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LAMONT GEOLOGICAL OBSERVATORY
Columbia University
Palisades, New York

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9 Semi-annual Technical Summary Report
July 1 - ~~December~~ 31, 1963,

16 ARPA Order # 218461
Project code No. 8100
Contractor - Columbia University
Contract Date: 1 April 1961
Contract Amount: \$154,180.00

15 Contract # Nonr 266 (82)
Contract Expiration Date: 31 March 1964
Project Scientist: Kenneth Hunkins,
Elmwood 9-2900

10 (UPPER CASE)

6 Studies in marine geophysics and underwater sound
from drifting ice stations.

I. Marine geophysics at T-3

An expanded program of research was inaugurated at T-3 in June 1963. Prior to this date the program had consisted of gravity, magnetic, spot depth and navigation measurements. Added to the program was a continuously operating precision Depth Recorder. This instrument incorporates the new transistorized ESRTR-3 Sonar Transceiver and has been very satisfactory. The adjustable ping length has made it possible to study the shallow sediment structures with considerable success. The instrument was particularly effective during the past six months when the station passed over the boundary between the Canada Abyssal Plain and the Alpha Rise several times.

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II. Seismic refraction experiments in the Arctic Ocean

A long seismic refraction profile was obtained in the Chukchi Sea utilizing the icebreakers USCGC Northwind and USS Staten Island. This was a cooperative project with the Universities of Wisconsin and Minnesota. Hurkins operated a listening station aboard the USCGC Northwind. A total of 109 shots were recorded during the program. Both hydrophones and geophones were used as detectors.

III. Physical oceanographic program at T-3

New studies in oceanography were begun at T-3 in June 1963. These included (1) continuous current measurements at three depths (2) serial hydrographic stations (3) bottom current measurements (4) ocean water sampling for radiochemical analyses.

The current measurements, using sensitive modified Roberts meters, have revealed frequent rotary currents of approximately 12 hour period. These are under study for inertial and tidal influences.

IV. Marine geology

Bottom sediment samples were taken with a specially designed corer containing seven barrels. These samples will be analyzed for radiocarbon date to determine the sedimentation and climatic history of the Arctic.

Several bottom photograph stations were made and about 180 pictures were taken. Interesting contrasts between the microrelief of the Alpha Rise and the microrelief of the Canada Abyssal Plain were observed.

V. Wave motion and earthquakes in the Arctic Ocean

Three long-period seismographs were operated at T-3 during the early summer to detect the direction and speed of the long waves in pack ice which have been under study. Phase differences were noted between the instruments indicating traveling wave motion. One vertical seismograph has been operated continuously since June providing data on wave motion

and earthquakes. This seismograph station is highly unusual since it is operating on the ocean surface in waters 4000 m. deep. Many earthquakes have been recorded at the station and an analysis of their paths should provide new data on oceanic surface wave paths in the Arctic Ocean. In addition, the accumulated data on the amplitudes and periods of the long wave background may, hopefully, lead to the source of these waves.

ARPA Order No. 218-61
Project Code No. 8100

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