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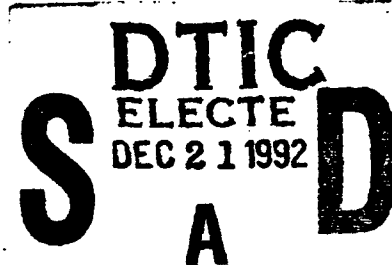
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Technical Report

POLARIMETRIC RADAR MEASUREMENTS OF ARTIFICIAL SEA ICE DURING CRRELEX '88

R.G. ONSTOTT
Advanced Concepts Division

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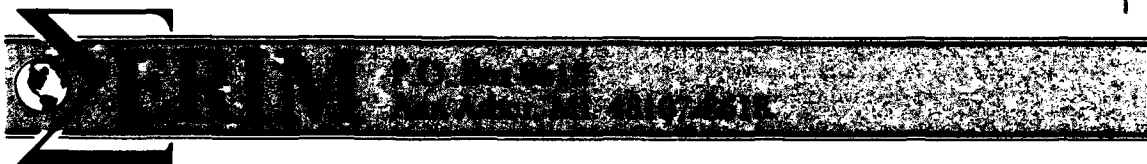
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1. INTRODUCTION

There is an important need to acquire geophysically useful information concerning the polar regions, particularly of sea ice, through the interpretation of satellite data. Studies are ongoing to understand the relationships between the physical properties and the microwave signatures of first-year and old sea ice, and to produce a more complete understanding of the parameters and processes which effect the active and passive microwave signatures. In the pursuit of these goals, the ability to make microwave measurements of sea ice in a laboratory-like environment was developed at the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL). A conclusion reached through discussion with both theoretical modelers and experimentalists is the need to coordinate very detailed laboratory type measurement investigations in which the physical properties needed to validate the developing models are measured, and that those persons developing models are fully aware of the constraints of what can be measured. Similar discussions are summarized in the "Workshop on Microwave Scattering and Emission from the Earth's Surface", Final Report [1].

The microwave properties of artificial sea ice grown at CRREL were investigated during the 1988 winter season. The sea ice facility is comprised of a 5 m x 15 m outdoor tank of a 1.2 m depth filled with sea water, a tent to protect the ice sheet from snow and rain, a gantry-style instrument mounting structure, and heated working environments in the immediate vicinity of the tank. The tank size, determined by instrument and experiment needs, allows for the acquisition of independent spatial samples and measurements at angles from vertical to 60°. These efforts, which are part of a new three-year, laboratory-based investigation, are focused on understanding the microwave signatures of sea ice; this will be accomplished by detailed studies of the various aspects of backscatter and emission and through

the intercomparison of measured data and theoretical predictions. Two strengths of the CRREL Ice Tank Facility are the ability to control the physical properties of the ice sheet and the time to rigorously measure the physical and microwave properties of ice which closely simulate that found in the Arctic.

Observations commenced with open water and continued until 15 cm of sea ice was formed. During this investigation, detailed scene characterizations were made. These included the standard array of measurements (i.e., fabric of the ice sheet, the salinity, the density, the temperature, location of layers, and location of internal inhomogeneities) and measurement of surface and interior ice sheet statistics. These active microwave measurements were coordinated with passive microwave observations, hence, a completely integrated comparison of backscatter and emission may be made with theoretical predictions. Physical properties which may influence backscatter and emission were measured; these data or their derivatives provide the critical inputs for the electromagnetic models. The roughness of the ice surface is important in determining the general backscatter level for first year ice. Experiments were performed to study the change in backscatter and polarization signatures with various roughness scales. Effects of freeze and thaw conditions were also examined.

For this investigation, a polarization diversified scatterometer has been enhanced by adding the sophistication necessary to measure phase. Previous measurements have been made to describe the noncoherent average scattering coefficients at VV, VH, HV, and HH polarizations (i.e., VH indicates vertical transmit and horizontal receive). This radar was used to measure the target scattering matrix (i.e., the matrix elements are the detected scattered fields at VV, VH, HV, and HH polarizations) which allows the examination of the functional dependence of intensity on polarization. During CRRELEX, polarimetric measurements were made at 1.8, 5, and 10 GHz in the configuration shown in Figure 1. The polarimetric radar is briefly

described in the next section of this report. In addition, millimeter wave data were collected at 18, 35, and 94 GHz using a noncoherent radar. The microwave measurements and characterization measurements performed by ERIM during this investigation are summarized in Table 1.

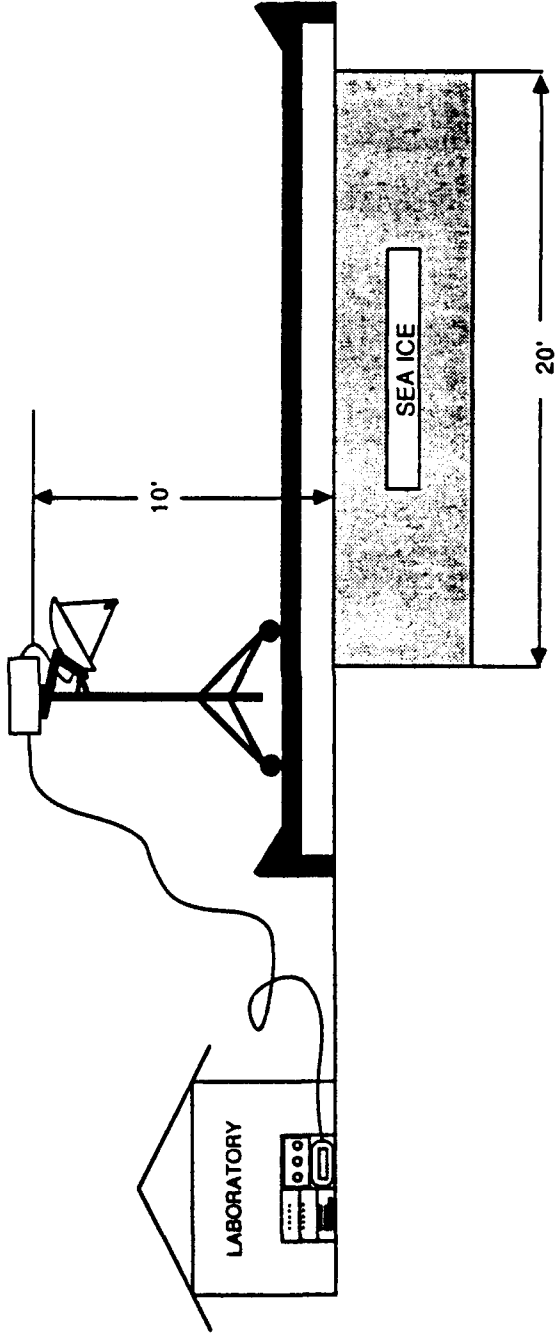


Figure 1. Configuration of Polarimetric Microwave Scatterometer at Sea Ice Tank

Table 1.

**MICROWAVE AND ICE CHARACTERIZATION
MEASUREMENTS OF SEA ICE DURING CRRELEX '88**Scatterometer

Polarimetric:

Frequency	1.75, 5 and 10 GHz
Angles	Vertical to 60°
Height	3 m
Sampling	Point and Power Spectrums

Non-Coherent:

Frequency	10, 18, 35 and 94 GHz
Angles	15 to 60°
Height	3 m
Sampling	Point and Transect

Characterization

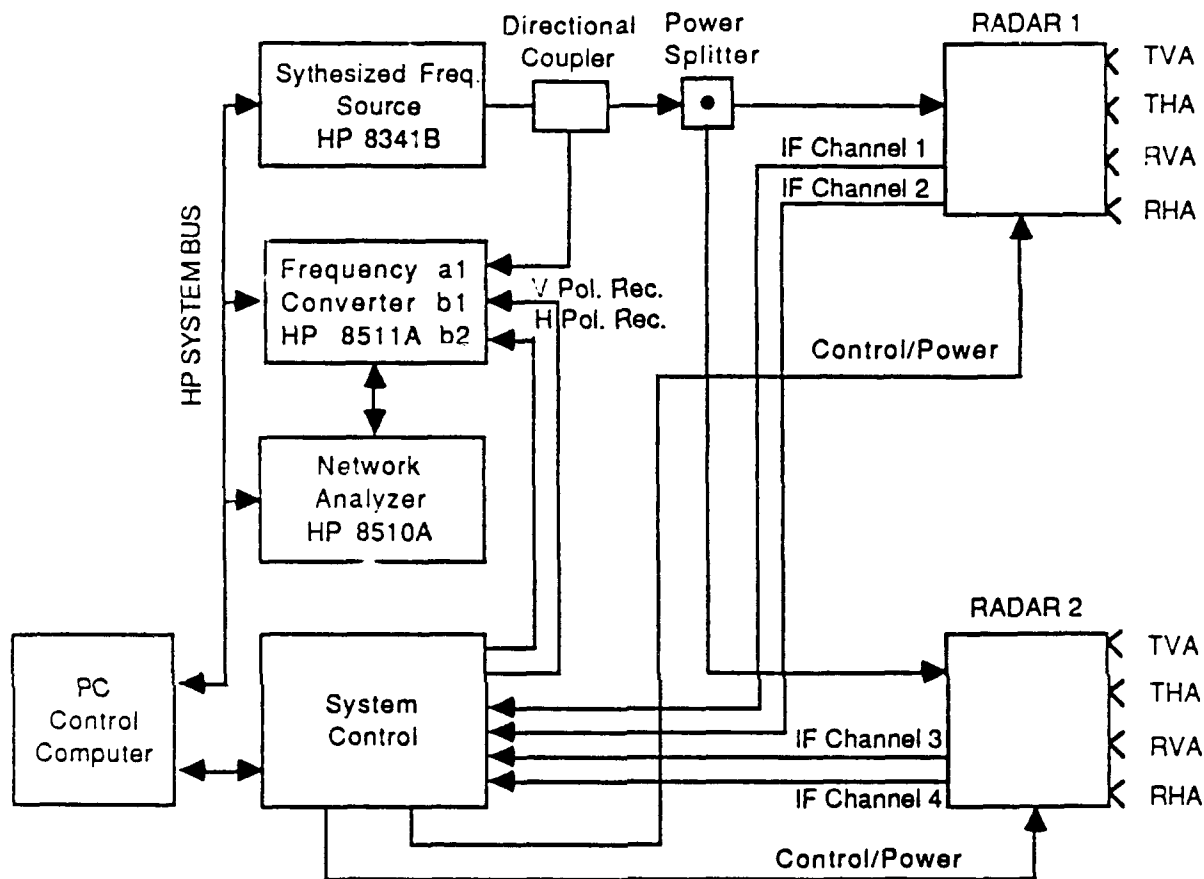
Surface Roughness

Photography

2. POLARIMETRIC RADAR DESCRIPTION

This polarimetric radar has been developed to operate at 1.8, 5, and 10 GHz, and measures the amplitude and phase at four linear transmit-receive polarizations--the elements of the target scattering matrix. Designed for application in both the laboratory and the field, the capable HP8510B network analyzer and HP8341B synthesized frequency source serve as the heart of this system. This radar allows the target scattering matrix (TSM) to be acquired through measurement; hence, the description of the polarization properties of the scattered field is complete. Measurements support studies which address surface and volume scattering, repolarization, and depolarization.

The sensor is comprised of a synthesized frequency source, RF-antenna packages (at each frequency), a three-channel frequency converter, a network analyzer, system control circuitry, and a data acquisition computer (see Figure 2). Simultaneous measurements may be made at two frequencies. Each receiver is dual channel (See Figure 3); both vertical and horizontal polarizations are received coincidentally. The TSM elements are acquired by transmitting using a V-pol antenna and then an H-Pol antenna. The RF hardware is mounted in temperature controlled enclosures. Clusters of four antennas are mounted rigidly to these enclosures. Symmetry in the antenna cluster and RF hardware provides short, nearly identical electrical paths; further adjustment of channel balance was not required and the data acquisition software remained relatively uncomplicated and inherently quicker. The oscillator which is shared by each transmitter and receiver determines the RF frequency and also provides the phase reference. A swept IF signal (1-2 GHz) is provided for the up conversion at the transmitters. The RF and antennas are separated from IF processing by a distance of 13 meters. Losses and phase errors due to cable flexure were kept small by selecting the low IF frequency and using helix type cable.



TVA = Trans. Vert. Antenna; THA = Trans. Horiz. Antenna;
 RVA = Rec. Vert. Antenna; RHA = Rec. Horiz. Antenna

Figure 2. Polarimetric Radar System Configuration

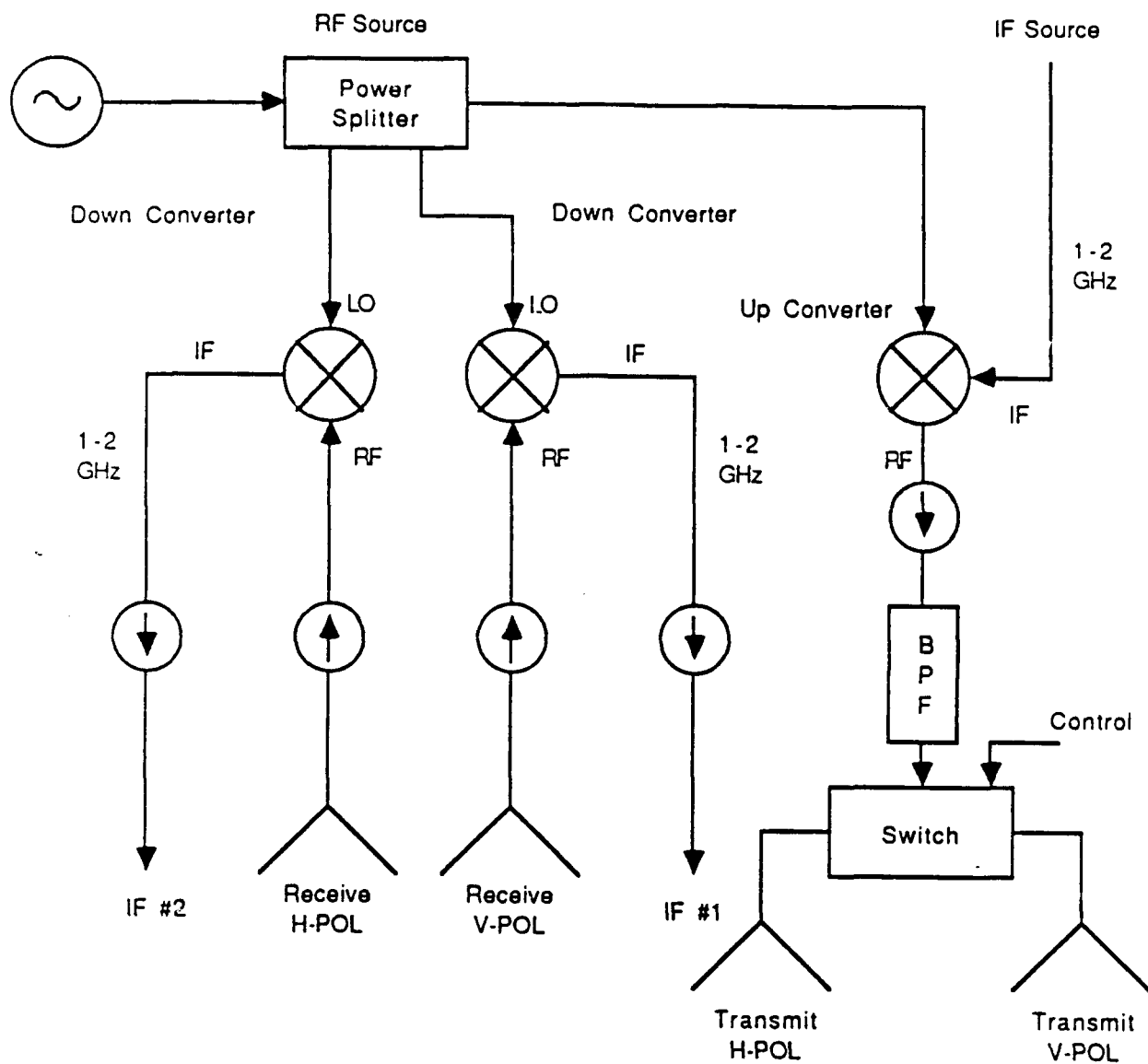
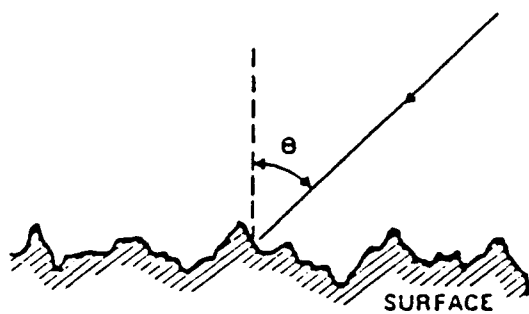


Figure 3. Polarimetric Radar RF/IF Diagram

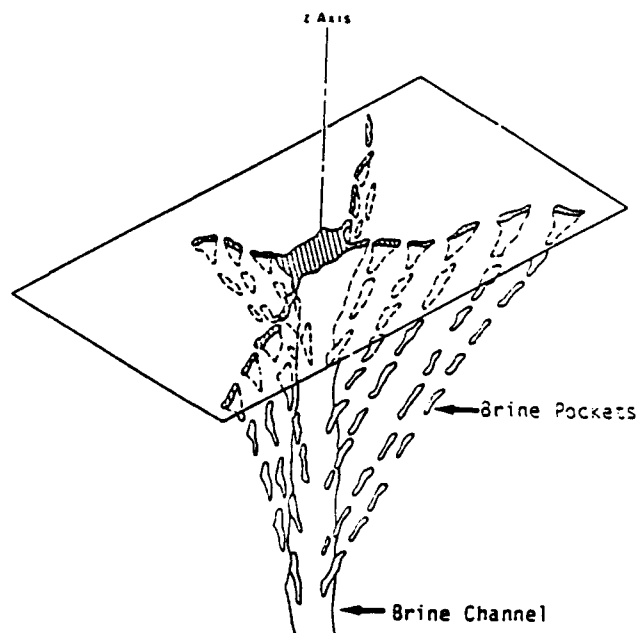
Data acquisition procedures greatly impact measurement accuracy. As backscatter levels become very small, locating the target returns in each of the four channels so that narrow range gates may be positioned precisely requires increased sophistication.

3. MEASUREMENT GOALS

There are two particularly interesting aspects to the acquisition of polarimetric radar data. One, of course, is to examine the utility of such a sensor to provide additional information. For example, by examining the phase difference and correlation between the returns at like polarization we hypothesize that information concerning the preferred geometric orientations or internal anisotropic physical-dielectric properties will be retrieved unambiguously. With a complete description of polarization properties there should be an increase in the number of ice forms that may be categorized and that computer algorithms may be simplified because of the ability to better select an optimum set of parameters from the scattering matrix. Resolution requirements may be able to be relaxed because of improvements in discrimination capability. A second aspect involves the modeling of ice forms from new to young first-year ice. A major question here is prompted by the apparent ability to adequately model what appear to be a lossy dielectric half-space with using either surface scattering and a volume scattering model approaches. In the case of surface scattering, the key model parameters include the complex permittivity of the ice sheet and the surface roughness statistics (i.e. the spatial correlation length and the rms height). The key parameters in the volume scattering model approach include describing the ice sheet as an anisotropic medium due to the enclosed brine pockets with a random permittivity with a tilt angle and a three-dimensional correlation function with a variance, and horizontal and vertical correlation lengths. These two approaches are modeled in Figure 4. One of the goals of this investigation is to validate these competing approaches.



(a) Surface Scatter Model



(b) Volume Scatter Model

Figure 4. Surface and Volume Scattering Model Approximation Used to Describe the Backscatter of New and Young First-Year Ice.

4. OBSERVATIONS

An ice sheet was allowed to grow over a 2-month period. Observations were made of open water, 5-mm thick new ice, 8-cm thick grey ice, 12-cm thick grey ice which had a rough, air-ice interface (rms roughness of about 0.5 cm), and 12-cm thick grey ice with a liquid film water on its surface, and 20-cm thick ice which had undergone desalination and showed some of the characteristics associated with multiyear. These observations are summarized in Table 2.

During the period from 11 to 18 January, air temperatures ranged from -26°C to 2°C and ice surface temperatures from -16°C to -1.8°C (See Figure 5). The second ice sheet from which the data provided in this report were obtained, grew to about 15 cm. Its growth time plot is provided in Figure 6. Salinity profiles of the ice sheet were obtained in two locations by Tony Gow, (CRREL) for the period from 14 January to 8 February. These salinity versus depth data for the north and south ends of the tank are included in Figures 7 and 8, respectively. They are also provided in tabular form in Table 3. Temperature profile data (courtesy of Tony Gow, CRREL) for the period from 12 to 28 January is found in Figure 9. Surface roughness data were acquired for the calculation of roughness statistics. In Table 4, the statistical characterization of surface roughness are provided in terms of the surface height root-mean-square (rms) deviation and correlation length. The number of samples and length of samples prepared are also included.

Table 2.

OBSERVED SCENES DURING 1988

Open Water ($\theta = 45$ to 55 Degrees)

New Ice ($\Delta z \cong 5$ mm)

Grey Ice ($\Delta z \cong 12$ cm)

Rough Grey Ice ($\Delta z \cong 12$ cm) With 1 cm Roughness Elements

Rough Grey Ice ($\Delta z \cong 12$ cm) With 2 cm Roughness Elements

Warm Grey Ice ($\Delta z \cong 12$ cm)

Desalinated Grey Ice ($\Delta z \cong 20$ cm)

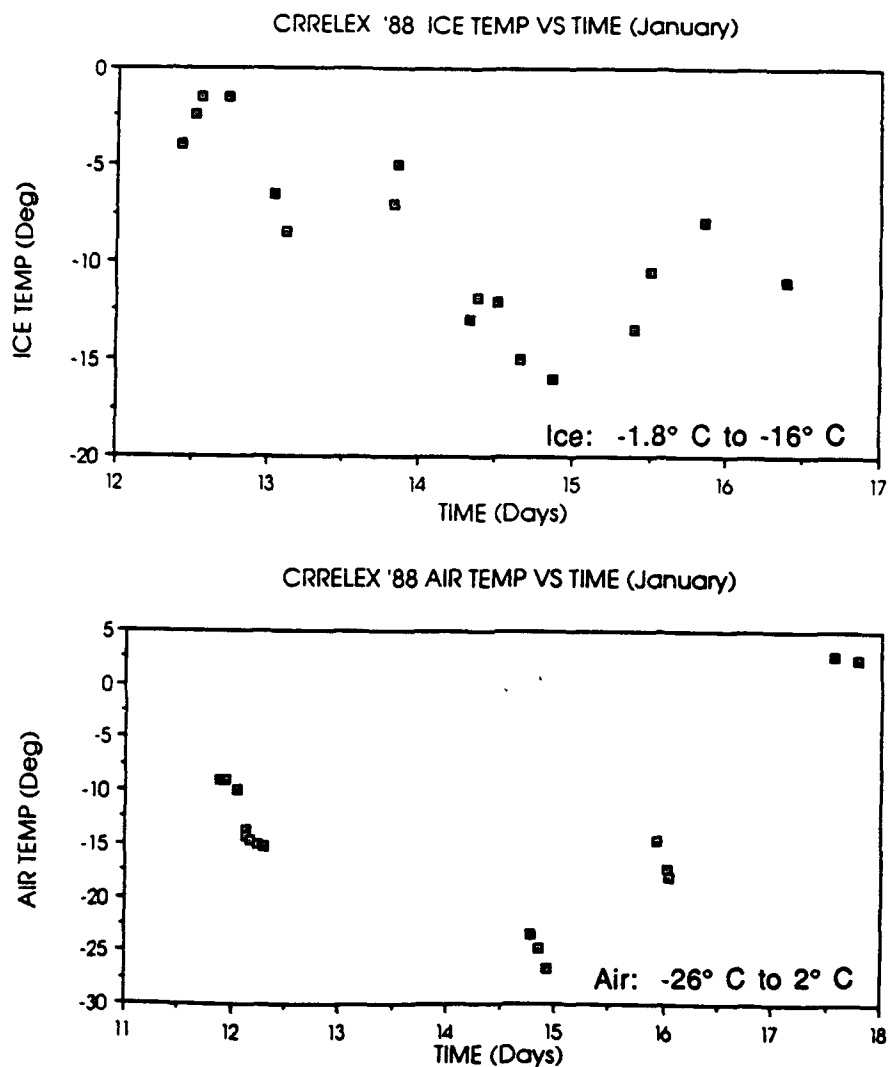


Figure 5. CRRELEX '88 Ice and Air Temperature for the Period From 11 to 18 January

CRRELEX '88 ICE THICKNESS VS TIME (January)

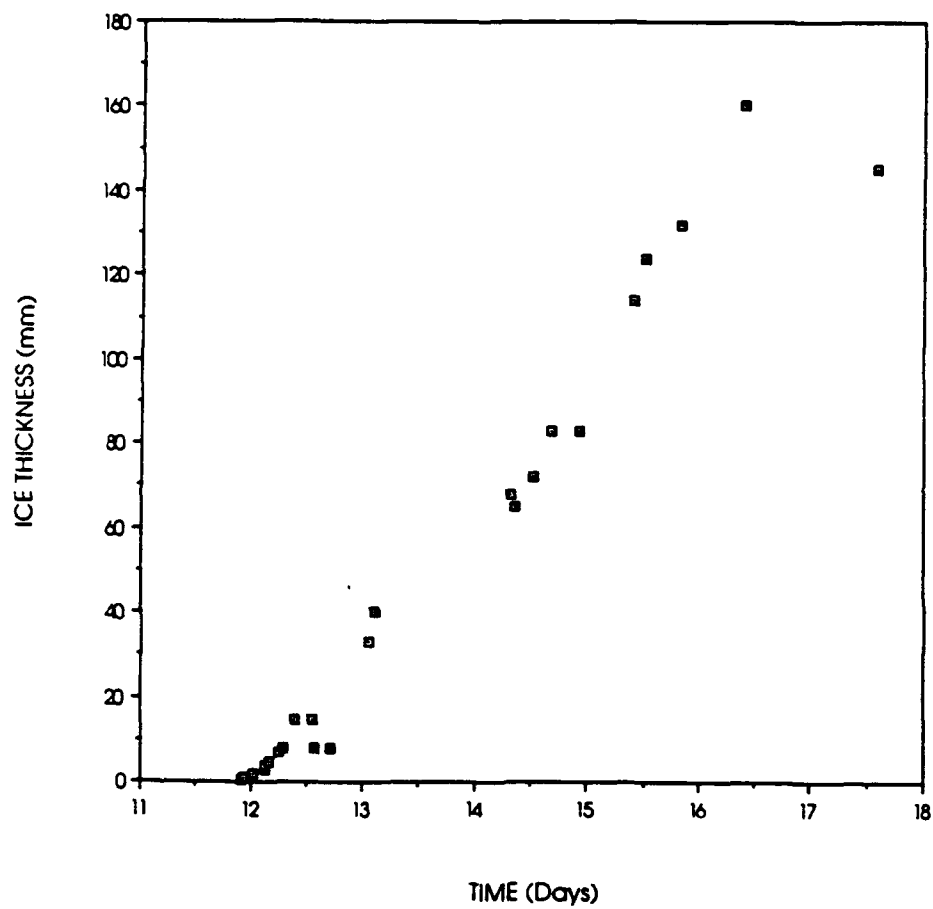


Figure 6. CRRELEX '88 Ice Thickness Growth-Time Response for 12 to 18 January

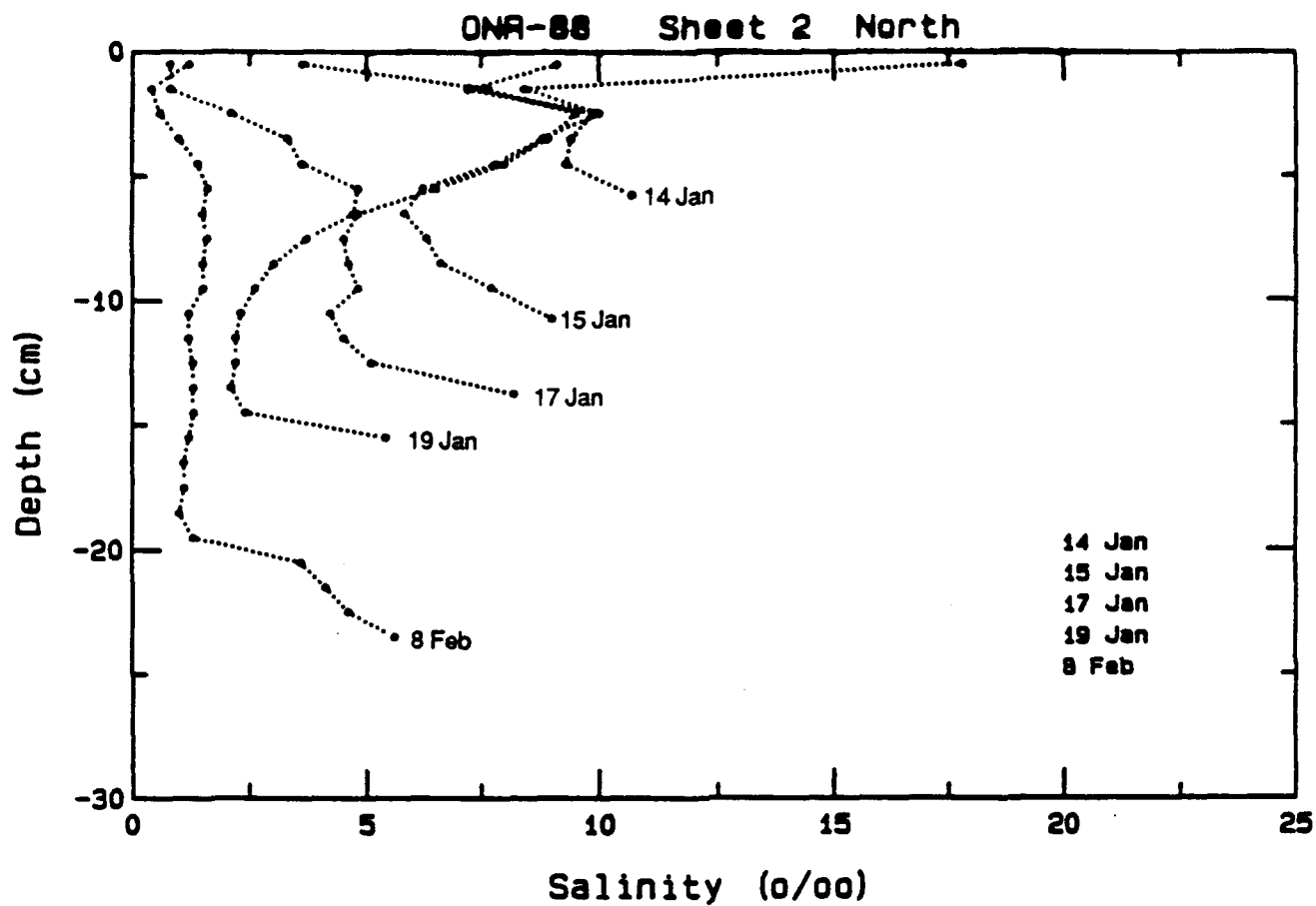


Figure 7. Salinity: ONR '88 Sheet #2 North End of Tank

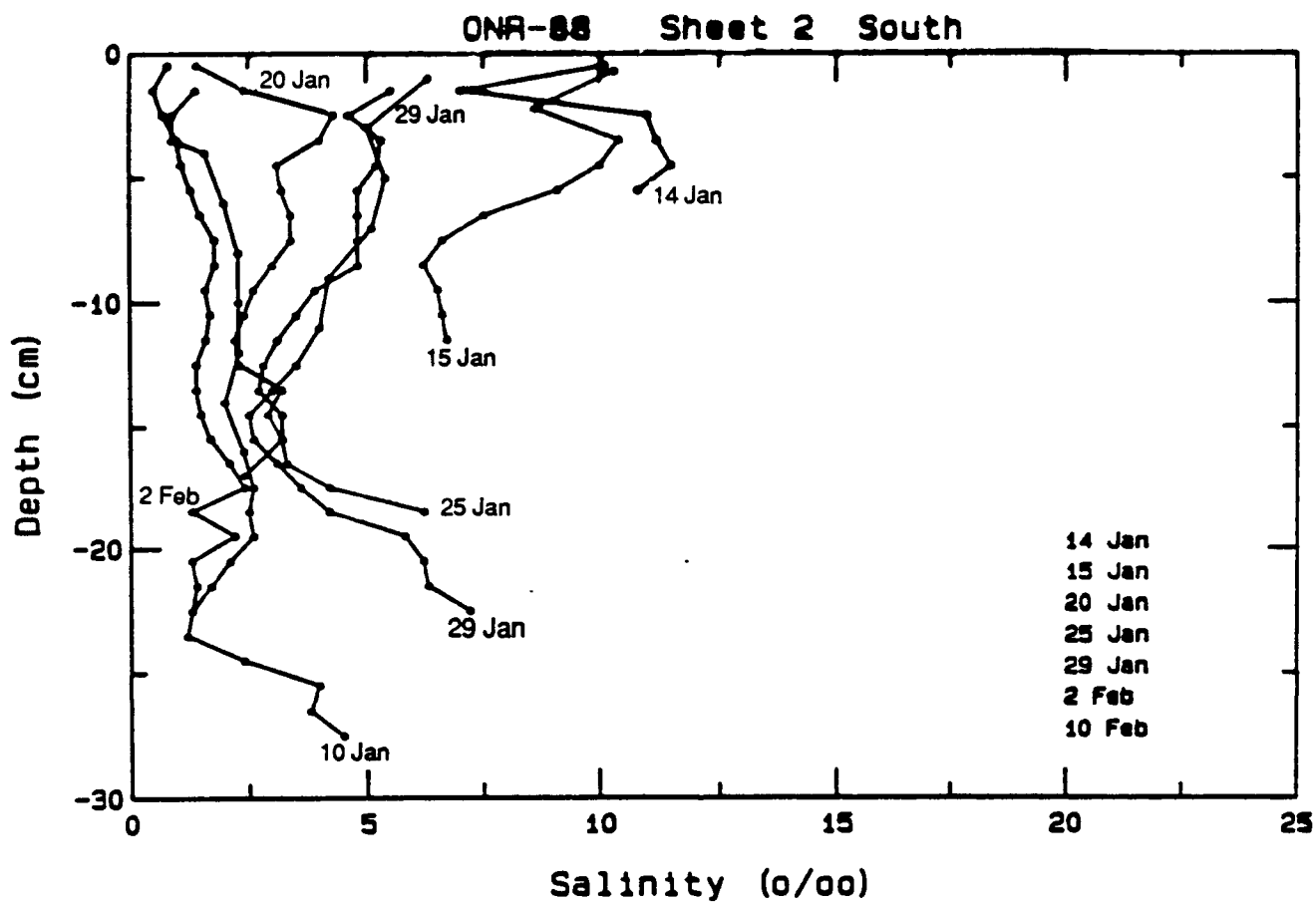


Figure 8. Salinity: ONR '88 Sheet #2 South End of Tank

Table 3.
**SALINITY PROFILE DATA FROM 14 AND 15 JANUARY
DURING CRRELEX '88**

Sheet 2					
<u>Date</u>	<u>Depth Range</u>	<u>S0/00</u>	<u>Date</u>	<u>Depth Range</u>	<u>S0/00</u>
14 January	0-1	9.1	14 January	0-1	10.1
(North)	1-2	7.2	(South)	1-2	7.0
	2-3	9.9		2-3	11.0
	3-4	9.4		3-4	11.2
	4-5	9.3		4-5	11.5
	5-6.5	10.7		5-6.5	10.8
15 January	0-1	17.8	15 January	0-1 1/2	10.3
(North)	1-2	8.4	(South)	1 1/2-3	8.6
	2-3	10.0		3-4	10.4
	3-4	8.8		4-5	10.0
	4-5	7.8		5-6	9.1
	5-6	6.2		6-7	7.5
	6-7	5.8		7-8	6.6
	7-8	6.3		8-9	6.2
	8-9	6.6		9-10	6.5
	9-10	7.7		10-11	6.6
	10-11.5	9.0		11-12	6.7

Ice Growth Began 11 January 1988 at 2030.

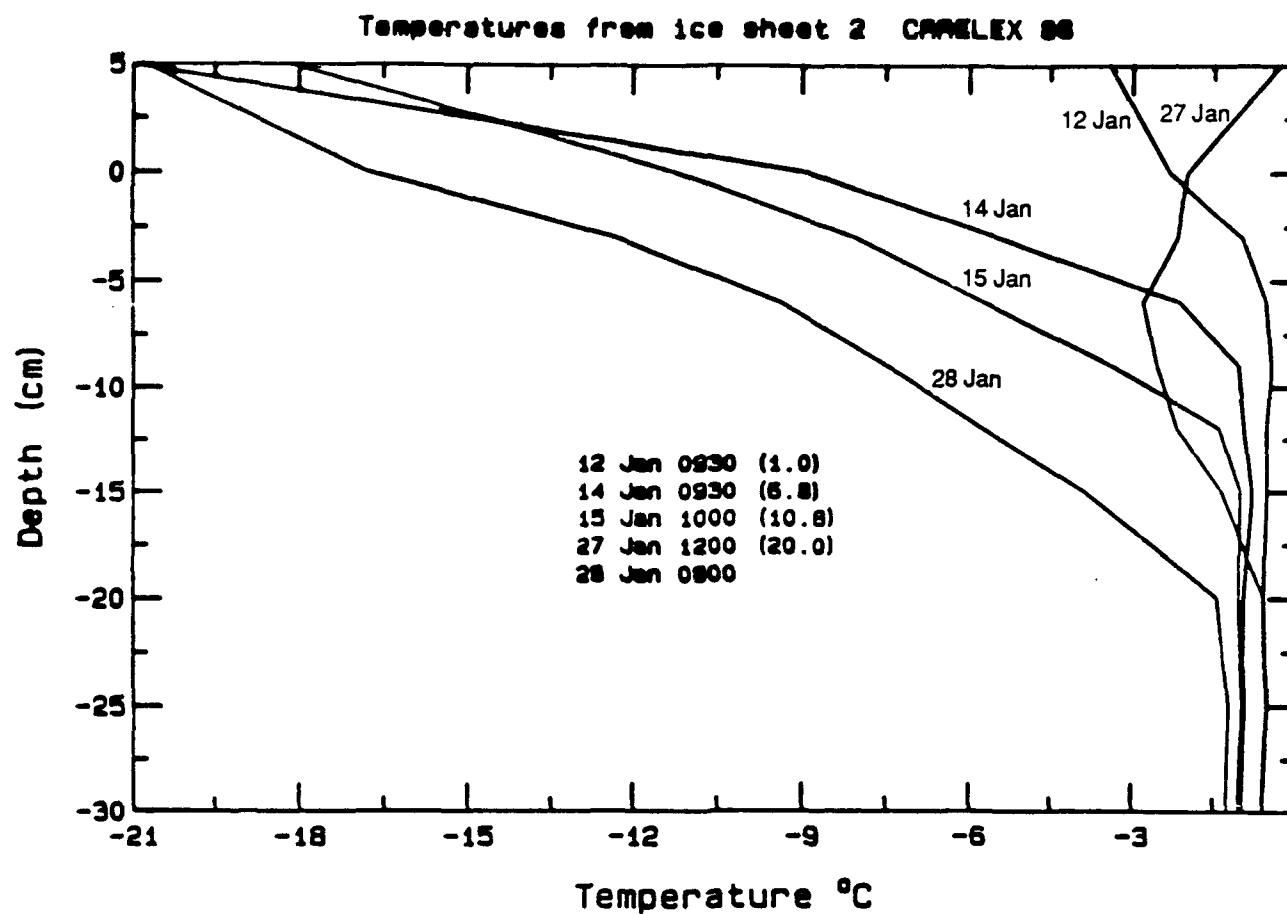


Figure 9. CRRELEX '88: Temperature Profiles for Ice Sheet 2 for the Period from 12 to 28 January

Table 4.
CRRELEX '88
SURFACE ROUGHNESS RESULTS

Date	TΔZ - To - hr -	Δ Z ice - cm -	σ - cm -	l - cm -	Samples	Sample Lengths - cm -	Comments
14 Jan	63.5	6.5	0.048	0.669	1	25	Top Surface
14 Jan	63.5	6.5	0.048	0.821	1	24	Bottom Surface
16 Jan	113	13	0.051 ± .003	1.635 ± .370	3	20	
15 Jan	99	8	0.544 ± .053	1.481 ± .334	4	23 to 55	Ice Roughened Using Cubed Ice (2 Layers)
15 Jan	95	8	0.611 ± .095	2.157 ± .862	2	25	Ice Roughened Using Cubed Ice (1 Layer)

5. DATA SET DESCRIPTION

Included in this data report are data acquired on the 14th and 15th of January. A two part experiment series was performed in which an ice sheet, with its physical-electrical-chemical properties changing slowly over time, was observed and then modified by adding a layer of cold fresh water ice cubes, and then observed again to determine the effect in the change in surface roughness. Photographs of cross-section cuts made from ice slabs retrieved before and after the cubes were placed on the surface are shown in Figures 10 and 11. Radar measurements were made at 5.0 and 10.0 GHz and have been included here. Data description parameters for these two scenes are summarized in Tables 5 and 6. In the processing of these data the target scattering matrices were calibrated based upon data collected from trihedral corner reflectors, dihedrals oriented at 22.5° , and dihedrals oriented at 45° . For the scenes, in this case the smooth grey ice sheet, in which the ice sheet is very smooth and produced specular backscatter responses, the near nadir response caused by the convolution of the coherent scattering cross-section response and the system radiation pattern response was determined and extracted to obtain true scattering cross-sections. A paper is being written to detail the operations performed here. Averages of the scattering matrices generated from independent spatial samples are provided in the form of covariance and Mueller matrices using the forms provided in Figure 12. Angular response plots of the radar scattering coefficients are provided in Appendix A. A comparison between the very rough and slightly rough ice scenes at C- and X-band are shown in Figure 13 to 22 for illustration. The covariance and Mueller matrix data are provided in Appendix B.

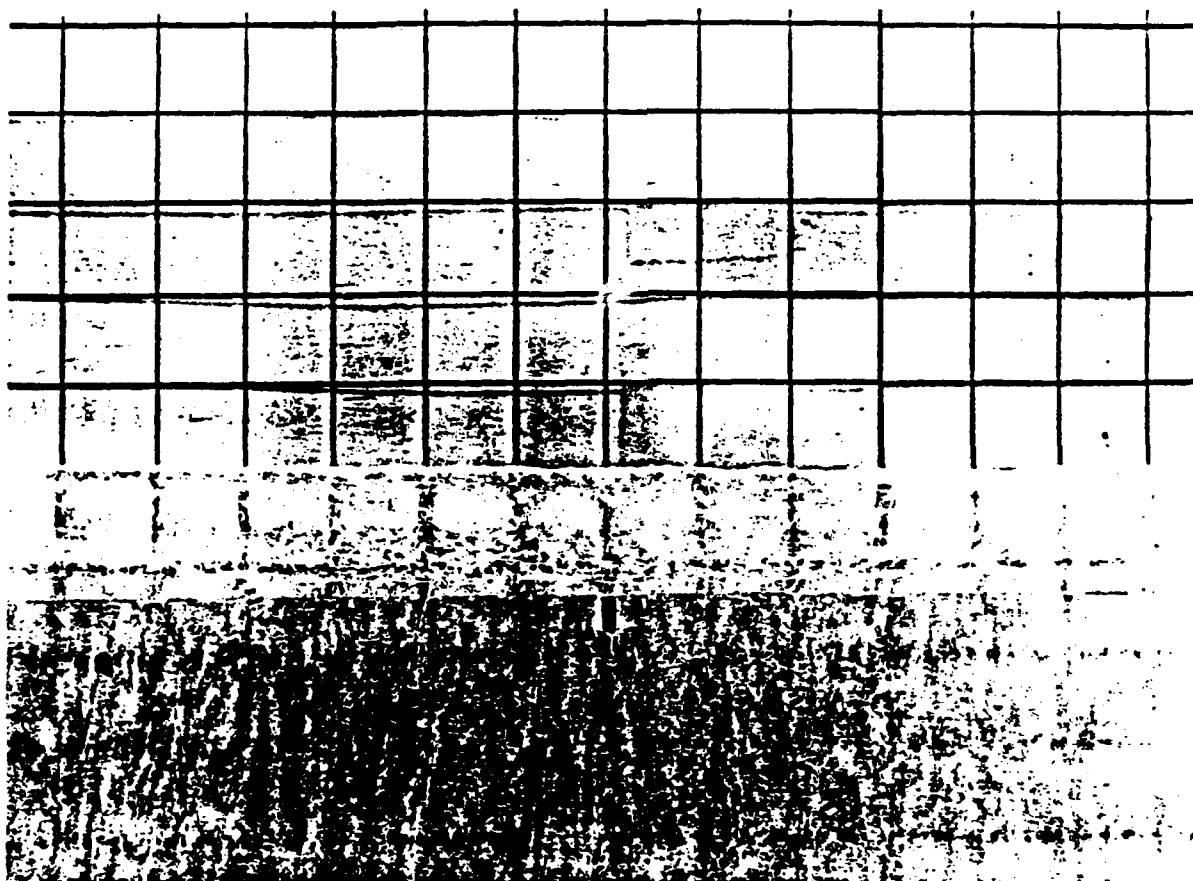


Figure 10. Vertical Thick Section Showing the Air-Ice Interface for Slightly Rough Grey Ice on 14 January 88.

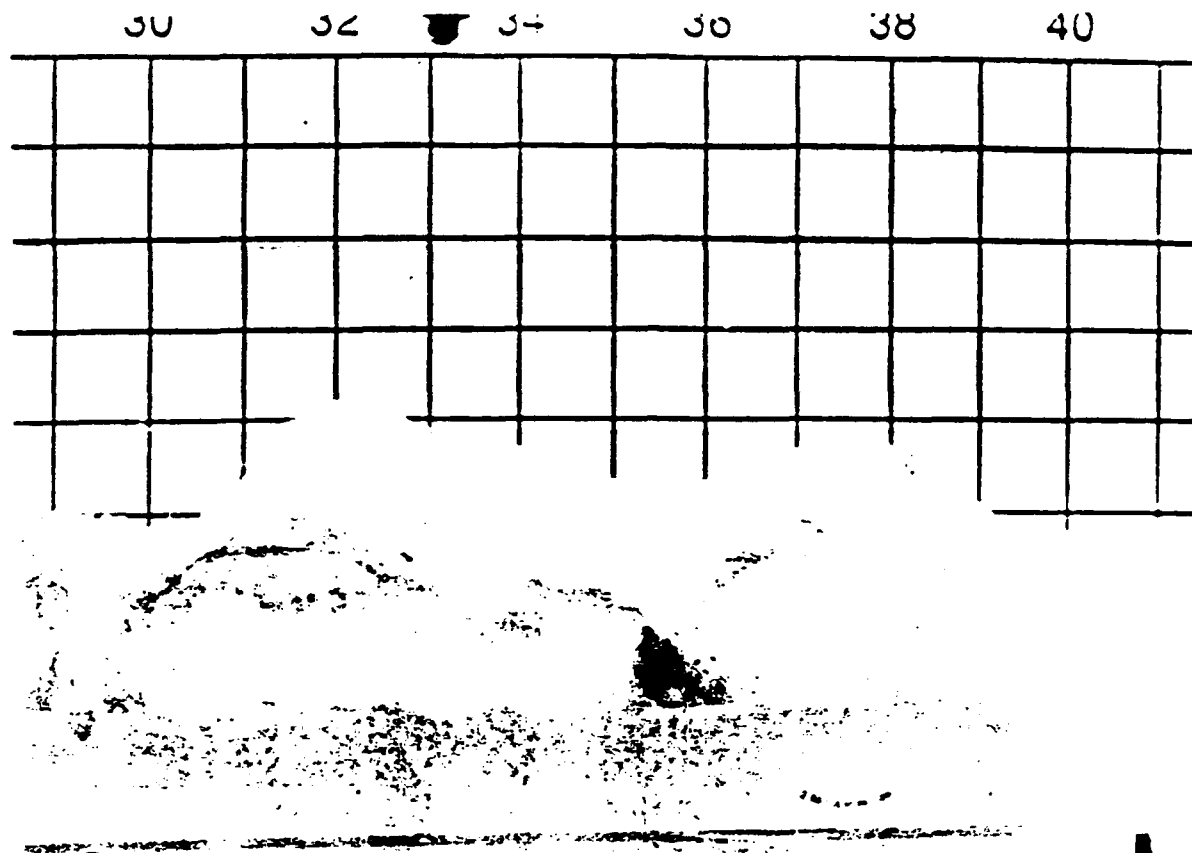


Figure 11. Vertical Thick Section Showing the Air-Ice Interface for Very Rough Grey Ice on 15 January 88

Table 5. Grey Ice Sheet Observations on 14 January 1988

Date	14 January 88
Time Period	1910 to 2300
Scene	Bare Grey Ice (Sheet #2)
Age	70 hours
Thickness	75 mm
Roughness	
Height	0.048 cm rms
Correl. Length	0.669 cm
Tair	-23.5°C to -26.6°C
Tice	-16.0°C

Table 6. Rough Grey Ice Sheet Observations on 15 January 1988

Date	14 & 15 January 88
Time Period	2300 to 0130
Scene	Rough Grey Ice (Sheet #2)
Age	100 hours
Thickness	132 mm
Roughness	Cubes Formed 2.5 cm Thick Layer
Height	0.544 $\pm$.053 cm rms
Correl. Length	1.481 $\pm$.334 cm
Tair	-14.62°C to -18.1°C
Tice	-8.0°C (T=2016)

$\overline{\overline{M}}$ is defined by

$$\begin{pmatrix} |f_{hh}|^2 & |f_{hv}|^2 & \text{Re}(f_{hv}f_{hh}^*) & -\text{Im}(f_{hv}f_{hh}^*) \\ |f_{vh}|^2 & |f_{vv}|^2 & \text{Re}(f_{vv}f_{vh}^*) & -\text{Im}(f_{vv}f_{vh}^*) \\ 2\text{Re}(f_{vh}f_{hh}^*) & 2\text{Re}(f_{vv}f_{hv}^*) & \text{Re}(f_{vv}f_{hh}^* + f_{hv}f_{vh}^*) & -\text{Im}(f_{vv}f_{hh}^* - f_{vh}f_{hv}^*) \\ 2\text{Im}(f_{vh}f_{hh}^*) & 2\text{Im}(f_{vv}f_{hv}^*) & \text{Im}(f_{vv}f_{hh}^* + f_{vh}f_{hv}^*) & \text{Re}(f_{vv}f_{hh}^* - f_{hv}f_{vh}^*) \end{pmatrix}$$

$$\overline{\overline{C}} = \begin{pmatrix} |f_{hh}|^2 & f_{hh}f_{vh}^* & f_{hh}f_{vv}^* \\ f_{vh}f_{hh}^* & |f_{vh}|^2 & f_{vh}f_{vv}^* \\ f_{vv}f_{hh}^* & f_{vv}f_{vh}^* & |f_{vv}|^2 \end{pmatrix}$$

Figure 12. Forms of the modified Mueller $\overline{\overline{M}}$ and covariance $\overline{\overline{C}}$ matrices where fpq denotes the complex amplitude information which is a function of the polarizations p and q. The letters h and v denote horizontal and vertical, respectively.

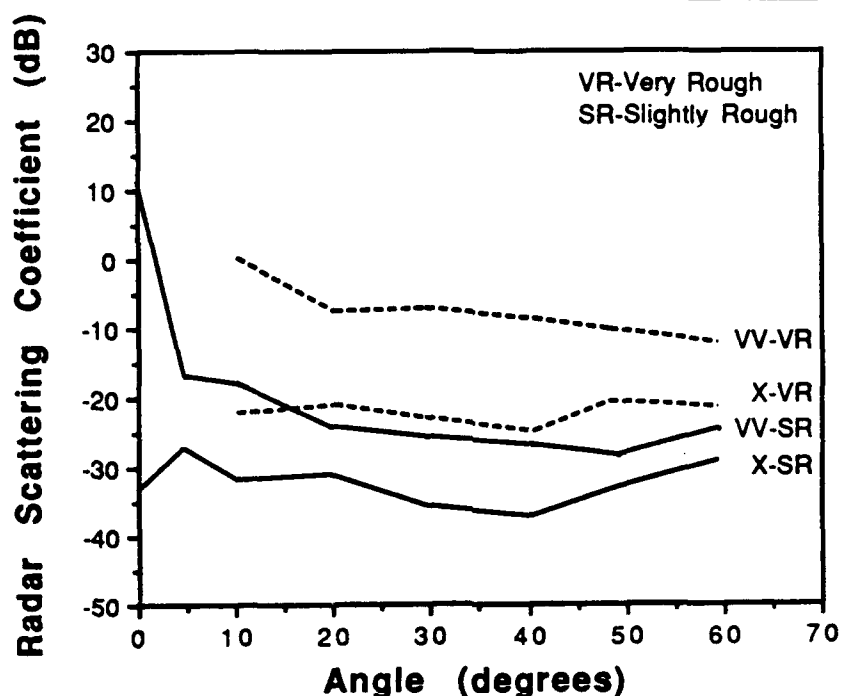


Figure 13: Radar scattering coefficient response for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 5.0 GHz.

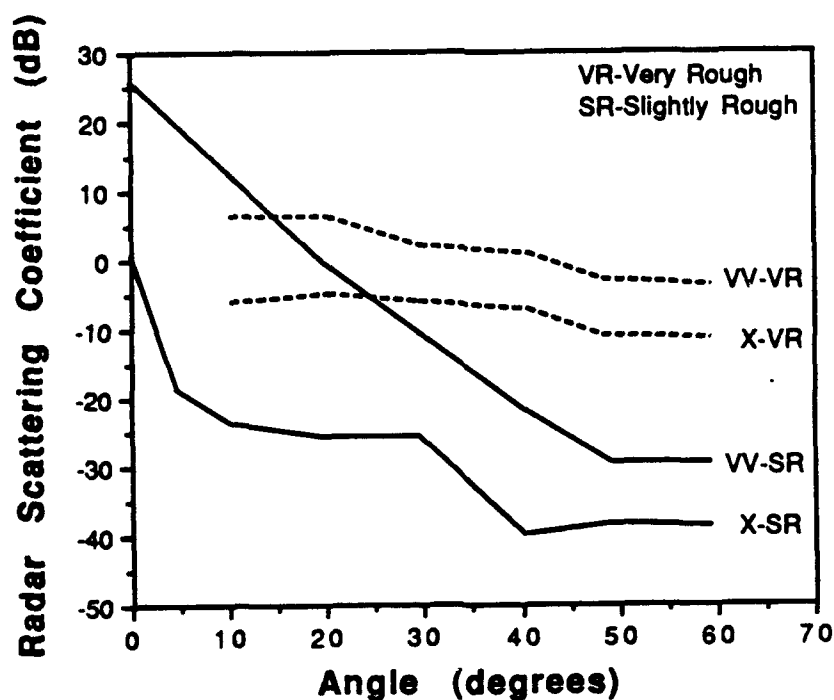


Figure 14: Radar scattering coefficient response for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 10.0 GHz.

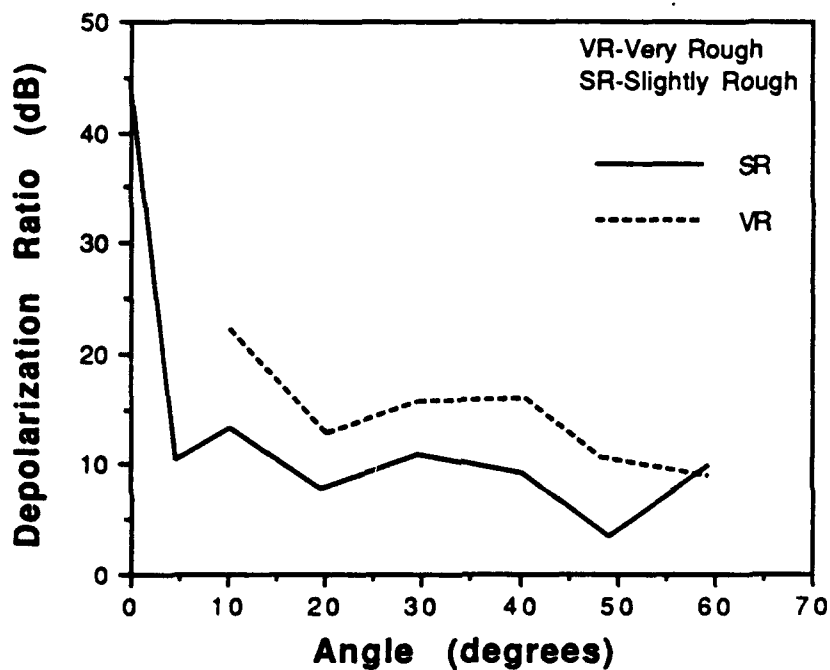


Figure 15: Depolarization response $(VV + HH) / (VH + HV)$ for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 5.0 GHz.

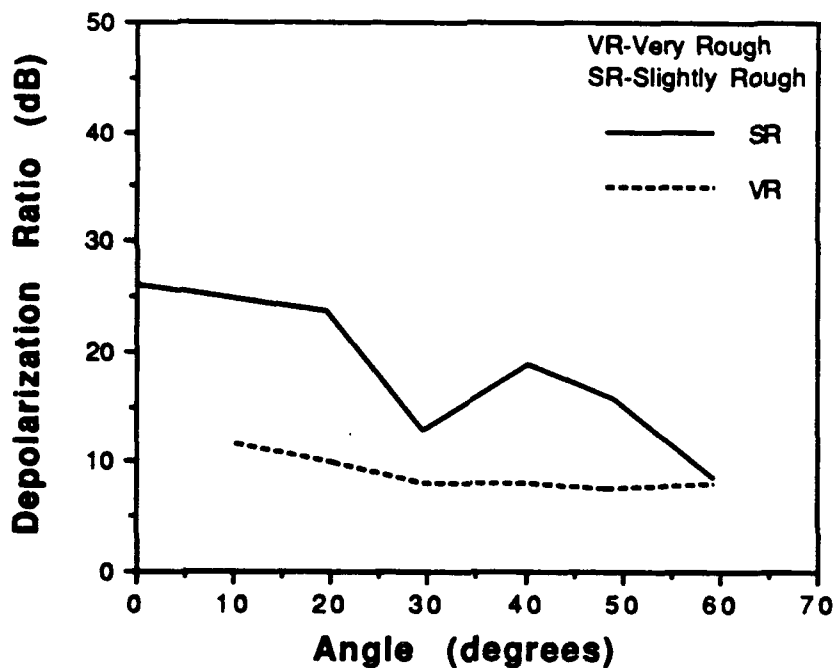


Figure 16: Depolarization response $(VV + HH) / (VH + HV)$ for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 10.0 GHz.

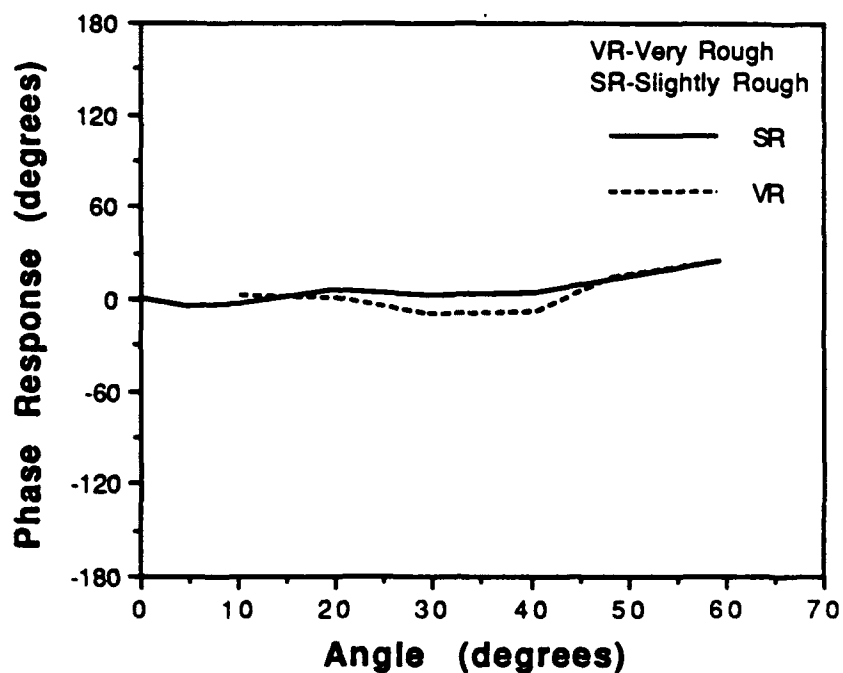


Figure 17: Phase difference (HH - VV) response for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 5.0 GHz.

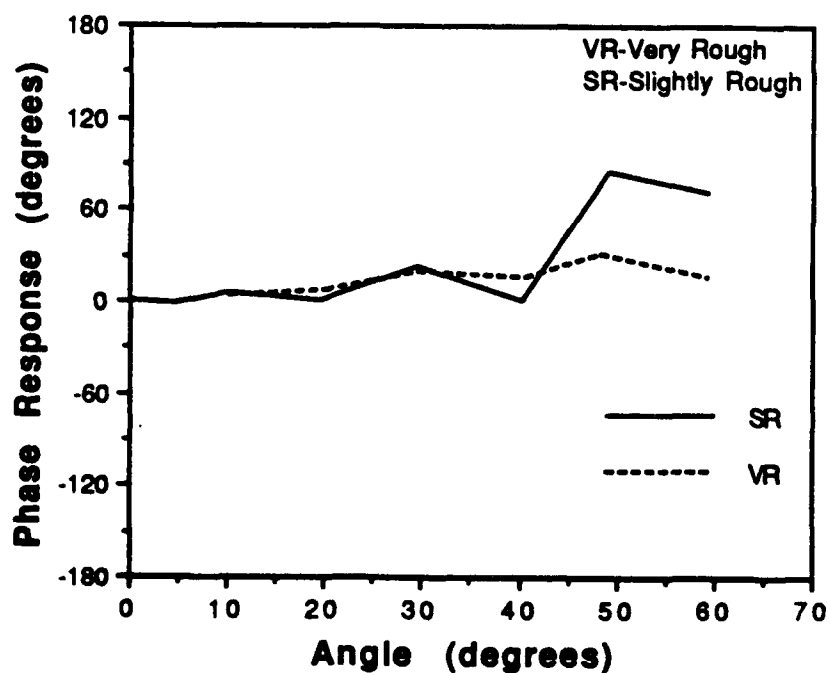


Figure 18: Phase difference (HH - VV) response for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 10.0 GHz.

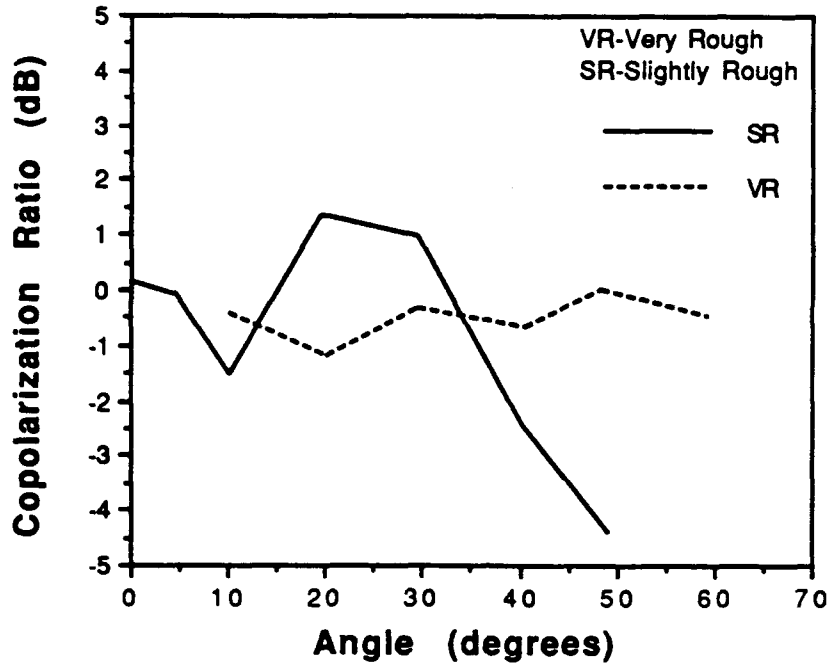


Figure 19: Copolarization response (VV / HH) for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 5.0 GHz.

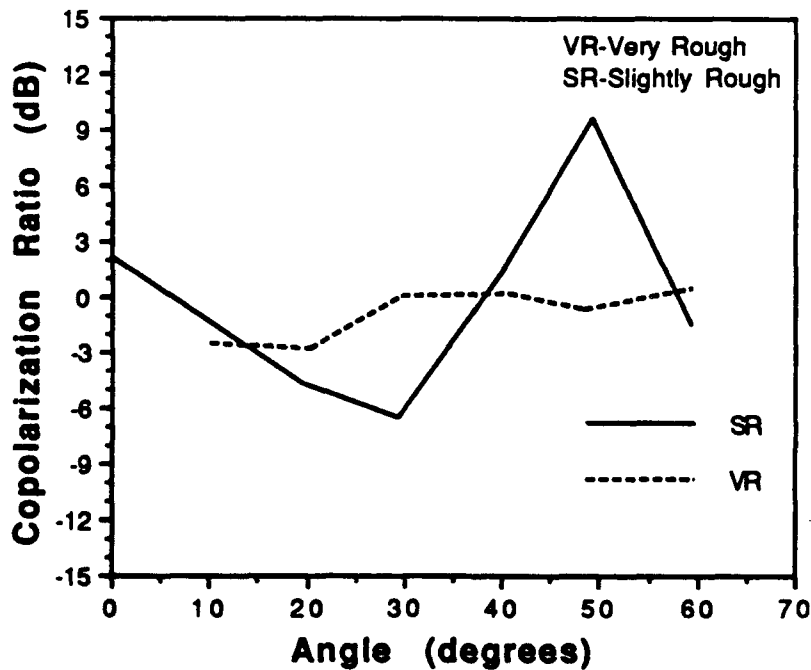


Figure 20: Copolarization response (VV / HH) for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 10.0 GHz.

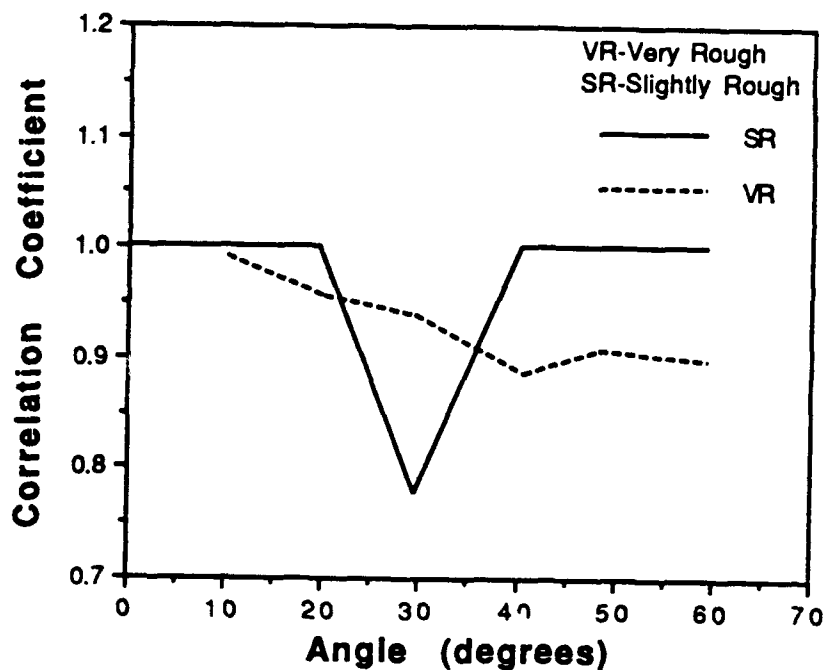


Figure 21: Correlation coefficient response for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 5.0 GHz.

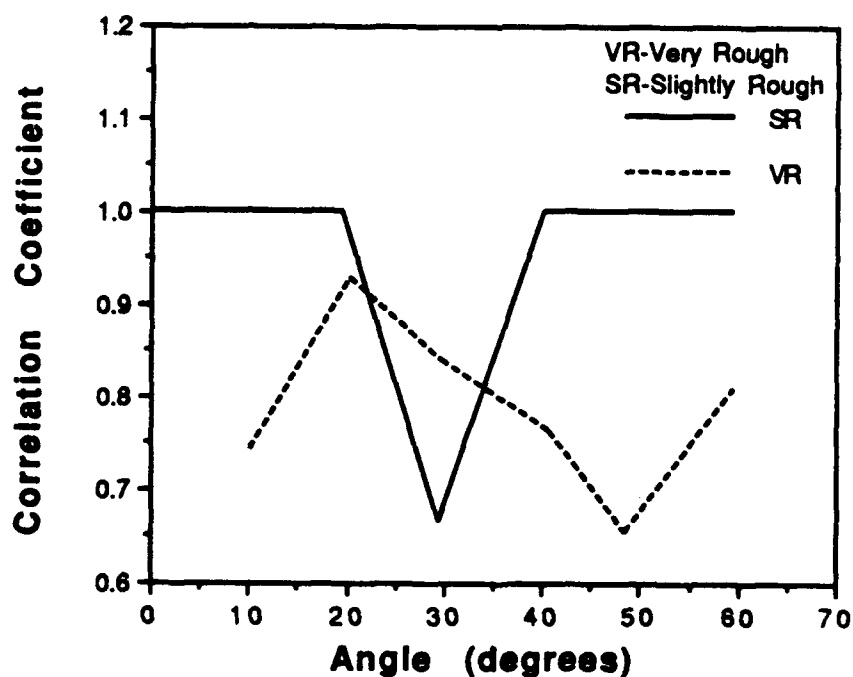


Figure 22: Correlation coefficient response for ice with a very rough surface (VR) and slightly rough surface (SR) for like and cross polarizations at 10.0 GHz.

6. CONCLUSIONS

Absolute backscatter levels for new to grey ice are small, except for the large, coherent returns at vertical. The backscatter responses of new, grey, rough grey, and desalinated first-year ice at linear polarization were found to be dissimilar. This was further demonstrated by examining their polarization signatures.

Results show that, in general, the backscatter response at VV and HH polarizations are similar at angles from vertical to 40 degrees, with the possibility of a few dB of spreading at the larger angles. Examination of the change in the Fresnel reflection coefficients at large angles explains the degree of separation. The nearly identical returns at VH and HV suggest reciprocity, i.e., that $VH = HV$. The rapidly decaying angular response and the large separation between like and cross polarized returns, especially between vertical to 20 degrees, are characteristic of scatter from a dielectric with a smooth surface in which there is sufficient penetration to produce a small volume scatter. This is necessary to generate the cross-polarized return. Study of the measurement system response to cross-polarization isolation will also be required to validate these conclusions.

REFERENCES

1. Carver, K.R. and R.H. Lang, Workshop on Microwave Scattering and Emission from the Earth's surface, held at George Washington University, Washington, DC, April 1985.

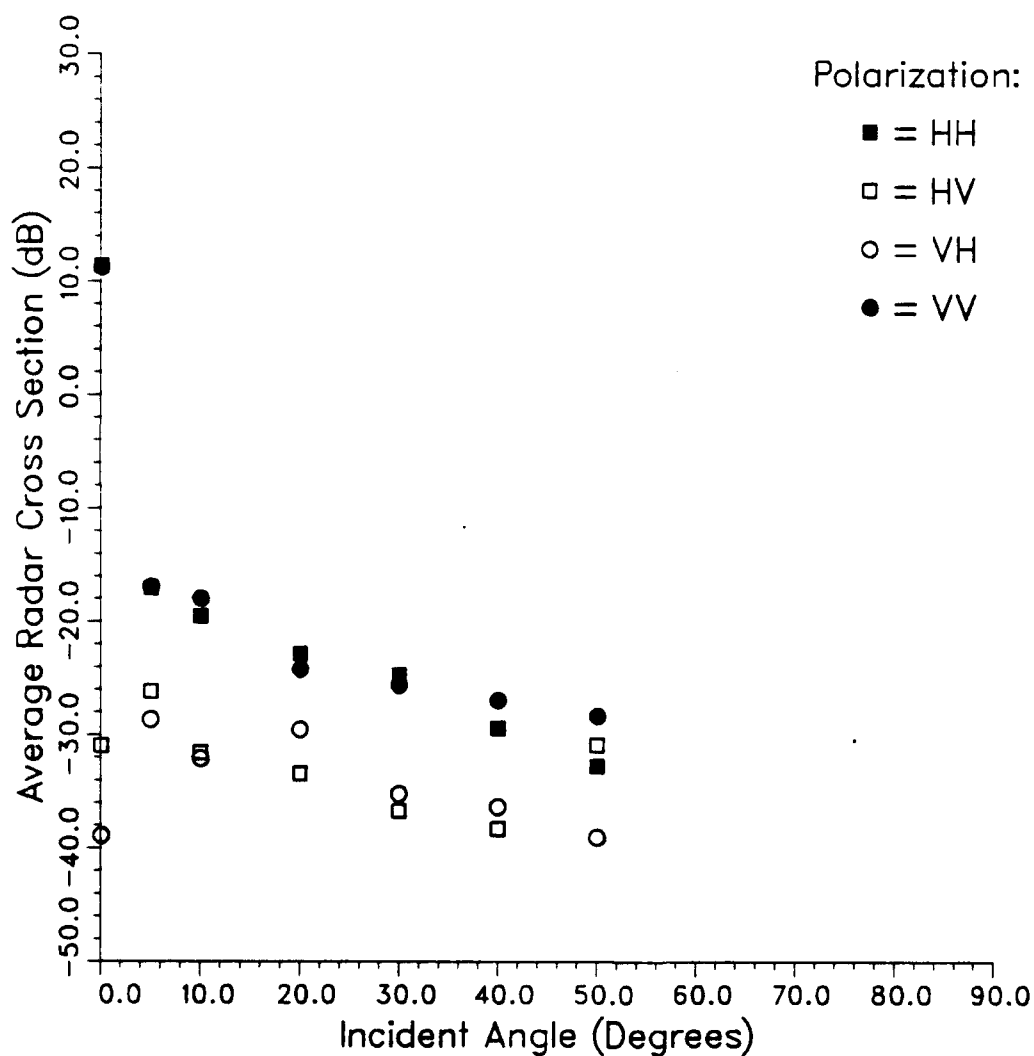
APPENDIX A

Average Radar Scattering Cross-Section σ^0 and Phase Difference
(HH/VV) Angular Response Data for 14 and 15 January 1988.

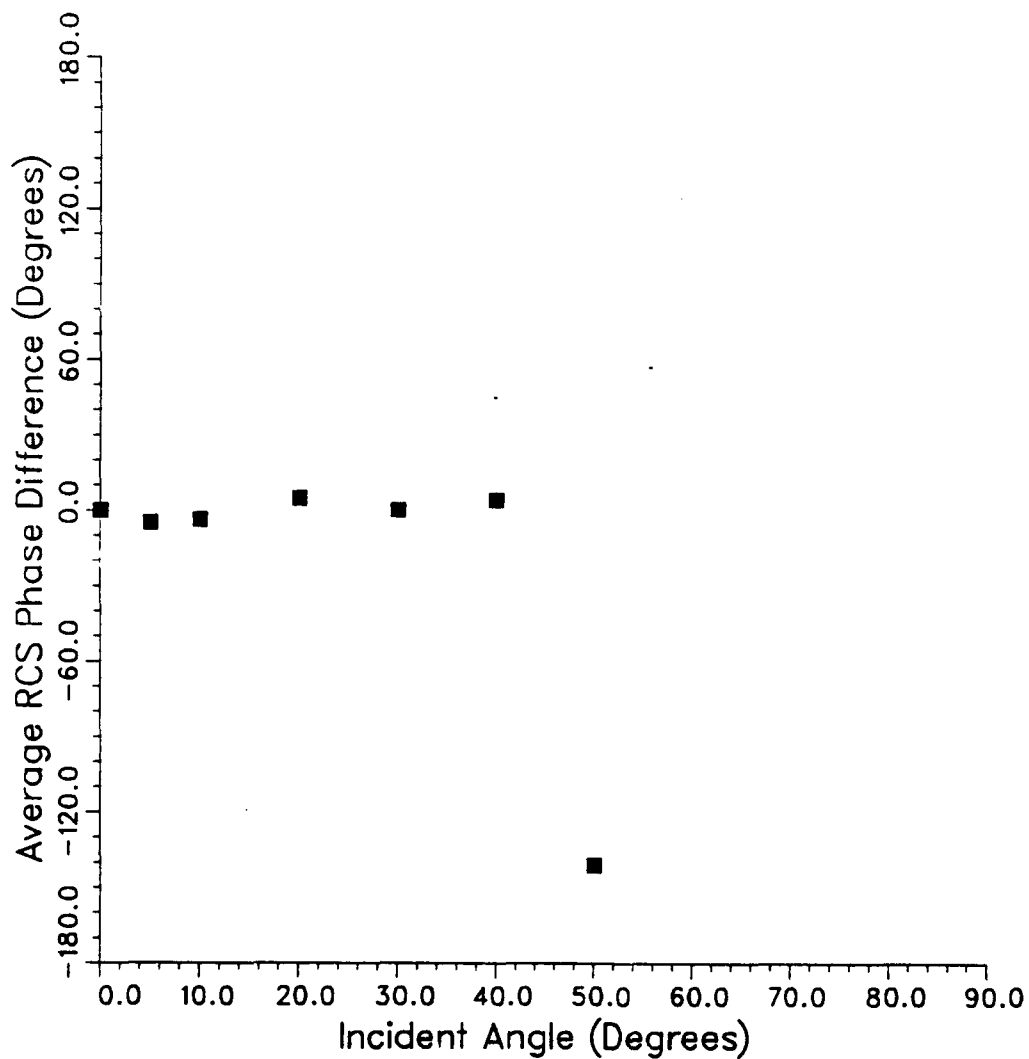
1988 CRREL Experiment

14 January C-Band Set A

Average RCS Magnitude



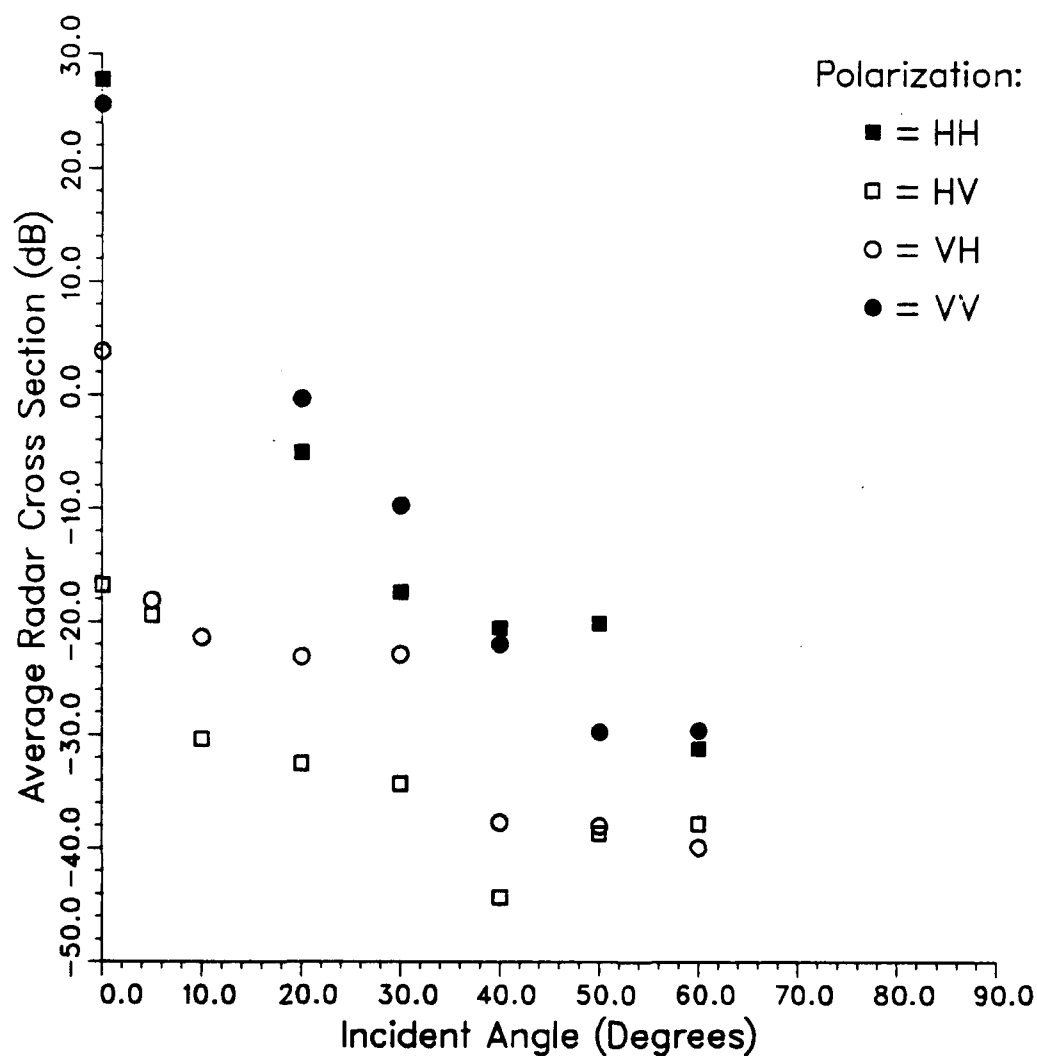
1988 CRREL Experiment
14 January C-Band Set A
Average HH-VV Phase



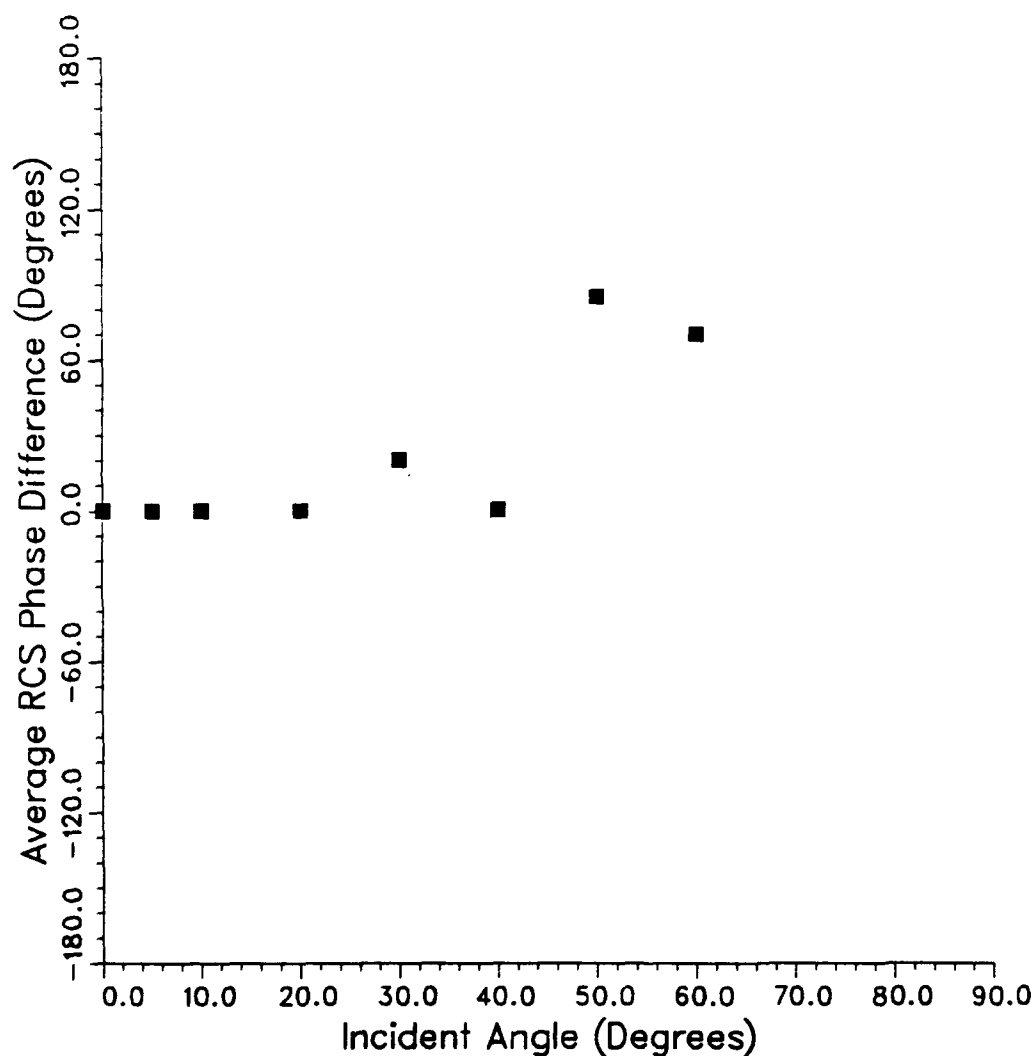
1988 CRREL Experiment

14 January X-Band Set A

Average RCS Magnitude



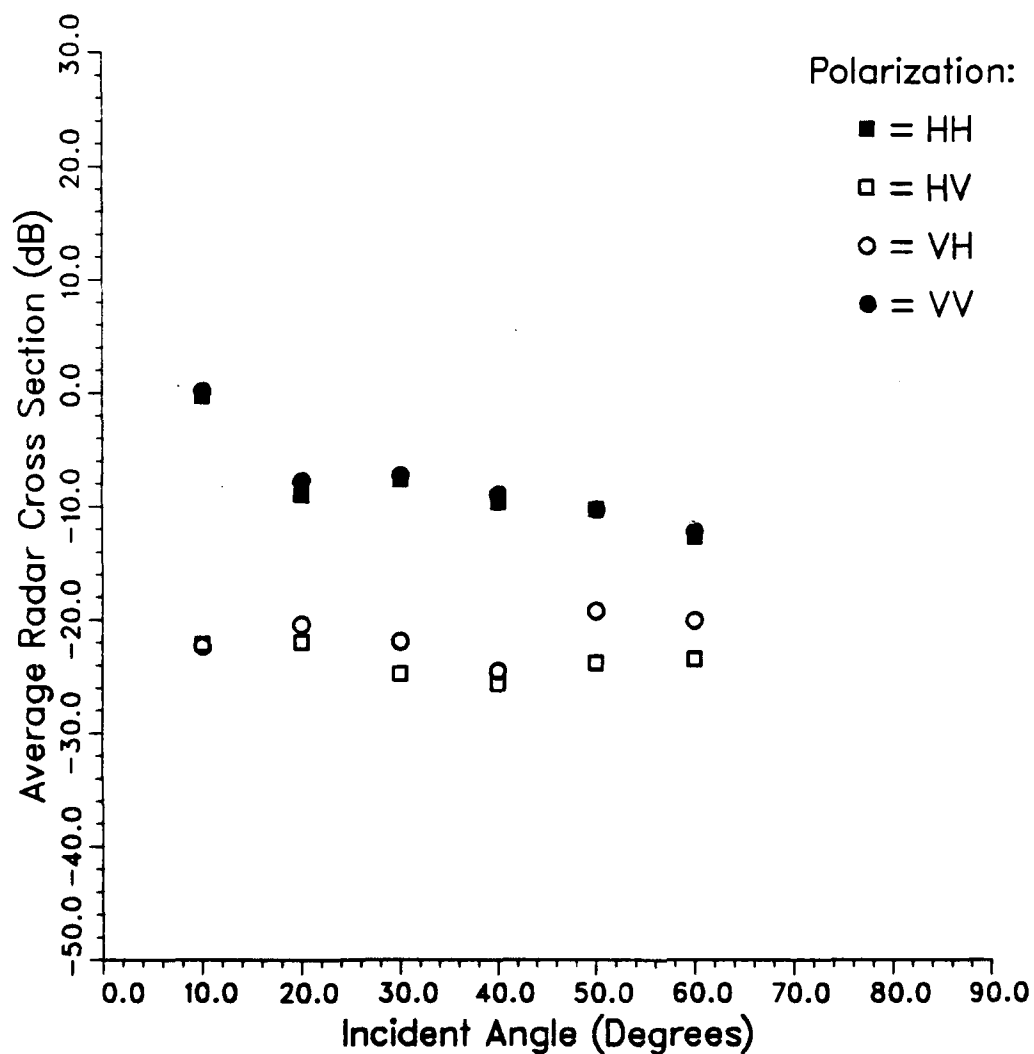
1988 CRREL Experiment
14 January X-Band Set A
Average HH-VV Phase



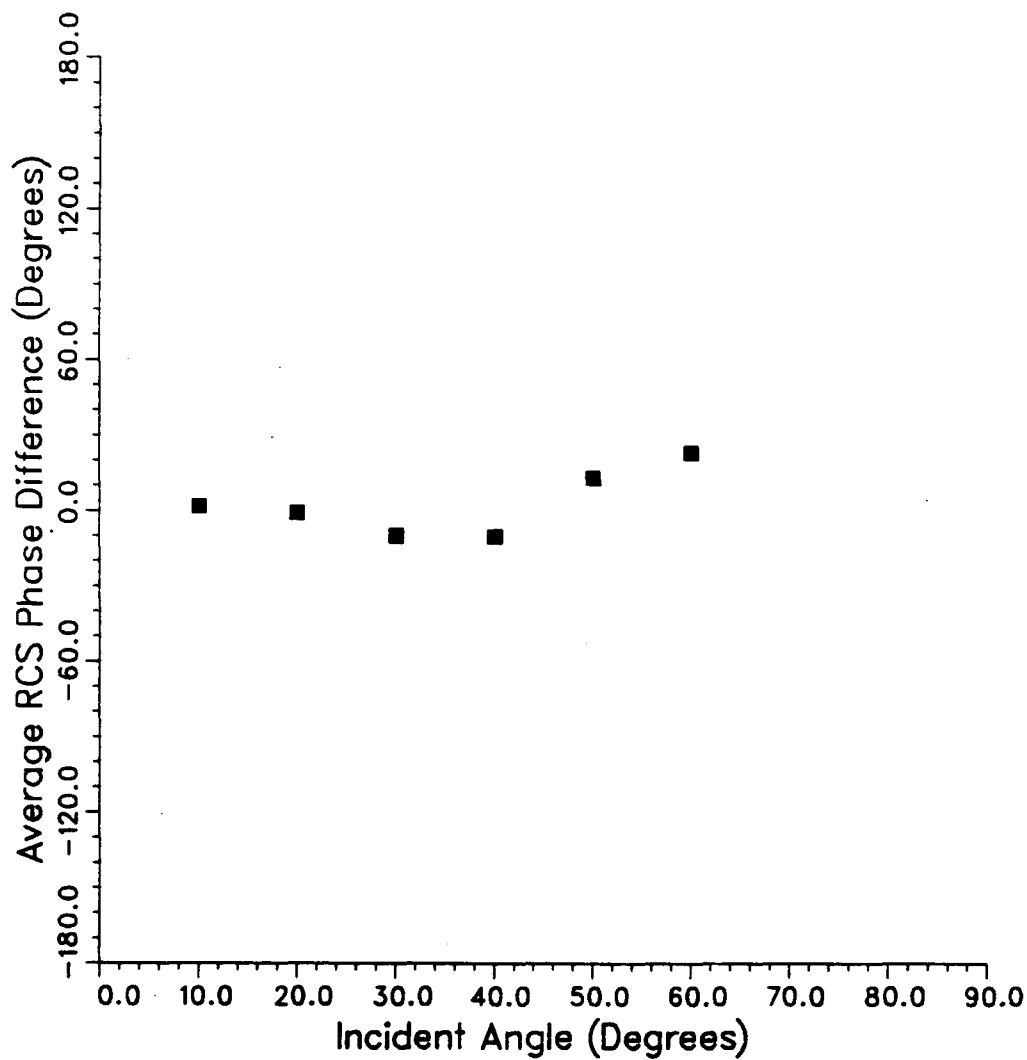
1988 CRREL Experiment

15 January C-Band Set A

Average RCS Magnitude



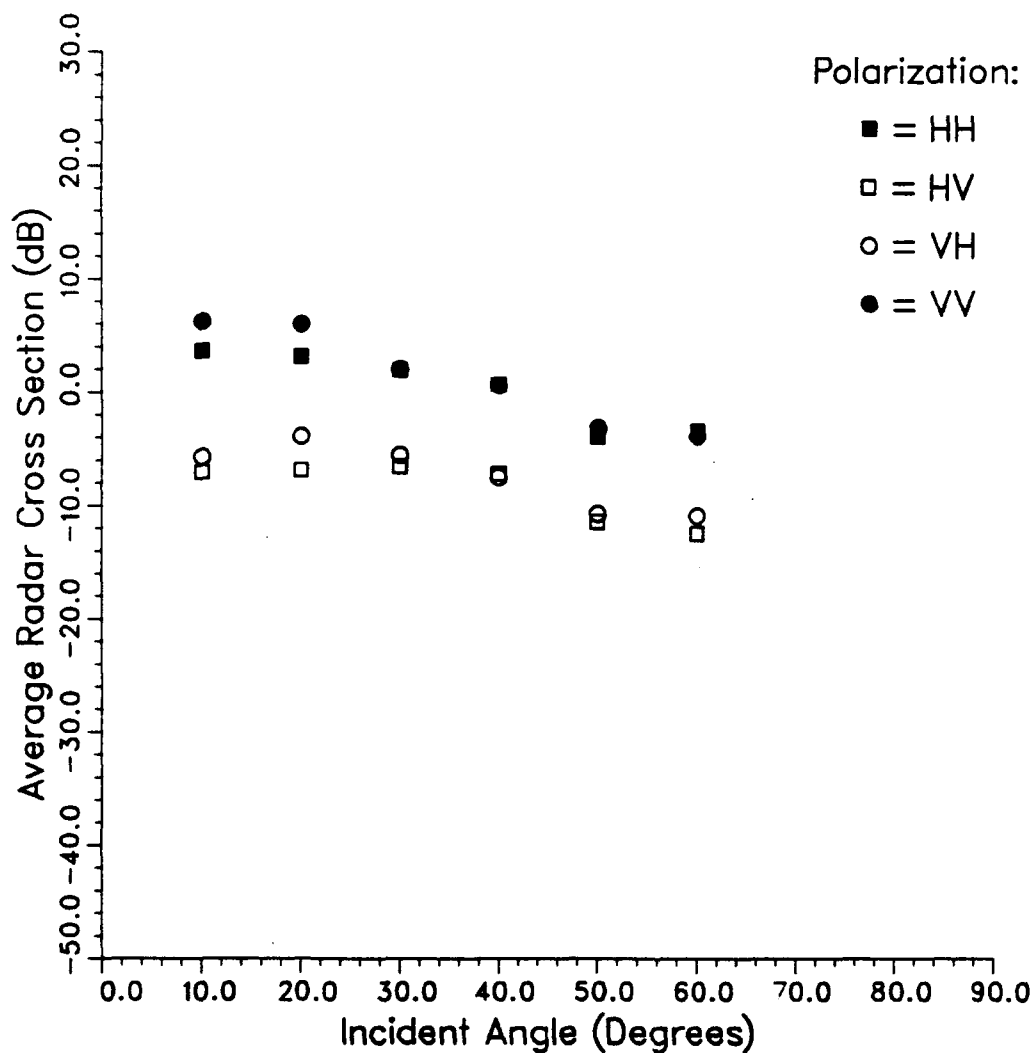
1988 CRREL Experiment
15 January C-Band Set A
Average HH-VV Phase



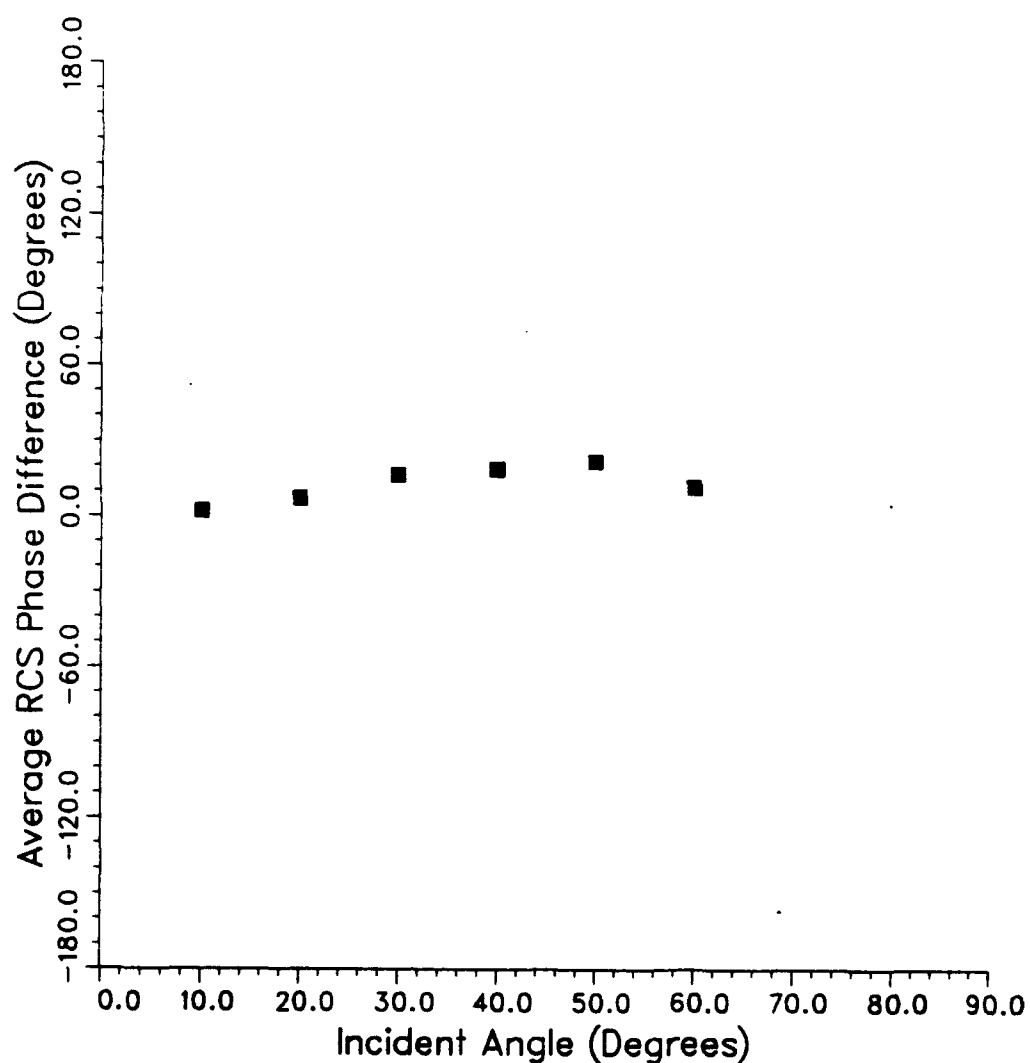
1988 CRREL Experiment

15 January X-Band Set A

Average RCS Magnitude



1988 CRREL Experiment
15 January X-Band Set A
Average HH-VV Phase



APPENDIX B

Average Mueller and Covariance Matrix Data for 14 and 15 January 1988.

01_14_A RUN: 0011 C BAND DATE: JAN 14 TIME: 21:30:00 INANG: 0.0
Average Mueller matrix file
Number of samples = 1

Average Mueller matrix:

0.1364583E+02	0.7998347E-03	-0.3888219E-01	-0.9696692E-01
0.1285287E-03	0.1324342E+02	0.2364647E-01	0.3380832E-01
0.4800609E-01	-0.7660916E-01	0.1344329E+02	-0.2683505E-03
0.6863627E-01	-0.1910529E+00	-0.2683505E-03	0.1344329E+02

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

11.351	0.00	-13.780	-55.03	11.284	0.00
-13.780	55.03	-38.911	0.00	-13.845	55.03
11.284	0.00	-13.845	-55.03	11.219	0.00

Average Covariance Matrix (Mag,Phase)

13.650	0.00	0.042	-55.03	13.440	0.00
0.042	55.03	0.000	0.00	0.041	55.03
13.440	0.00	0.041	-55.03	13.240	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	11.22 dB
2. RCS HH	11.35 dB
3. RCS X	-33.33 dB
4. Copolarization Ratio	0.13 dB
5. Depolarization Ratio	44.62 dB
6. Total Power	14.30 dB
7. Phase Relative to VV	0.00 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0010 C BAND DATE: JAN 14 TIME: 21:20:00 INANG: 4.7
Average Mueller matrix file
Number of samples = 1

Average Mueller matrix:

0.1976969E-01	0.2415461E-02	-0.5134582E-02	-0.4624822E-02
0.1358313E-02	0.2013725E-01	-0.1369482E-02	0.5047495E-02
-0.3531116E-02	-0.9557330E-02	0.2148266E-01	-0.2501096E-02
0.9743971E-02	-0.1015974E-01	0.7964446E-03	0.2148266E-01

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-17.040	0.00	-22.855	-109.92	-17.001	-4.74
-22.855	109.92	-28.671	0.00	-22.816	105.18
-17.001	4.74	-22.816	-105.18	-16.959	0.00

Average Covariance Matrix (Mag,Phase)

0.020	0.00	0.005	-109.92	0.020	-4.74
0.005	109.92	0.001	0.00	0.005	105.18
0.020	4.74	0.005	-105.18	0.020	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-16.96 dB
2. RCS HH	-17.04 dB
3. RCS X	-27.24 dB
4. Copolarization Ratio	-0.08 dB
5. Depolarization Ratio	10.24 dB
6. Total Power	-13.60 dB
7. Phase Relative to VV	-4.74 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0009 C BAND DATE: JAN 14 TIME: 21:12:00 INANG: 10.2
Average Mueller matrix file
Number of samples = 1

Average Mueller matrix:

0.1116863E-01	0.6966266E-03	-0.5307955E-03	0.2738361E-02
0.6180162E-03	0.1584893E-01	0.9061458E-03	0.2995630E-02
0.1215931E-02	-0.1654924E-02	0.1262487E-01	-0.7730430E-03
0.5111858E-02	0.6436177E-02	0.8282249E-03	0.1262487E-01

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-19.519	0.00	-25.805	-76.62	-18.760	-3.45
-25.805	76.62	-32.090	0.00	-25.045	73.17
-18.760	3.45	-25.045	-73.17	-18.000	0.00

Average Covariance Matrix (Mag,Phase)

0.011	0.00	0.003	-76.62	0.013	-3.45
0.003	76.62	0.001	0.00	0.003	73.17
0.013	3.45	0.003	-73.17	0.016	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-18.00 dB
2. RCS HH	-19.52 dB
3. RCS X	-31.82 dB
4. Copolarization Ratio	-1.52 dB
5. Depolarization Ratio	13.13 dB
6. Total Power	-15.48 dB
7. Phase Relative to VV	-3.45 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0008 C BAND DATE: JAN 14 TIME: 21:00:00 INANG: 19.6
Average Mueller matrix file
Number of samples = 1

Average Mueller matrix:

0.5176069E-02	0.4528977E-03	-0.4061349E-04	0.1530549E-02
0.1109175E-02	0.3775723E-02	-0.2007123E-02	0.3992416E-03
-0.4603730E-02	0.1528286E-03	0.4226176E-02	-0.3105708E-03
0.1330539E-02	0.2610883E-02	-0.1061179E-02	0.4226176E-02

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-22.860	0.00	-26.205	-163.88	-23.545	4.87
-26.205	163.88	-29.551	0.00	-26.890	168.75
-23.545	-4.87	-26.890	-168.75	-24.230	0.00

Average Covariance Matrix (Mag,Phase)

0.005	0.00	0.002	-163.88	0.004	4.87
0.002	163.88	0.001	0.00	0.002	168.75
0.004	-4.87	0.002	-168.75	0.004	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-24.23 dB
2. RCS HH	-22.86 dB
3. RCS X	-31.07 dB
4. Copolarization Ratio	1.37 dB
5. Depolarization Ratio	7.58 dB
6. Total Power	-19.78 dB
7. Phase Relative to VV	4.87 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0007 C BAND DATE: JAN 14 TIME: 20:45:00 INANG: 29.5
Average Mueller matrix file
Number of samples = 9

Average Mueller matrix:

0.3392237E-02	0.2123712E-03	0.3244430E-03	-0.1544954E-04
0.2997580E-03	0.2732587E-02	-0.9584693E-04	0.4071987E-03
0.1865634E-03	0.2733726E-03	0.2402951E-02	0.5288879E-04
0.7880249E-03	-0.9766961E-05	-0.3555640E-04	0.2402951E-02

Standard Deviation of Mueller matrices:

0.5705443E-03	0.9523863E-04	0.3664935E-04	0.1027911E-02
0.5997397E-03	0.2164184E-04	0.1663427E-02	0.2653654E-03
0.3341917E-02	0.7767264E-03	0.1115412E-02	0.1349563E-02
0.5565481E-03	0.1502253E-02	0.5257352E-03	0.1115412E-02

Average Covariance Matrix (dB,Phase)

-24.695	0.00	-33.926	-76.68	-26.255	1.07
-33.926	76.68	-35.232	0.00	-33.785	103.24
-26.255	-1.07	-33.785	-103.24	-25.634	0.00

Average Covariance Matrix (Mag,Phase)

0.003	0.00	0.000	-76.68	0.002	1.07
0.000	76.68	0.000	0.00	0.000	103.24
0.002	-1.07	0.000	-103.24	0.003	0.00

Standard Deviation of Covariance matrices:

0.001	0.00	0.002	-9.46	0.001	-49.07
0.002	9.46	0.001	0.00	0.002	-9.06
0.001	49.07	0.002	9.06	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-25.63 dB
2. RCS HH	-24.70 dB
3. RCS X	-35.92 dB
4. Copolarization Ratio	0.94 dB
5. Depolarization Ratio	10.78 dB
6. Total Power	-21.78 dB
7. Phase Relative to VV	1.07 degrees
8. Correlation Coeff.	0.778

01_14_A RUN: 0005 C BAND DATE: JAN 14 TIME: 20:20:00 INANG: 40.3
Average Mueller matrix file
Number of samples = 1

Average Mueller matrix:

0.1145513E-02	0.1479109E-03	-0.3314410E-03	0.2440916E-03
0.2312064E-03	0.2009093E-02	-0.4504516E-03	0.5114767E-03
-0.7341283E-03	-0.8290401E-03	0.1696179E-02	0.1354098E-03
-0.7214260E-03	0.7080670E-03	-0.8310520E-04	0.1696179E-02

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-29.408	0.00	-32.885	135.50	-28.190	4.13
-32.885	-135.50	-36.360	0.00	-31.665	-131.37
-28.190	-4.13	-31.665	131.37	-26.970	0.00

Average Covariance Matrix (Mag,Phase)

0.001	0.00	0.001	135.50	0.002	4.13
0.001	-135.50	0.000	0.00	0.001	-131.37
0.002	-4.13	0.001	131.37	0.002	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-26.97 dB
2. RCS HH	-29.41 dB
3. RCS X	-37.22 dB
4. Copolarization Ratio	-2.44 dB
5. Depolarization Ratio	9.20 dB
6. Total Power	-24.52 dB
7. Phase Relative to VV	4.13 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0004 C BAND DATE: JAN 14 TIME: 20:00:00 INANG: 49.3
Average Mueller matrix file
Number of samples = 1

Average Mueller matrix:

0.5308844E-03	0.8184647E-03	-0.3015116E-03	0.5861747E-03
0.1250259E-03	0.1465547E-02	0.3534895E-03	0.2414055E-03
-0.5135536E-03	-0.4471863E-03	-0.5628178E-03	-0.8505330E-03
0.4195106E-04	-0.2144299E-02	0.2596681E-03	-0.5628178E-03

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-32.750	0.00	-35.890	-175.33	-30.545	-141.00
-35.890	175.33	-39.031	0.00	-33.685	34.33
-30.545	141.00	-33.685	-34.33	-28.339	0.00

Average Covariance Matrix (Mag,Phase)

0.001	0.00	0.000	-175.33	0.001	-141.00
0.000	175.33	0.000	0.00	0.000	34.33
0.001	141.00	0.000	-34.33	0.001	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV -28.34 dB
2. RCS HH -32.75 dB
3. RCS X -33.26 dB
4. Copolarization Ratio -4.41 dB
5. Depolarization Ratio 3.26 dB
6. Total Power -25.32 dB
7. Phase Relative to VV -141.00 degrees
8. Correlation Coeff. 1.000

01_14_A RUN: 0003 C BAND DATE: JAN 14 TIME: 19:40:00 INANG: 59.5
 Average Mueller matrix file
 Number of samples = 1

Average Mueller matrix:

0.2009093E-01	0.8147043E-03	0.2617867E-03	-0.4037281E-02
0.1682675E-02	0.3589218E-02	-0.2162176E-02	-0.1168109E-02
-0.1158789E-01	-0.1162424E-02	0.7609494E-02	0.4554925E-02
-0.9730631E-03	-0.3216423E-02	-0.2239013E-02	0.7609494E-02

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-16.970	0.00	-22.355	175.20	-20.710	23.58
-22.355	-175.20	-27.739	0.00	-26.095	-151.62
-20.710	-23.58	-26.095	151.62	-24.450	0.00

Average Covariance Matrix (Mag,Phase)

0.020	0.00	0.006	175.20	0.008	23.58
0.006	-175.20	0.002	0.00	0.002	-151.62
0.008	-23.58	0.002	151.62	0.004	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-24.45 dB
2. RCS HH	-16.97 dB
3. RCS X	-29.04 dB
4. Copolarization Ratio	7.48 dB
5. Depolarization Ratio	9.77 dB
6. Total Power	-15.82 dB
7. Phase Relative to VV	23.58 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0011 X BAND DATE: JAN 14 TIME: 21:30:00 INANG: 0.0
 Average Mueller matrix file
 Number of samples = 1

Average Mueller matrix:

0.6039485E+03	0.2113489E-01	-0.3439773E+01	0.9655808E+00
0.2421029E+01	0.3664375E+03	0.2707741E+02	-0.1240844E+02
0.6952439E+02	-0.5358704E+01	0.4702628E+03	0.1463063E+00
-0.3186011E+02	0.1504245E+01	0.1463063E+00	0.4702628E+03

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

27.810	0.00	15.825	24.62	26.725	0.00
15.825	-24.62	3.840	0.00	14.740	-24.62
26.725	0.00	14.740	24.62	25.640	0.00

Average Covariance Matrix (Mag,Phase)

603.900	0.00	38.236	24.62	470.400	0.00
38.236	-24.62	2.421	0.00	29.788	-24.62
470.400	0.00	29.788	24.62	366.400	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	25.64 dB
2. RCS HH	27.81 dB
3. RCS X	0.87 dB
4. Copolarization Ratio	2.17 dB
5. Depolarization Ratio	25.99 dB
6. Total Power	29.88 dB
7. Phase Relative to VV	0.00 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0010 X BAND DATE: JAN 14 TIME: 21:20:00 INANG: 4.7
 Average Mueller matrix file
 Number of samples = 1

Average Mueller matrix:

0.1002306E-09	0.1140250E-01	-0.1062599E-05	-0.1173122E-06
0.1538155E-01	0.1002306E-09	0.2774105E-06	0.1210267E-05
0.4950917E-06	-0.2118782E-05	-0.1200284E-02	-0.1318891E-01
0.2433453E-05	-0.2868474E-06	-0.1318891E-01	-0.1200284E-02

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-99.991	0.00	-59.059	-78.50	-99.990	-1.41
-59.059	78.50	-18.130	0.00	-59.061	77.09
-99.990	1.41	-59.061	-77.09	-99.991	0.00

Average Covariance Matrix (Mag,Phase)

0.000	0.00	0.000	-78.50	0.000	-1.41
0.000	78.50	0.015	0.00	0.000	77.09
0.000	1.41	0.000	-77.09	0.000	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-99.99 dB
2. RCS HH	-99.99 dB
3. RCS X	-18.73 dB
4. Copolarization Ratio	0.00 dB
5. Depolarization Ratio	-81.26 dB
6. Total Power	-15.72 dB
7. Phase Relative to VV	-1.41 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0009 X BAND DATE: JAN 14 TIME: 21:12:00 INANG: 10.2
Average Mueller matrix file
Number of samples = 1

Average Mueller matrix:

0.1002306E-09	0.9225712E-03	-0.3039816E-06	0.8066253E-08
0.7277799E-02	0.1002306E-09	-0.8033883E-06	-0.2898713E-06
-0.1652858E-05	-0.6039741E-06	0.2523761E-02	0.5872971E-03
-0.4311533E-06	0.7137822E-07	0.5872971E-03	0.2523761E-02

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-99.991	0.00	-60.685	165.38	-99.990	5.22
-60.685	-165.38	-21.380	0.00	-60.685	-160.16
-99.990	-5.22	-60.685	160.16	-99.991	0.00

Average Covariance Matrix (Mag,Phase)

0.000	0.00	0.000	165.38	0.000	5.22
0.000	-165.38	0.007	0.00	0.000	-160.16
0.000	-5.22	0.000	160.16	0.000	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-99.99 dB
2. RCS HH	-99.99 dB
3. RCS X	-23.87 dB
4. Copolarization Ratio	0.00 dB
5. Depolarization Ratio	-76.12 dB
6. Total Power	-20.86 dB
7. Phase Relative to VV	5.22 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0008 X BAND DATE: JAN 14 TIME: 21:00:00 INANG: 19.6
 Average Mueller matrix file
 Number of samples = 1

Average Mueller matrix:

0.3111716E+00	0.5584705E-03	-0.1292612E-01	0.2587588E-02
0.4897790E-02	0.9225715E+00	-0.1173044E-01	0.6618880E-01
-0.1343735E-01	-0.4449225E-01	0.5357543E+00	-0.3441678E-03
0.7691326E-01	0.9019715E-02	-0.2962562E-02	0.5357543E+00

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-5.070	0.00	-14.085	-99.91	-2.710	0.14
-14.085	99.91	-23.100	0.00	-11.725	100.05
-2.710	-0.14	-11.725	-100.05	-0.350	0.00

Average Covariance Matrix (Mag,Phase)

0.311	0.00	0.039	-99.91	0.536	0.14
0.039	99.91	0.005	0.00	0.067	100.05
0.536	-0.14	0.067	-100.05	0.923	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-0.35 dB
2. RCS HH	-5.07 dB
3. RCS X	-25.64 dB
4. Copolarization Ratio	-4.72 dB
5. Depolarization Ratio	23.54 dB
6. Total Power	0.93 dB
7. Phase Relative to VV	0.14 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0007 X BAND DATE: JAN 14 TIME: 20:45:00 INANG: 29.5
Average Mueller matrix file
Number of samples = 9

Average Mueller matrix:

0.1814275E-01	0.3675611E-03	-0.6884908E-04	-0.6605790E-03
0.5100552E-02	0.8195166E-01	-0.7281893E-02	-0.6085666E-02
0.4351518E-03	-0.1683905E-02	0.2332316E-01	0.1021065E-01
0.3708761E-02	-0.1356754E-02	-0.9866958E-02	0.2332316E-01

Standard Deviation of Mueller matrices:

0.1290285E-01	0.2476112E-03	0.3514185E-03	0.2569524E-02
0.4564755E-02	0.4249974E-01	0.1022299E-03	0.2195536E-02
0.8588553E-02	0.6134886E-02	0.3215335E-01	0.1751499E-01
0.3950748E-02	0.7673441E-02	0.1836222E-01	0.3215335E-01

Average Covariance Matrix (dB,Phase)

-17.413	0.00	-27.289	-83.32	-15.912	23.05
-27.289	83.32	-22.923	0.00	-20.227	-140.12
-15.912	-23.05	-20.227	140.12	-10.864	0.00

Average Covariance Matrix (Mag,Phase)

0.018	0.00	0.002	-83.32	0.026	23.05
0.002	83.32	0.005	0.00	0.009	-140.12
0.026	-23.05	0.009	140.12	0.082	0.00

Standard Deviation of Covariance matrices:

0.013	0.00	0.005	-24.70	0.037	29.34
0.005	24.70	0.005	0.00	0.002	87.33
0.037	-29.34	0.002	-87.33	0.043	0.00

Polarimetric Discriminants:

1. RCS VV -10.86 dB
2. RCS HH -17.41 dB
3. RCS X -25.63 dB
4. Copolarization Ratio -6.55 dB
5. Depolarization Ratio 12.63 dB
6. Total Power -9.76 dB
7. Phase Relative to VV 23.05 degrees
8. Correlation Coeff. 0.665

01_14_A RUN: 0005 X BAND DATE: JAN 14 TIME: 20:20:00 INANG: 40.3
 Average Mueller matrix file
 Number of samples = 1

Average Mueller matrix:

0.8770010E-02	0.3698280E-04	-0.4567394E-04	0.5676737E-03
0.1678804E-03	0.6280581E-02	0.1026097E-02	-0.3888062E-04
0.2423942E-02	-0.6723792E-04	0.7418718E-02	0.1564729E-03
-0.1172784E-03	0.9615473E-03	0.1037210E-05	0.7418718E-02

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-20.570	0.00	-29.160	2.77	-21.295	0.60
-29.160	-2.77	-37.749	0.00	-29.885	-2.17
-21.295	-0.60	-29.885	2.17	-22.020	0.00

Average Covariance Matrix (Mag,Phase)

0.009	0.00	0.001	2.77	0.007	0.60
0.001	-2.77	0.000	0.00	0.001	-2.17
0.007	-0.60	0.001	2.17	0.006	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-22.02 dB
2. RCS HH	-20.57 dB
3. RCS X	-39.90 dB
4. Copolarization Ratio	1.45 dB
5. Depolarization Ratio	18.66 dB
6. Total Power	-18.17 dB
7. Phase Relative to VV	0.60 degrees
8. Correlation Coeff.	1.000

01_14_A RUN: 0004 X BAND DATE: JAN 14 TIME: 20:00:00 INANG: 49.3
 Average Mueller matrix file
 Number of samples = 1

Average Mueller matrix:

0.9638291E-02	0.1355189E-03	0.3290802E-04	-0.1142404E-02
0.1573983E-03	0.1064143E-02	0.3832931E-03	0.1434599E-03
0.1051964E-02	-0.7547557E-03	0.1355451E-03	0.3125389E-02
-0.2227459E-02	-0.8479286E-04	-0.3257681E-02	0.1355451E-03

Standard Deviation of Mueller matrices:

0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00
0.0000000E+00	0.0000000E+00	0.0000000E+00	0.0000000E+00

Average Covariance Matrix (dB,Phase)

-20.160	0.00	-29.094	64.72	-24.944	85.24
-29.094	-64.72	-38.030	0.00	-33.880	20.52
-24.944	-85.24	-33.880	-20.52	-29.731	0.00

Average Covariance Matrix (Mag,Phase)

0.010	0.00	0.001	64.72	0.003	85.24
0.001	-64.72	0.000	0.00	0.000	20.52
0.003	-85.24	0.000	-20.52	0.001	0.00

Standard Deviation of Covariance matrices:

0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00
0.000	0.00	0.000	0.00	0.000	0.00

Polarimetric Discriminants:

1. RCS VV	-29.73 dB
2. RCS HH	-20.16 dB
3. RCS X	-38.34 dB
4. Copolarization Ratio	9.57 dB
5. Depolarization Ratio	15.63 dB
6. Total Power	-19.59 dB
7. Phase Relative to VV	85.24 degrees
8. Correlation Coeff.	1.000

01_15_A RUN: 0032 C BAND DATE: JAN 16 TIME: 11:08:29 INANG: 10.2
Average Mueller matrix file
Number of samples = 10

Average Mueller matrix:

0.9398540E+00	0.6090157E-02	0.6322323E-02	0.3869399E-02
0.5821473E-02	0.1039014E+01	0.6327598E-02	-0.9631803E-02
0.1383620E-01	0.9903564E-02	0.9791873E+00	0.2953304E-01
-0.1459526E-01	0.1994299E-01	-0.2544824E-01	0.9791873E+00

Standard Deviation of Mueller matrices:

0.6707005E+00	0.1498175E-02	0.2358056E-01	0.2675904E-01
0.3404237E-02	0.7109191E+00	0.4632493E-01	0.2558872E-01
0.8281478E-01	0.4473582E-01	0.6868425E+00	0.1060761E-01
0.3890819E-01	0.4943384E-01	0.1596229E-01	0.6868425E+00

Average Covariance Matrix (dB,Phase)

-0.269	0.00	-19.976	46.53	-0.090	1.61
-19.976	-46.53	-22.350	0.00	-19.385	-56.69
-0.090	-1.61	-19.385	56.69	0.166	0.00

Average Covariance Matrix (Mag,Phase)

0.940	0.00	0.010	46.53	0.979	1.61
0.010	-46.53	0.006	0.00	0.012	-56.69
0.979	-1.61	0.012	56.69	1.039	0.00

Standard Deviation of Covariance matrices:

0.671	0.00	0.046	-25.17	0.682	1.12
0.046	25.17	0.003	0.00	0.053	28.92
0.682	-1.12	0.053	-28.92	0.711	0.00

Polarimetric Discriminants:

1. RCS VV	0.17 dB
2. RCS HH	-0.27 dB
3. RCS X	-22.25 dB
4. Copolarization Ratio	-0.44 dB
5. Depolarization Ratio	22.20 dB
6. Total Power	2.99 dB
7. Phase Relative to VV	1.61 degrees
8. Correlation Coeff.	0.991

01_15_A RUN: 0022 C BAND DATE: JAN 16 TIME: 09:58:05 INANG: 20.3
Average Mueller matrix file
Number of samples = 10

Average Mueller matrix:

0.1269704E+00	0.6360862E-02	-0.6074651E-02	0.3919881E-02
0.9068301E-02	0.1673510E+00	-0.2496575E-02	-0.9112185E-02
-0.7866858E-02	-0.1902704E-01	0.1405997E+00	0.7306580E-03
-0.1790308E-01	0.1754902E-01	0.2095750E-02	0.1405997E+00

Standard Deviation of Mueller matrices:

0.6902757E-01	0.4451009E-02	0.4442619E-02	0.3697739E-02
0.3623273E-02	0.4145854E-01	0.5880348E-02	0.3391775E-01
0.4417202E-02	0.1198436E-01	0.5417249E-01	0.6119418E-02
0.5123632E-01	0.1774387E-01	0.2804436E-02	0.5417249E-01

Average Covariance Matrix (dB,Phase)

-8.963	0.00	-20.098	113.73	-8.558	-0.28
-20.098	-113.73	-20.425	0.00	-20.247	-105.32
-8.558	0.28	-20.247	105.32	-7.764	0.00

Average Covariance Matrix (Mag,Phase)

0.127	0.00	0.010	113.73	0.139	-0.28
0.010	-113.73	0.009	0.00	0.009	-105.32
0.139	0.28	0.009	105.32	0.167	0.00

Standard Deviation of Covariance matrices:

0.069	0.00	0.026	85.07	0.054	1.76
0.026	-85.07	0.004	0.00	0.034	-80.16
0.054	-1.76	0.034	80.16	0.041	0.00

Polarimetric Discriminants:

1. RCS VV	-7.76 dB
2. RCS HH	-8.96 dB
3. RCS X	-21.13 dB
4. Copolarization Ratio	-1.20 dB
5. Depolarization Ratio	12.80 dB
6. Total Power	-5.09 dB
7. Phase Relative to VV	-0.28 degrees
8. Correlation Coeff.	0.956

01_15_A RUN: 0013 C BAND DATE: JAN 16 TIME: 08:57:57 INANG: 29.7
Average Mueller matrix file
Number of samples = 9

Average Mueller matrix:

0.1719787E+00	0.3342652E-02	0.1616784E-02	0.1522670E-02
0.6433079E-02	0.1867187E+00	0.4911976E-02	-0.6365882E-02
0.1908273E-01	-0.2681602E-02	0.1671723E+00	-0.2858806E-01
-0.9308816E-02	0.5473140E-02	0.2943294E-01	0.1671723E+00

Standard Deviation of Mueller matrices:

0.1252052E+00	0.9160410E-03	0.1675385E-02	0.8609590E-02
0.5331845E-03	0.1164114E+00	0.1119432E-01	0.2154369E-01
0.6342480E-02	0.9912864E-02	0.1117405E+00	0.3031259E-01
0.3493898E-01	0.1962949E-01	0.2384578E-01	0.1117405E+00

Average Covariance Matrix (dB,Phase)

-7.646	0.00	-19.741	25.99	-7.748	-9.95
-19.741	-25.99	-21.916	0.00	-20.947	-52.35
-7.748	9.95	-20.947	52.35	-7.288	0.00

Average Covariance Matrix (Mag,Phase)

0.172	0.00	0.011	25.99	0.168	-9.95
0.011	-25.99	0.006	0.00	0.008	-52.35
0.168	9.95	0.008	52.35	0.187	0.00

Standard Deviation of Covariance matrices:

0.125	0.00	0.018	-79.72	0.111	-14.06
0.018	79.72	0.001	0.00	0.024	62.54
0.111	14.06	0.024	-62.54	0.116	0.00

Polarimetric Discriminants:

1. RCS VV	-7.29 dB
2. RCS HH	-7.65 dB
3. RCS X	-23.11 dB
4. Copolarization Ratio	-0.36 dB
5. Depolarization Ratio	15.65 dB
6. Total Power	-4.34 dB
7. Phase Relative to VV	-9.95 degrees
8. Correlation Coeff.	0.937

01_15_A RUN: 0002 C BAND DATE: JAN 15 TIME: 06:53:09 INANG: 40.7
 Average Mueller matrix file
 Number of samples = 9

Average Mueller matrix:

0.1081651E+00	0.2709920E-02	-0.2177921E-02	-0.1502540E-02
0.3511765E-02	0.1267241E+00	0.7349306E-02	0.2953803E-03
0.9108718E-02	-0.7463287E-02	0.1021633E+00	-0.1467612E-01
0.5162742E-02	0.5121990E-02	0.1443734E-01	0.1021633E+00

Standard Deviation of Mueller matrices:

0.1397612E-01	0.3591019E-03	0.1690208E-01	0.1000354E-01
0.3519061E-03	0.1715581E-01	0.2881597E-01	0.9455880E-02
0.4365052E-01	0.4411388E-01	0.1080952E-01	0.1580600E-01
0.1103987E-01	0.1544536E-01	0.1615189E-01	0.1080952E-01

Average Covariance Matrix (dB,Phase)

-9.659	0.00	-22.811	-29.55	-9.844	-8.07
-22.811	29.55	-24.545	0.00	-21.334	2.30
-9.844	8.07	-21.334	-2.30	-8.971	0.00

Average Covariance Matrix (Mag,Phase)

0.108	0.00	0.005	-29.55	0.104	-8.07
0.005	29.55	0.004	0.00	0.007	2.30
0.104	8.07	0.007	-2.30	0.127	0.00

Standard Deviation of Covariance matrices:

0.014	0.00	0.023	14.19	0.021	49.24
0.023	-14.19	0.000	0.00	0.030	-18.17
0.021	-49.24	0.030	18.17	0.017	0.00

Polarimetric Discriminants:

1. RCS VV	-8.97 dB
2. RCS HH	-9.66 dB
3. RCS X	-25.07 dB
4. Copolarization Ratio	-0.69 dB
5. Depolarization Ratio	15.77 dB
6. Total Power	-6.18 dB
7. Phase Relative to VV	-8.07 degrees
8. Correlation Coeff.	0.885

01_15_A RUN: 0052 C BAND DATE: JAN 16 TIME: 09:45:32 INANG: 48.5
Average Mueller matrix file
Number of samples = 5

Average Mueller matrix:

0.9369382E-01	0.4137609E-02	-0.5250036E-03	-0.2170575E-02
0.1189678E-01	0.9334470E-01	-0.1676074E-01	0.1221437E-01
-0.2198932E-01	-0.8111399E-02	0.8538236E-01	0.2131577E-01
0.3614878E-01	-0.9823559E-02	-0.1735384E-01	0.8538236E-01

Standard Deviation of Mueller matrices:

0.1480781E-01	0.5003523E-02	0.7077865E-03	0.2468224E-01
0.8089664E-03	0.1280686E-01	0.5401239E-02	0.1768973E-01
0.1211688E-01	0.2651861E-02	0.3265873E-02	0.3222272E-02
0.2639526E-01	0.4336460E-01	0.2765836E-02	0.3265873E-02

Average Covariance Matrix (dB,Phase)

-10.283	0.00	-16.746	-121.31	-10.715	13.17
-16.746	121.31	-19.245	0.00	-16.832	143.92
-10.715	-13.17	-16.832	-143.92	-10.299	0.00

Average Covariance Matrix (Mag,Phase)

0.094	0.00	0.021	-121.31	0.085	13.17
0.021	121.31	0.012	0.00	0.021	143.92
0.085	-13.17	0.021	-143.92	0.093	0.00

Standard Deviation of Covariance matrices:

0.015	0.00	0.015	-65.34	0.005	33.14
0.015	65.34	0.001	0.00	0.018	73.02
0.005	-33.14	0.018	-73.02	0.013	0.00

Polarimetric Discriminants:

1. RCS VV	-10.30 dB
2. RCS HH	-10.28 dB
3. RCS X	-20.96 dB
4. Copolarization Ratio	0.02 dB
5. Depolarization Ratio	10.67 dB
6. Total Power	-6.92 dB
7. Phase Relative to VV	13.17 degrees
8. Correlation Coeff.	0.907

01_15_A RUN: 0047 C BAND DATE: JAN 16 TIME: 09:05:52 INANG: 59.5
Average Mueller matrix file
Number of samples = 5

Average Mueller matrix:

0.5363394E-01	0.4468897E-02	0.6601255E-02	0.5164735E-02
0.9761373E-02	0.5972799E-01	-0.6973383E-02	0.6653366E-02
-0.5997235E-02	0.1715822E-01	0.4453234E-01	0.2192730E-01
0.2174884E-01	-0.4041471E-02	-0.2063802E-01	0.4453234E-01

Standard Deviation of Mueller matrices:

0.1454986E-01	0.9082993E-02	0.5245155E-02	0.1456661E-01
0.1726112E-02	0.2448384E-02	0.6851107E-02	0.2305886E-01
0.2692482E-01	0.3722223E-01	0.3791615E-01	0.1665341E-01
0.8620939E-02	0.8114000E-02	0.3058408E-01	0.3791615E-01

Average Covariance Matrix (dB,Phase)

-12.706	0.00	-19.477	-105.42	-12.941	24.77
-19.477	105.42	-20.105	0.00	-20.161	136.35
-12.941	-24.77	-20.161	-136.35	-12.238	0.00

Average Covariance Matrix (Mag,Phase)

0.054	0.00	0.011	-105.42	0.051	24.77
0.011	105.42	0.010	0.00	0.010	136.35
0.051	-24.77	0.010	-136.35	0.060	0.00

Standard Deviation of Covariance matrices:

0.015	0.00	0.014	-17.75	0.039	-37.11
0.014	17.75	0.002	0.00	0.024	73.46
0.039	37.11	0.024	-73.46	0.002	0.00

Polarimetric Discriminants:

1. RCS VV	-12.24 dB
2. RCS HH	-12.71 dB
3. RCS X	-21.48 dB
4. Copolarization Ratio	-0.47 dB
5. Depolarization Ratio	9.01 dB
6. Total Power	-8.94 dB
7. Phase Relative to VV	24.77 degrees
8. Correlation Coeff.	0.898

01_15_A RUN: 0032 X BAND DATE: JAN 16 TIME: 11:05:28 INANG: 10.2
Average Mueller matrix file
Number of samples = 10

Average Mueller matrix:

0.2305057E+01	0.1967947E+00	0.2250885E+00	0.2503940E+00
0.2677150E+00	0.4187535E+01	-0.6152098E+00	-0.1690820E+00
-0.5318984E+00	0.3974928E+00	0.2252922E+01	0.1245258E+00
-0.1010559E+00	-0.3293315E-01	-0.1220732E+00	0.2252922E+01

Standard Deviation of Mueller matrices:

0.1851115E+01	0.3441177E-01	0.2996719E+00	0.6487030E-01
0.3928870E-02	0.2694741E+01	0.1228545E+00	0.5729320E+00
0.1700192E+00	0.1307388E+01	0.1549825E+01	0.8706433E+00
0.1245862E+00	0.7763484E+00	0.3768399E+00	0.1549825E+01

Average Covariance Matrix (dB,Phase)

3.627	0.00	-5.674	169.25	3.633	3.06
-5.674	-169.25	-5.723	0.00	-1.952	-164.63
3.633	-3.06	-1.952	164.63	6.220	0.00

Average Covariance Matrix (Mag,Phase)

2.305	0.00	0.271	169.25	2.308	3.06
0.271	-169.25	0.268	0.00	0.638	-164.63
2.308	-3.06	0.638	164.63	4.188	0.00

Standard Deviation of Covariance matrices:

1.851	0.00	0.105	36.22	1.765	20.69
0.105	-36.22	0.004	0.00	0.586	77.91
1.765	-20.69	0.586	-77.91	2.695	0.00

Polarimetric Discriminants:

1. RCS VV	6.22 dB
2. RCS HH	3.63 dB
3. RCS X	-6.34 dB
4. Copolarization Ratio	-2.59 dB
5. Depolarization Ratio	11.45 dB
6. Total Power	8.42 dB
7. Phase Relative to VV	3.06 degrees
8. Correlation Coeff.	0.743

01_15_A RUN: 0022 X BAND DATE: JAN 16 TIME: 09:55:02 INANG: 20.3
 Average Mueller matrix file
 Number of samples = 10

Average Mueller matrix:

0.2055983E+01	0.2037657E+00	-0.1544038E+00	0.1248436E+00
0.4050978E+00	0.3961591E+01	0.3757907E+00	-0.2049435E+00
0.5428420E+00	-0.2270354E+00	0.2708747E+01	0.4411764E+00
-0.3072005E+00	0.3069519E+00	-0.2608405E+00	0.2708747E+01

Standard Deviation of Mueller matrices:

0.1621473E+01	0.1205740E+00	0.1827779E+00	0.2898813E+00
0.1754829E+00	0.1379331E+01	0.1137566E+01	0.9259010E-01
0.1086990E+01	0.9924646E+00	0.1577411E+01	0.6125240E+00
0.1371050E-01	0.1671847E+01	0.8878970E+00	0.1577411E+01

Average Covariance Matrix (dB,Phase)

3.130	0.00	-5.060	29.51	4.230	7.62
-5.060	-29.51	-3.924	0.00	-3.685	-28.61
4.230	-7.62	-3.685	28.61	5.979	0.00

Average Covariance Matrix (Mag,Phase)

2.056	0.00	0.312	29.51	2.649	7.62
0.312	-29.51	0.405	0.00	0.428	-28.61
2.649	-7.62	0.428	28.61	3.962	0.00

Standard Deviation of Covariance matrices:

1.622	0.00	0.544	-0.73	1.807	24.53
0.544	0.73	0.176	0.00	1.141	-4.65
1.807	-24.53	1.141	4.65	1.380	0.00

Polarimetric Discriminants:

1. RCS VV	5.98 dB
2. RCS HH	3.13 dB
3. RCS X	-5.17 dB
4. Copolarization Ratio	-2.85 dB
5. Depolarization Ratio	9.95 dB
6. Total Power	8.21 dB
7. Phase Relative to VV	7.62 degrees
8. Correlation Coeff.	0.928

01_15_A RUN: 0013 X BAND DATE: JAN 16 TIME: 08:54:31 INANG: 29.7
 Average Mueller matrix file
 Number of samples = 9

Average Mueller matrix:

0.1566614E+01	0.2219684E+00	0.3096237E-01	-0.5448891E-01
0.2781518E+00	0.1584334E+01	-0.3105961E+00	-0.3029896E+00
-0.8238786E+00	0.2712003E+00	0.1281607E+01	0.4526463E+00
-0.5276459E+00	-0.3225166E-01	-0.3999676E+00	0.1281607E+01

Standard Deviation of Mueller matrices:

0.1432549E+01	0.7061230E-01	0.4068727E+00	0.4576068E+00
0.2195380E+00	0.1911772E+00	0.3716350E-01	0.2199666E+00
0.1232518E+00	0.4987694E+00	0.5884373E+00	0.1004963E+01
0.6689486E-01	0.4683458E+00	0.1004651E+01	0.5884373E+00

Average Covariance Matrix (dB,Phase)

1.949	0.00	-3.105	147.36	1.213	18.81
-3.105	-147.36	-5.557	0.00	-3.626	-135.71
1.213	-18.81	-3.626	135.71	1.998	0.00

Average Covariance Matrix (Mag,Phase)

1.567	0.00	0.489	147.36	1.322	18.81
0.489	-147.36	0.278	0.00	0.434	-135.71
1.322	-18.81	0.434	135.71	1.584	0.00

Standard Deviation of Covariance matrices:

1.432	0.00	0.070	-28.47	1.230	-54.78
0.070	28.47	0.220	0.00	0.223	80.40
1.230	54.78	0.223	-80.40	0.191	0.00

Polarimetric Discriminants:

1. RCS VV	2.00 dB
2. RCS HH	1.95 dB
3. RCS X	-6.02 dB
4. Copolarization Ratio	-0.05 dB
5. Depolarization Ratio	7.99 dB
6. Total Power	5.62 dB
7. Phase Relative to VV	18.81 degrees
8. Correlation Coeff.	0.839

01_15_A RUN: 0002 X BAND DATE: JAN 15 TIME: 06:49:10 INANG: 40.7
 Average Mueller matrix file
 Number of samples = 10

Average Mueller matrix:

0.1163452E+01	0.1889042E+00	0.1488350E+00	-0.1894218E+00
0.1770590E+00	0.1142075E+01	0.8234985E-01	0.5441031E-01
0.1549878E+00	0.2296646E+00	0.8674929E+00	0.2188571E+00
0.7561356E-01	-0.6344675E+00	-0.2395085E+00	0.8674929E+00

Standard Deviation of Mueller matrices:

0.7368722E+00	0.5097910E-01	0.1582905E+00	0.9996105E-01
0.6448713E-01	0.1936563E+00	0.4792923E+00	0.3218490E+00
0.6720559E+00	0.1724239E+00	0.7995250E+00	0.5712527E+00
0.3049058E+00	0.3177732E+00	0.1682001E+00	0.7995250E+00

Average Covariance Matrix (dB,Phase)

0.657	0.00	-10.644	-26.01	-0.552	15.08
-10.644	26.01	-7.519	0.00	-10.056	33.45
-0.552	-15.08	-10.056	-33.45	0.577	0.00

Average Covariance Matrix (Mag,Phase)

1.163	0.00	0.086	-26.01	0.881	15.08
0.086	26.01	0.177	0.00	0.099	33.45
0.881	-15.08	0.099	-33.45	1.142	0.00

Standard Deviation of Covariance matrices:

0.737	0.00	0.369	24.41	0.736	-30.17
0.369	-24.41	0.064	0.00	0.577	33.88
0.736	30.17	0.577	-33.88	0.194	0.00

Polarimetric Discriminants:

1. RCS VV	0.58 dB
2. RCS HH	0.66 dB
3. RCS X	-7.38 dB
4. Copolarization Ratio	0.08 dB
5. Depolarization Ratio	7.99 dB
6. Total Power	4.27 dB
7. Phase Relative to VV	15.08 degrees
8. Correlation Coeff.	0.764

01_15_A RUN: 0052 X BAND DATE: JAN 16 TIME: 09:41:46 INANG: 48.5
 Average Mueller matrix file
 Number of samples = 5

Average Mueller matrix:

0.4038437E+00	0.7148244E-01	0.5252818E-01	-0.1358217E-01
0.8404490E-01	0.4796913E+00	0.6097469E-01	-0.4440476E-01
0.6313759E-01	-0.6985443E-01	0.2550314E+00	0.1517850E+00
-0.2793700E-02	-0.2145900E+00	-0.1483729E+00	0.2550314E+00

Standard Deviation of Mueller matrices:

0.1785281E-01	0.3083812E-01	0.1834231E+00	0.1604976E-01
0.1852030E-01	0.1321552E+00	0.2344677E+00	0.3006196E-01
0.4492504E+00	0.1676234E+00	0.1880564E+00	0.1195568E+00
0.1518749E+00	0.2248754E+00	0.1618946E+00	0.1880564E+00

Average Covariance Matrix (dB,Phase)

-3.938	0.00	-15.002	2.53	-5.418	31.50
-15.002	-2.53	-10.754	0.00	-11.224	-36.06
-5.418	-31.50	-11.224	36.06	-3.190	0.00

Average Covariance Matrix (Mag,Phase)

0.404	0.00	0.032	2.53	0.287	31.50
0.032	-2.53	0.084	0.00	0.075	-36.06
0.287	-31.50	0.075	36.06	0.480	0.00

Standard Deviation of Covariance matrices:

0.018	0.00	0.237	-18.67	0.197	-45.60
0.237	18.67	0.019	0.00	0.236	7.31
0.197	45.60	0.236	-7.31	0.132	0.00

Polarimetric Discriminants:

1. RCS VV	-3.19 dB
2. RCS HH	-3.94 dB
3. RCS X	-11.09 dB
4. Copolarization Ratio	-0.75 dB
5. Depolarization Ratio	7.54 dB
6. Total Power	0.17 dB
7. Phase Relative to VV	31.50 degrees
8. Correlation Coeff.	0.653

01_15_A RUN: 0047 X BAND DATE: JAN 16 TIME: 09:02:56 INANG: 59.5
Average Mueller matrix file
Number of samples = 5

Average Mueller matrix:

0.4562880E+00	0.5658693E-01	-0.5815751E-01	-0.1592315E-01
0.8081822E-01	0.4078551E+00	-0.1192471E+00	-0.1487186E-01
-0.1427525E+00	-0.1047566E+00	0.3352596E+00	0.6655870E-01
-0.3948974E-02	0.6073492E-01	-0.1149890E+00	0.3352596E+00

Standard Deviation of Mueller matrices:

0.2377424E-01	0.3567018E-01	0.8546229E-01	0.1547606E+00
0.1293796E-01	0.3882846E-01	0.6867963E-01	0.9588367E-01
0.2124272E-01	0.1270666E+00	0.8904418E-01	0.1825169E+00
0.3879265E+00	0.3446553E+00	0.3005943E+00	0.8904418E-01

Average Covariance Matrix (dB,Phase)

-3.408	0.00	-11.462	178.42	-4.575	15.09
-11.462	-178.42	-10.925	0.00	-9.202	-172.88
-4.575	-15.09	-9.202	172.88	-3.895	0.00

Average Covariance Matrix (Mag,Phase)

0.456	0.00	0.071	178.42	0.349	15.09
0.071	-178.42	0.081	0.00	0.120	-172.88
0.349	-15.09	0.120	172.88	0.408	0.00

Standard Deviation of Covariance matrices:

0.024	0.00	0.194	-86.86	0.246	-78.54
0.194	86.86	0.013	0.00	0.118	-54.40
0.246	78.54	0.118	54.40	0.039	0.00

Polarimetric Discriminants:

1. RCS VV	-3.89 dB
2. RCS HH	-3.41 dB
3. RCS X	-11.63 dB
4. Copolarization Ratio	0.49 dB
5. Depolarization Ratio	7.99 dB
6. Total Power	0.01 dB
7. Phase Relative to VV	15.09 degrees
8. Correlation Coeff.	0.808