, 33.65E) is quite close to the true location of the event, and forms a useful starting point for further interactive processing.

### *Location and signal characteristics*

Because of the excellent coverage of stations at local distances, we have been able to estimate a very accurate location of the calibration event by interactive analysis of the available seismic data (see Fig. 7.5.1). However, in the context of the GSETT-3 experimental monitoring system, the location problem becomes far more difficult because of the sparseness of the GSETT-3 network. Partly, the difficulties are related to the problems in reading accurate phase onsets at low SNR. Another problem is the possible inaccuracy of the seismic travel time curves employed for this region. Such inaccuracy will cause a systematic mislocation, whereas the uncertainty in onset time readings could cause a mixture of ran-

dom error and systematic error (the latter occurring, e.g., if P-wave arrivals are read consistently late).

We have collected data for all large underground explosions in Mine 1 so far during GSETT-3, and compared the IDC solutions to the actual epicenters. The events (15 in all) are listed in Table 7.5.3. Fig. 7.5.8 is a plot showing the IDC locations for these events. The explosions are mislocated by typically 20-30 km. A systematic shift in epicenters is clearly seen, with a general shift westwards compared to the true location.

**Table 7.5.3: Explosions in Khibiny Mine 1 processed by the IDC**

| DATE       | IDC<br>Origin time | Latitude<br>(IDC) | Longitude<br>(IDC) | Yield<br>tons | M <sub>L</sub><br>IDC | M <sub>L</sub><br>KRSC |
|------------|--------------------|-------------------|--------------------|---------------|-----------------------|------------------------|
| 1995/01/22 | 04:27:07.2         | 67.5400           | 33.2600            | 136           | 2.1                   | 2.1                    |
| 1995/02/12 | 03:34:54.1         | 67.6800           | 33.0200            | 131           | 2.2                   | 2.6                    |
| 1995/03/19 | 03:15:05.3         | 67.6000           | 33.4100            | 67            | 2.2                   | 2.4                    |
| 1995/04/02 | 03:26:43.4         | 67.6100           | 32.6900            | 59            | 2.5                   | 2.8                    |
| 1995/05/21 | 03:23:35.3         | 67.5900           | 32.5800            | 123           | 3.7                   | 2.2                    |
| 1995/07/30 | 09:23:40.9         | 67.5600           | 32.8200            | 100           | 3.6                   | 2.1                    |
| 1995/10/01 | 04:27:58.4         | 67.5600           | 32.7500            | 152           | 3.9                   | 2.1                    |
| 1995/10/29 | 04:53:45.0         | 67.6100           | 32.7700            | 156           | 3.2                   | 2.7                    |
| 1995/12/11 | 04:42:17.4         | 67.5200           | 33.1600            | 245           | 3.3                   | 2.4                    |
| 1995/12/31 | 03:45:18.4         | 67.5600           | 33.0200            | 100           | 3.3                   | 2.3                    |
| 1996/01/28 | 03:47:17.9         | 67.7100           | 33.3500            | 148           | 3.1                   | 2.0                    |
| 1996/03/31 | 03:40:24.9         | 67.5200           | 32.8400            | 92            | 3.1                   | 2.0                    |
| 1996/06/23 | 02:34:15.3         | 67.5200           | 32.6300            | 82            | 3.0                   | 2.4                    |
| 1996/07/28 | 03:14:31.0         | 67.6700           | 33.2800            | 95            | 2.9                   | 2.4                    |
| 1996/09/29 | 06:05:50.0         | 67.5700           | 32.5400            | 350           | 3.4                   | 2.9                    |

We have carried out a simple experiment to model the combination of random and systematic errors causing the observed scatter in IDC locations. In this model, we used only the parameters that are the most significant for the IDC solutions, namely, the arrival times of P and S phases from ARCESS, NORESS and FINESS. We did not consider azimuths, since these have relatively modest effect on the network location estimates.

For each of the phases mentioned above, we assigned a random uncertainty of 1.0 seconds (P) or 2.0 seconds (S). While these values may seem high, especially for the P-phase, it must be remembered that low SNR contributes to the reading uncertainty, especially for the more distant stations. Furthermore, we assumed a systematic error in the IDC velocity model of 0.15 km/sec (P-waves) and 0.09 km/sec (S-waves) for this area.

The resulting 90 per cent "uncertainty" ellipse is shown in Fig. 7.5.8, and seems to correspond well to the actually observed data. Thus, a first order correction to the model would be quite simple to make, and as a result the epicenters would be shifted towards the true location, although the scatter would not be reduced. In practice, station-specific travel time corrections would probably be the simplest way to implement this improvement. This is also consistent with the general philosophy now applied at the IDC, which is based upon global and regional geographical grid systems of varying density to assign regional calibration corrections.

We note that the travel-time corrections introduced on the basis of this calibration explosion could be expected to be appropriate for the general Khibiny region, not just Mine 1. An interesting question is to which extent these corrections would apply to the entire Kola Peninsula, or more generally, the Baltic Shield as a whole. This will require extensive study, and is outside the scope of this paper.

A comparison of the waveforms of 5 large underground explosions at Mine 1 is shown in Fig. 7.5.9. The recordings have been made by the vertical component of the High-frequency element in the Apatity array. The calibration explosion (bottom of the figure) is not possible to separate from most of the other explosions, based upon the waveform characteristics. The only explosion that appears different is explosion no. 2 from top (5 Dec. 93), which has a relatively much larger Rg phase than the others, and correspondingly lower proportion of high frequency energy.

We have investigated the explosion of 5 Dec. 93 in some detail, and have found that it was followed by a significant number of rockbursts. It is therefore possible that there was some tectonic release occurring simultaneously with the explosion, and that this could explain the anomalous recording. None of the other explosions in this figure had a similar after-shock sequence, although the calibration event was in fact followed by a few rockbursts. In conclusion, the seismic "signature" of the calibration event is not unusual compared to other explosions in the same mine.

We also make a note on the magnitudes provided in Table 7.5.3. The IDC magnitudes were generally lower than our ML values during the first half of 1995, but have been significantly larger since then. This is because the IDC changed its local magnitude estimation procedure at that time. The KRSC magnitude estimates are consistent throughout the period, and have in fact been shown to have a good correlation with yield, when considering underground mining explosions in Khibiny in general (Kremenetskaya, Asming and Ringdal, 1995).

### **Conclusions**

The calibration explosion of 29 September 1996 has provided valuable data for the purpose of improving the routine location process at the IDC for the Khibiny area. The excellent recordings achieved by the stations in the Kola Peninsula could prove useful also for more detailed geophysical investigations, including mapping the crustal velocity structure.

This explosion has been one of the first conducted for calibration purposes in GSETT-3. There is clearly a need for additional such explosions in various areas, including other

explosions in Fennoscandia to validate the travel-time corrections for other areas. In addition, the efforts to obtain detailed "ground truth" data for selected mining explosions should continue.

It has been argued that calibration events are most useful if they are large enough to be detected teleseismically. While this is generally true, it seems unrealistic to obtain such events in all regions of the world where calibration is needed. Calibration explosions that are recorded only at regional distances are therefore also important, and will contribute to improve the processing of many small events that might otherwise be significantly mislocated in the IDC bulletin.

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Table 7.5.4: Kola explosion 29.09.96 — NORSAR's automatic Generalized Beamforming solution

Origin time      Lat      Lon      Azres      Timres      Wres      Nphase      Ntot      Nsta      Netmag  
 1996-273:06.05.46.0      67.75      33.65      9.63      1.86      4.27      13      25      5      2.41

| Sta | Dist  | Az    | Ph | Time       | Tres | Azim  | Ares  | Vel | Snr        | Amp     | Freq | Fkq | Pol | Arid   | Mag  |
|-----|-------|-------|----|------------|------|-------|-------|-----|------------|---------|------|-----|-----|--------|------|
| APA | 32.4  | 58.6  | Pg | 06.05.50.8 | -0.5 | 76.8  | 18.2  | 6.1 | 1249.<br>4 | 6678.8  | 1.26 | 1   |     | 221346 | -    |
| APA | 32.4  | 58.6  | Lg | 06.05.59.1 | 4.1  | 82.7  | 24.1  | 5.2 | 9.5        | 13516.3 | 4.71 | 3   | -3  | 221350 | 1.27 |
| ARC | 386.1 | 117.1 | Pn | 06.06.41.9 | 0.9  | 121.4 | 4.3   | 7.7 | 163.5      | 5055.7  | 5.74 | 2   | 1   | 221366 | -    |
| ARC | 386.1 | 117.1 | p  | 06.06.50.1 |      | 109.6 | -7.5  | 7.4 | 8.7        | 4648.5  | 2.34 | 1   | 1   | 221367 | -    |
| ARC | 386.1 | 117.1 | p  | 06.06.59.3 |      | 126.1 | 9.0   | 7.7 | 2.6        | 1177.0  | 5.87 | 3   |     | 221371 | -    |
| ARC | 386.1 | 117.1 | Sn | 06.07.22.7 | -2.1 | 126.3 | 9.2   | 4.4 | 4.7        | 5079.8  | 4.83 | 2   | -2  | 221373 | 1.96 |
| ARC | 386.1 | 117.1 | s  | 06.07.29.6 |      | 124.8 | 7.7   | 3.9 | 2.5        | 3785.3  | 1.63 | 2   |     | 221378 | -    |
| ARC | 386.1 | 117.1 | Lg | 06.07.32.6 | -1.4 | 112.4 | -4.7  | 3.7 | 6.9        | 5569.9  | 1.25 | 2   | -2  | 221381 | 2.02 |
| ARC | 386.1 | 117.1 | s  | 06.07.39.9 |      | 115.0 | -2.1  | 3.7 | 3.1        | 8202.0  | 1.94 | 1   | -3  | 221384 | 2.42 |
| ARC | 386.1 | 117.1 | s  | 06.07.45.3 |      | 116.7 | -0.4  | 3.7 | 2.5        | 8657.8  | 2.66 | 3   |     | 221385 | -    |
| ARC | 386.1 | 117.1 | Rg | 06.07.57.6 | 0.7  | 106.7 | -10.4 | 3.2 | 3.2        | 11081.5 | 0.86 | 1   |     | 221387 | -    |
| FIN | 790.8 | 23.9  | Pn | 06.07.29.9 | -0.5 | 23.6  | -0.3  | 8.2 | 7.4        | 111.1   | 5.27 | 3   |     | 221358 | -    |
| FIN | 790.8 | 23.9  | p  | 06.07.35.9 |      | 16.9  | -7.0  | 8.2 | 4.5        | 62.1    | 4.90 | 2   |     | 221363 | -    |
| FIN | 790.8 | 23.9  | p  | 06.07.38.9 |      | 24.7  | 0.8   | 8.5 | 6.3        | 116.1   | 4.81 | 2   |     | 221369 | -    |

| Sta | Dist   | Az   | Ph | Time       | Tres | Azim | Ares  | Vel | Snr | Amp    | Freq | Fkq | Pol | Arid   | Mag  |
|-----|--------|------|----|------------|------|------|-------|-----|-----|--------|------|-----|-----|--------|------|
| FIN | 790.8  | 23.9 | Sn | 06.08.58.0 | 6.2  | 25.7 | 1.8   | 5.0 | 2.5 | 371.4  | 2.53 | 1   |     | 221379 | 2.16 |
| FIN | 790.8  | 23.9 | s  | 06.09.09.7 |      | 13.1 | -10.8 | 4.6 | 2.9 | 561.2  | 2.82 | 1   |     | 221388 | -    |
| FIN | 790.8  | 23.9 | s  | 06.09.20.4 |      | 19.2 | -4.7  | 3.7 | 8.4 | 1455.6 | 1.33 | 1   |     | 221392 | -    |
| FIN | 790.8  | 23.9 | Lg | 06.09.30.7 | 3.5  | 22.4 | -1.5  | 4.2 | 2.7 | 1099.2 | 2.54 | 1   |     | 221398 | 2.63 |
| HFS | 1285.9 | 40.4 | Lg | 06.11.44.4 | -1.3 | 55.0 | 14.6  | 4.6 | 4.1 | 277.1  | 2.05 | 1   |     | 221374 | 2.99 |
| NRS | 1316.8 | 44.3 | Pn | 06.08.33.2 | -1.1 | 59.8 | 15.5  | 8.4 | 7.3 | 271.1  | 2.81 | 2   |     | 221357 | -    |
| NRS | 1316.8 | 44.3 | Sn | 06.10.42.6 | -1.0 | 60.3 | 16.0  | 4.2 | 2.9 | 441.8  | 2.20 | 2   | -1  | 221390 | 2.37 |
| NRS | 1316.8 | 44.3 | s  | 06.10.48.6 |      | 45.5 | 1.2   | 4.9 | 3.6 | 622.0  | 1.84 | 2   |     | 221397 | -    |
| NRS | 1316.8 | 44.3 | Lg | 06.11.55.4 | 1.1  | 39.8 | -4.5  | 3.8 | 2.8 | 1890.9 | 1.27 | 1   |     | 221405 | 2.64 |
| NRS | 1316.8 | 44.3 | s  | 06.12.01.4 |      | 52.2 | 7.9   | 4.7 | 2.7 | 597.9  | 2.33 | 2   |     | 221407 | 2.77 |
| NRS | 1316.8 | 44.3 | s  | 06.12.02.6 |      | 50.1 | 5.8   | 4.3 | 3.6 | 967.6  | 1.72 | 2   |     | 221412 | -    |

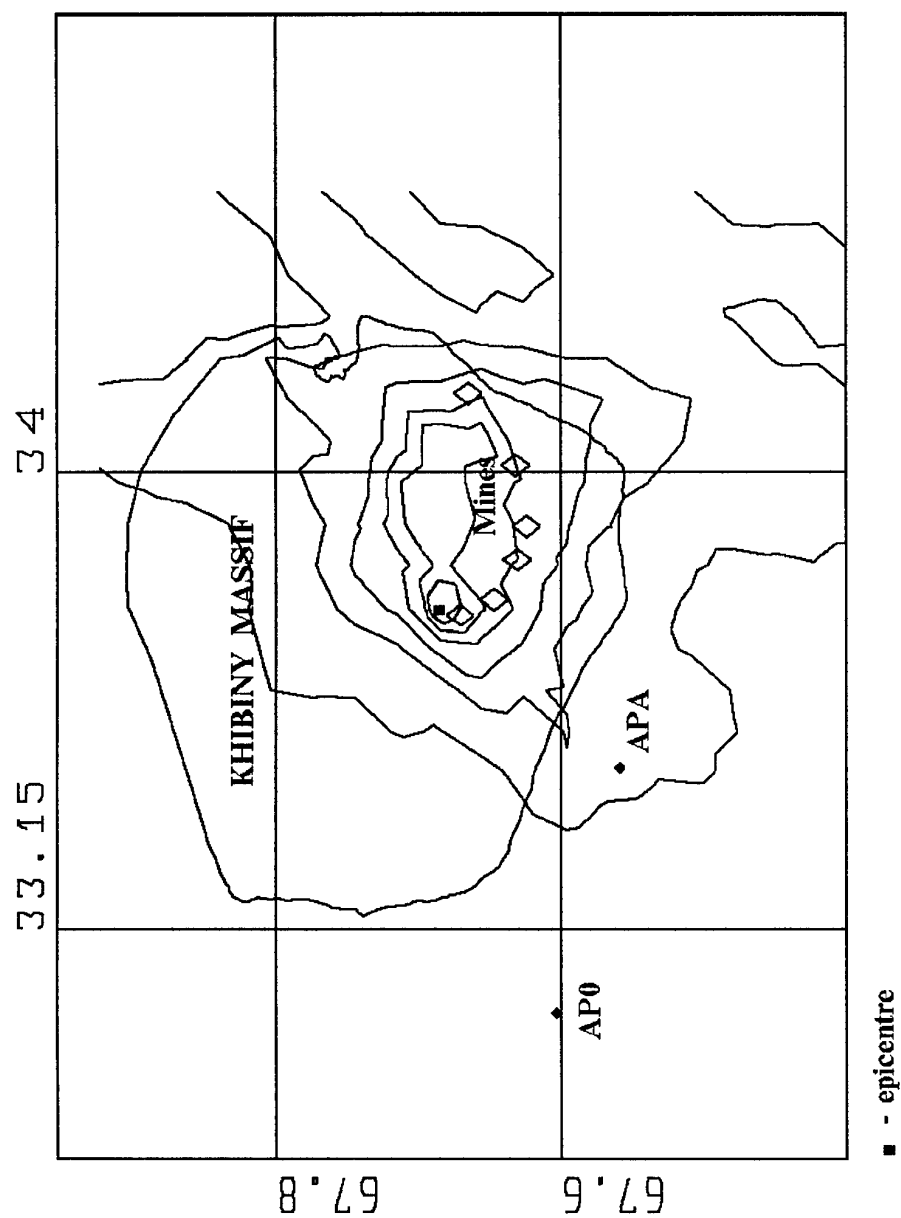


Fig. 7.5.1. The Khibiny Massif, with locations of 6 mines. The seismic stations AP0 (array) and APA are shown, together with the epicenter of the calibration explosion estimated from seismic recordings.

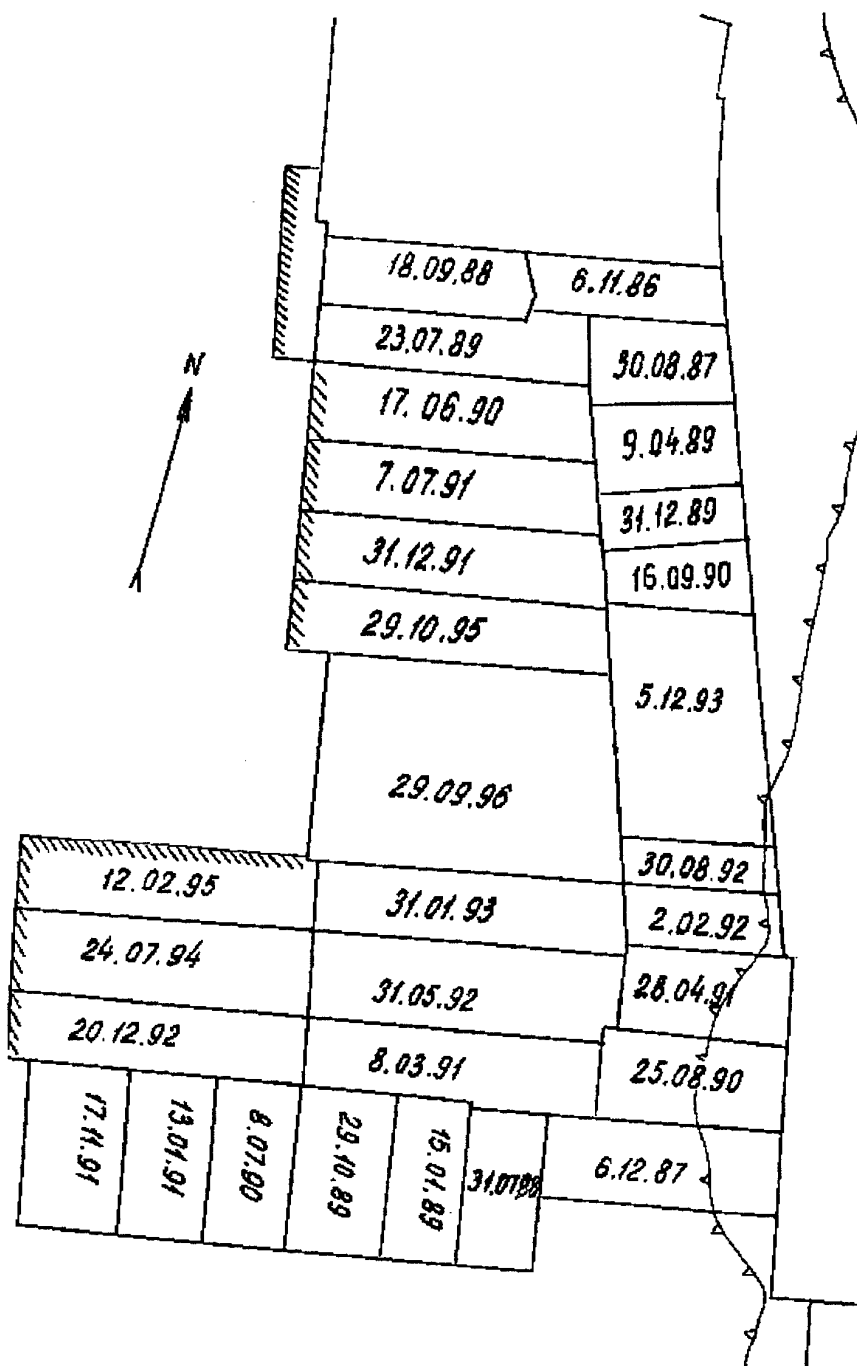


Fig. 7.5.2. Relative locations of selected large mining explosions in Khibiny Mine 1. The calibration explosion of 29.09.96 took place near the center of the mine.

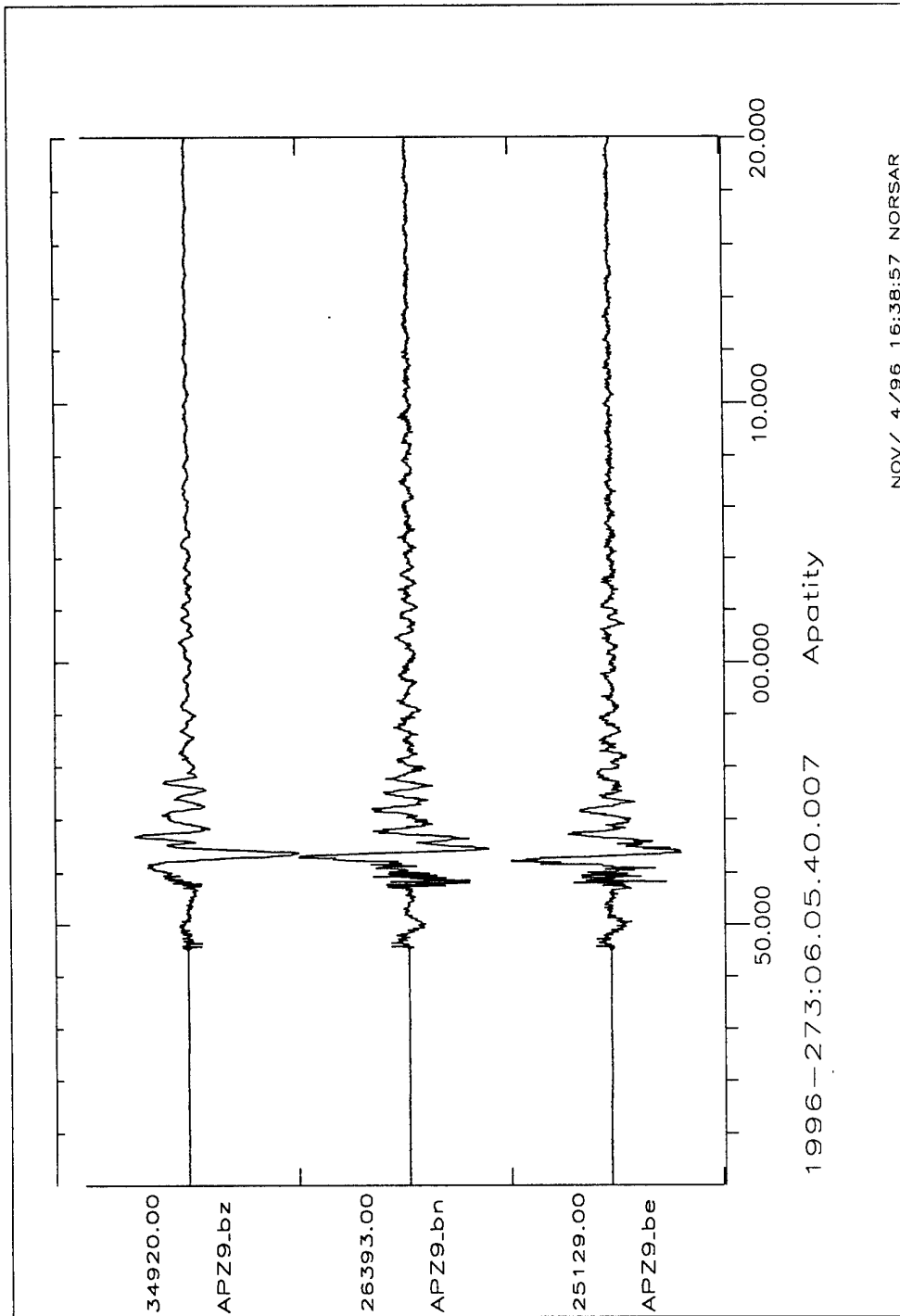


Fig. 7.5.3. Kola explosion 29.09.96 — Station APZ9; 3-component broadband recordings.

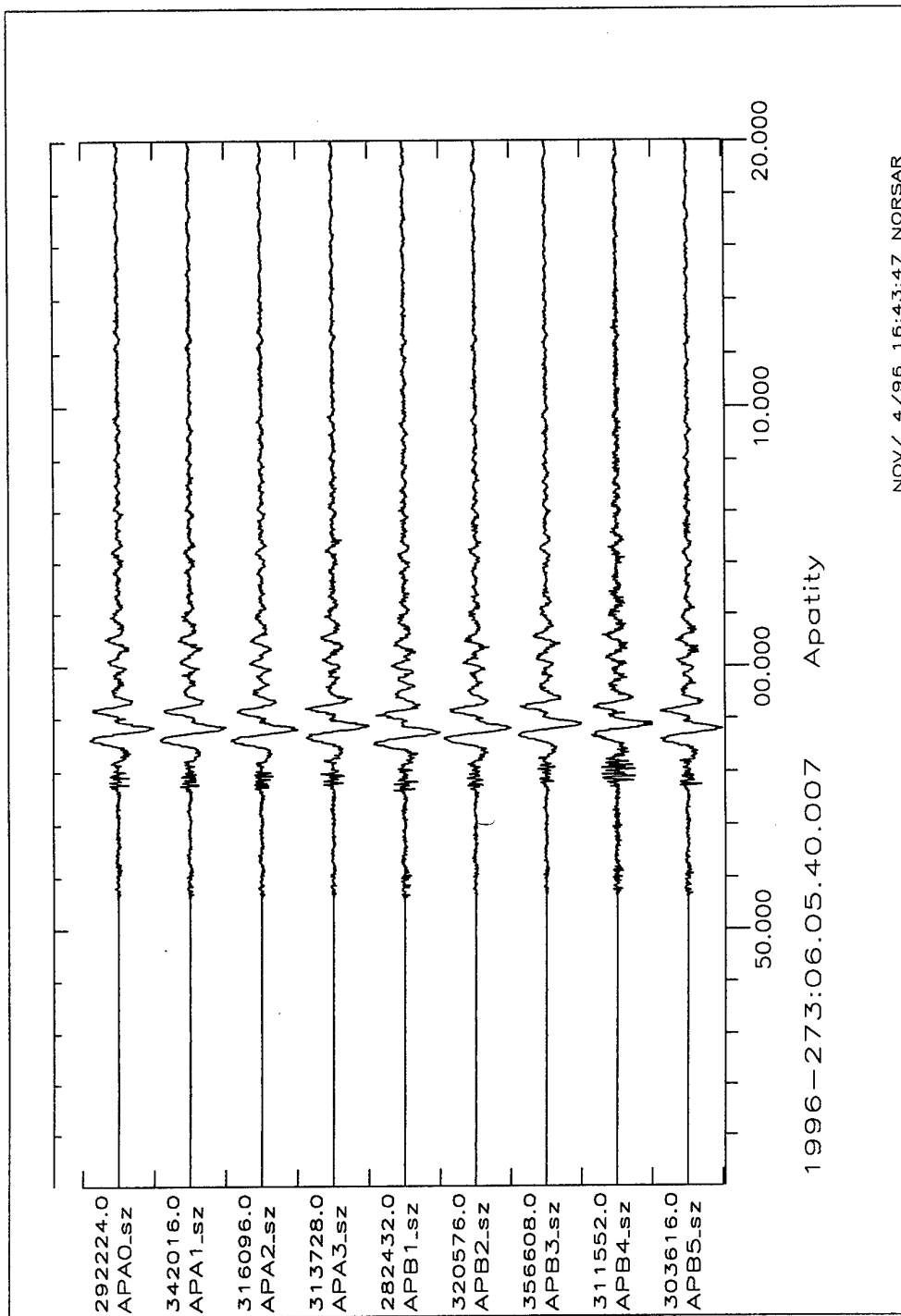


Fig. 7.5.4. Kola explosion 29.09.96 — Apatity array (APA0).

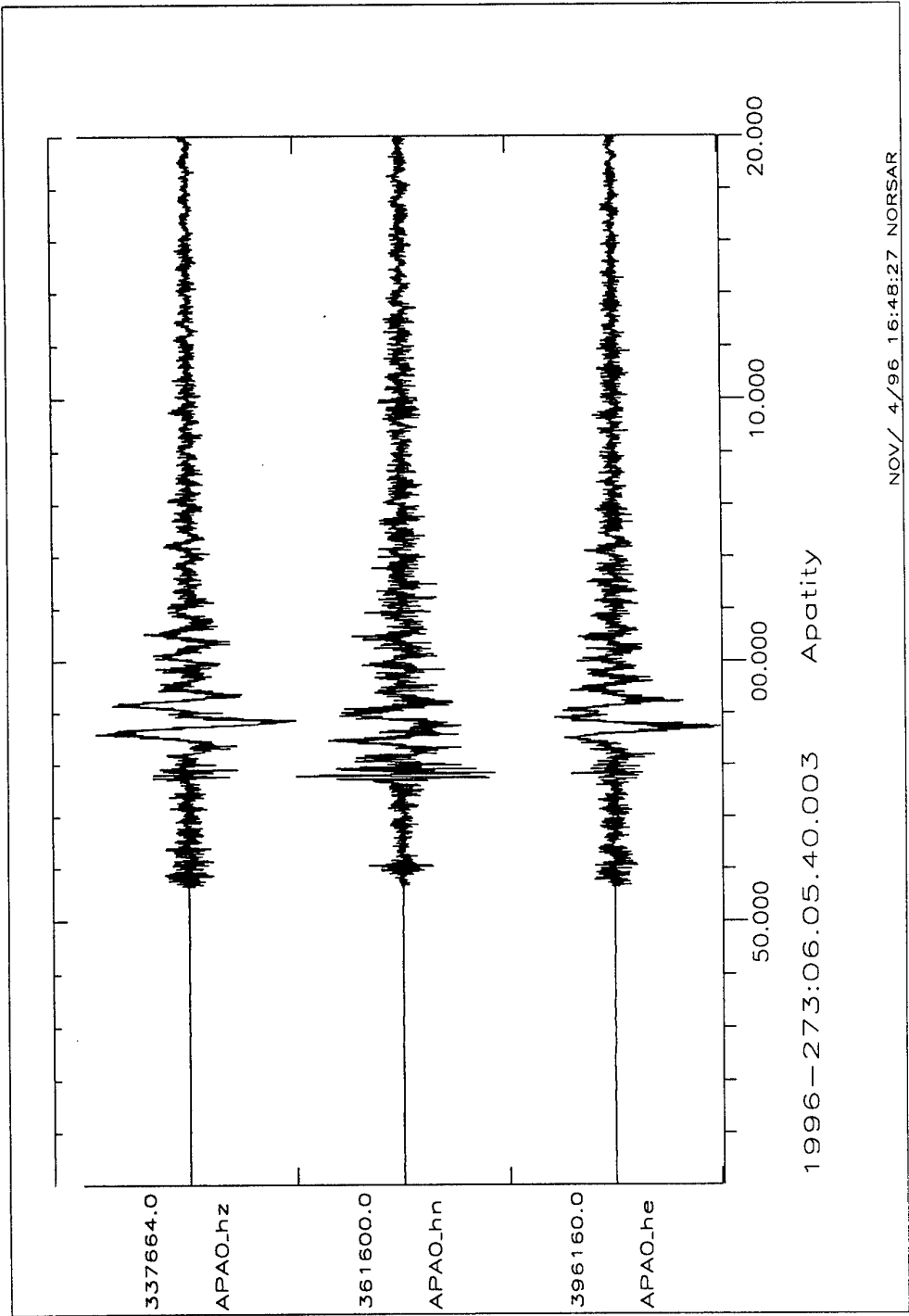


Fig. 7.5.5. Kola explosion 29.09.96 — Station APA0; high frequency element, 3-component recordings.

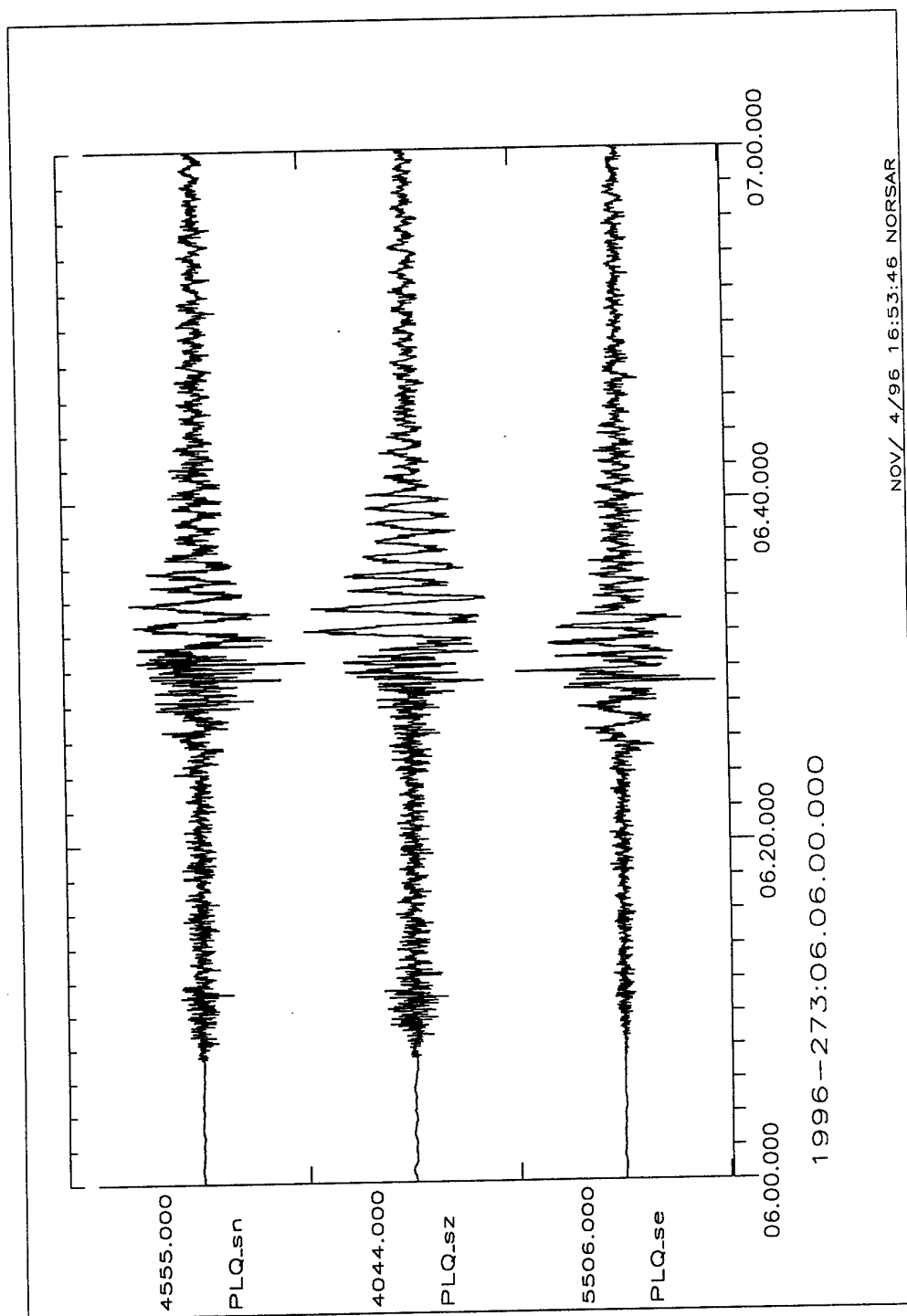


Fig. 7.5.6. Kola explosion 29.09.96 — Station PLQ; 3-component recordings.

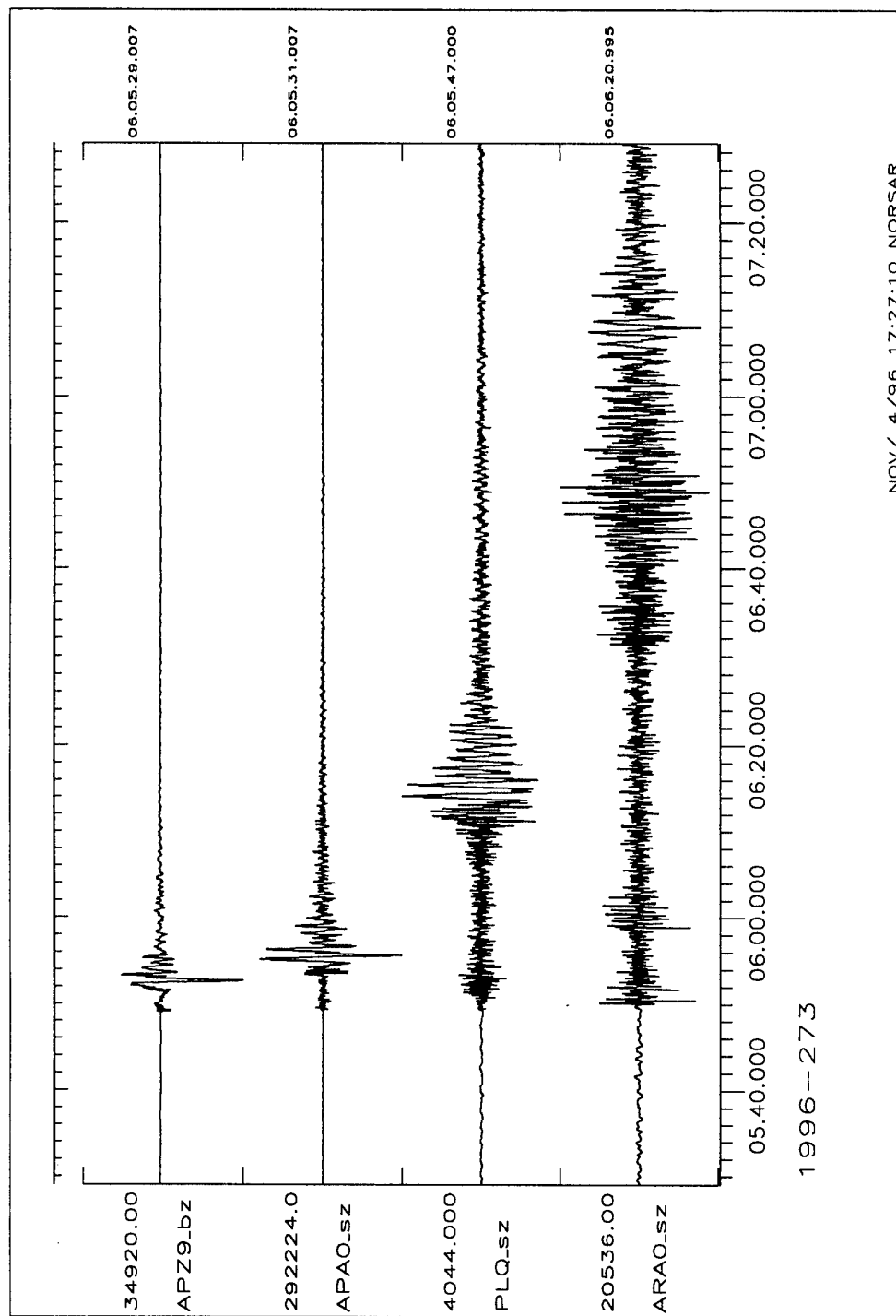


Fig. 7.5.7. Kola explosion 29.09.96 — Comparison of station recordings. The figure shows 2 minutes of data for each trace, and the traces are lined up according to their P-arrival times.

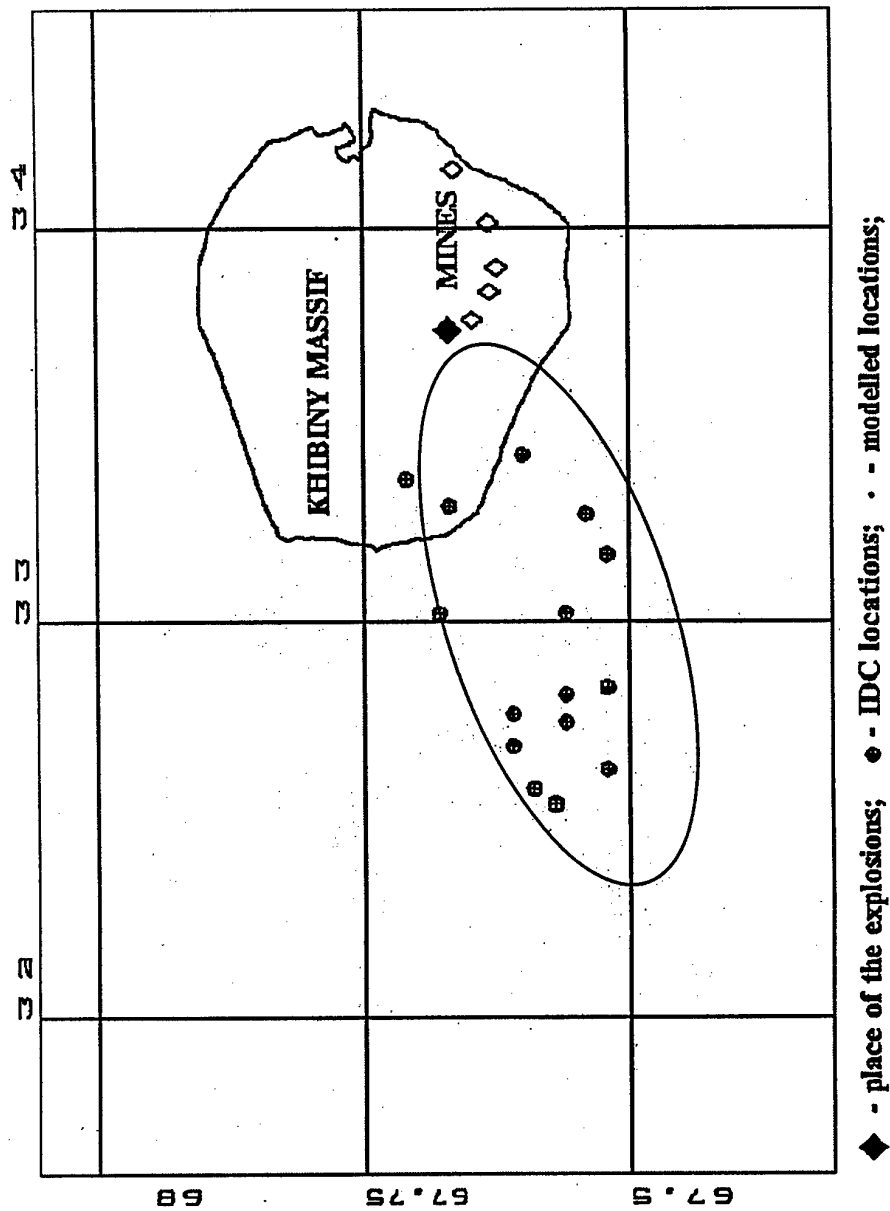


Fig. 7.5.8. GSETT-3 IDC location estimates for large explosions in Mine 1. The ellipse indicates the model simulation described in the text.

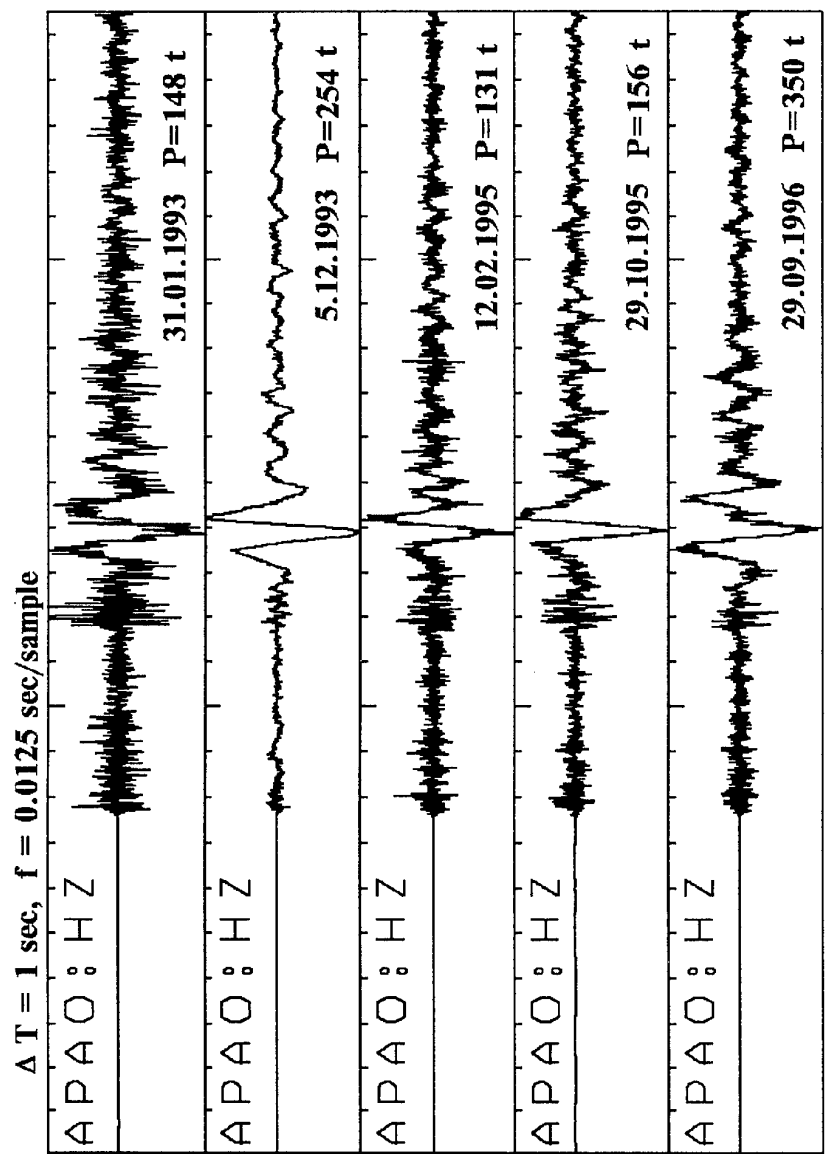


Fig. 7.5.9. Waveform comparisons of 5 large explosions in Mine 1. Note the similarities of the waveforms, except for no. 2 from top (see text for details).