

# USCGC POLAR SEA Drift Project '81

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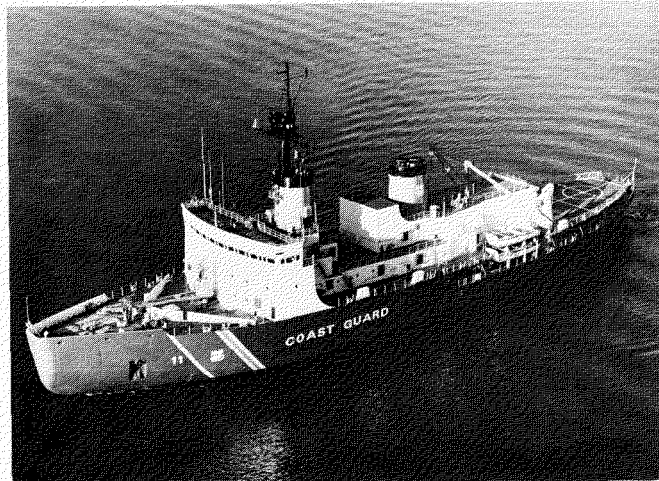


FIG. 1. The USCGC POLAR SEA (WAGB 11).

The USCGC POLAR SEA (WAGB 11) (Fig. 1) departed her home port of Seattle, Washington on 20 January 1981 to conduct Arctic West Winter 1981 operations. The purpose of the deployment was to determine whether it was possible to transit to Prudhoe Bay, Alaska, during the winter and also to conduct ice studies to determine the type of ice conditions that could normally be expected during such a transit. On 11 February 1981, the POLAR SEA made history when she became the first ship ever to reach Point Barrow, Alaska in the middle of winter.

On 13 March 1981, after several mechanical casualties, the POLAR SEA was beset in ice. It was decided to use this unique opportunity to study the arctic environment. Various agencies were contacted and offered the opportunity to send scientists aboard the POLAR SEA to conduct studies. Several agencies were able to respond within the short time frame available to get personnel and equipment aboard before the POLAR SEA drifted out of helicopter range.

During the POLAR SEA's journey her drift was monitored by satellite-tracked radio transmitters (Fig. 2). One transmitter especially packaged by the U.S. Coast Guard Oceanographic Unit was placed aboard the bridge of the POLAR SEA. The POLAR SEA's positions were then determined using the ARGOS Data Collection System (DCS) aboard the TIROS-N series of polar orbiting U.S. meteorological satellites. The positions were processed at the Service ARGOS facility in Toulouse, France and were accessed via a telephone data terminal.

Three TIROS Arctic Drifters (TADs), tracked using the same TIROS-N ARGOS system, were deployed on the ice in the vicinity of the POLAR SEA to study the dynamics

of the Arctic gyre in the southern Beaufort Sea. These transmitters indicated a drift rate for the ice pack of about 6 cm/sec to the northwest. The trackline of the POLAR SEA is not representative of the drift in the area since the ship was maneuvering in an attempt to break free of the ice pack. The drift of the TADs should lend a great deal of information on the drift of the ice pack throughout the year. Further information on this project can be obtained by contacting Mr. Richard Hayes, U.S. Coast Guard Oceanographic Unit, Building 159-E, Navy Yard Annex, Washington, D.C. 20593.

## COOPERATIVE INVESTIGATIONS

A study was conducted of the micromorphology and structure of the upper surface layer of the sea ice. Horizontal and vertical thin sections were cut from the samples and photographed with the ice section between cross polarized light filters. Photographs of some sections were made with reflected light. Some snow depth measurements were made and snow samples were melted and their salinity determined. These observations were conducted by Mr. Arnold Hanson, Department of Atmospheric Sciences, University of Washington, Seattle, Washington 98195.

Mr. Daniel Parish at the Institute of Water Resources, University of Alaska collected ice cores for ice algae density

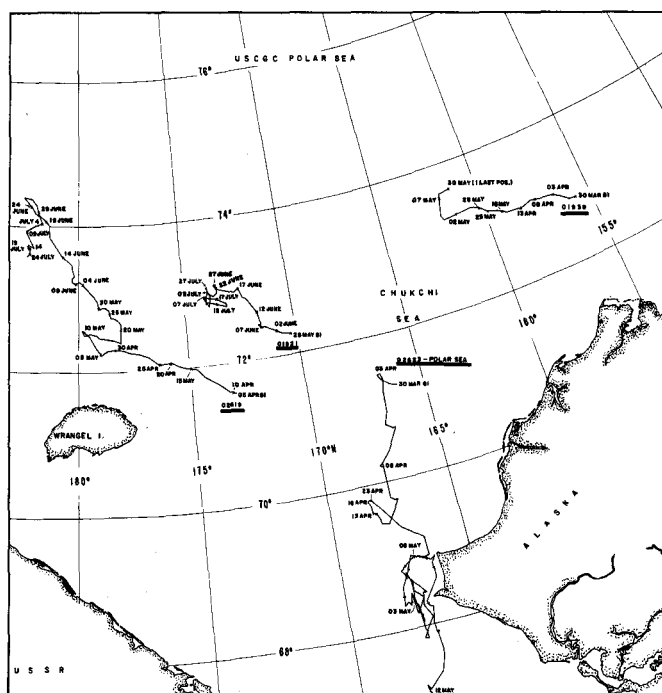


FIG. 2. Tracklines of satellite-tracked radio transmitters placed on the USCGC POLAR SEA (02623) and on the pack ice (01921, 01939, 02619).

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studies and water samples for nutrients, salinity and pH measurements. Ten ice cores from four different locations were obtained as well as a number of frozen and preserved water samples for later analysis. He can be contacted at the University in Fairbanks, Alaska 99701, for further information.

An extensive marine mammal survey was also conducted. The POLAR SEA drift offered an unparalleled opportunity to obtain information about marine mammals inhabiting the Arctic ice pack during winter. The study methods included necropsy of bear kill remains, quantitative observation of behavior, and measurements of habitat parameters. These studies were conducted by Dr. A. R. Weisbrod, Endangered Species Biologist, Division of Natural Science, National Park Service, Washington, D.C. 20340.

Prior to the besetment, ARCTEC, Inc. personnel profiled eleven pressure ridges in the vicinity of Point Barrow, ten of which were multi-year ridges. Ten core samples were obtained with a maximum core depth of 107 inches. One first-year pressure ridge was profiled at Nome. During the drift phase of the project, two multi-year ridges were

profiled (sail, sonar, and physical drilling), and two multi-year ridges partially profiled. More information about this project can be obtained from Mr. R. P. Voelker, ARCTEC, Inc., 9104 Red Branch Road, Columbia, Maryland 21045.

During the Drift Project sea ice analysis and forecasts along with weather forecasting were provided by NAV-POLAROCEANCEN. An aerial ice observer flew aboard Coast Guard C-130 aircraft out of Kodiak to identify types of ice and prepare ice charts. These observations have been encoded on Standard Ice Observation Forms and are available from the Naval Polar Oceanography Center, 4301 Suitland Road, Navy Department, Washington, D.C. 20390.

On 13 May 1981 two months after being beset, the USCGC POLAR SEA reached the edge of the ice pack and steamed into open water. These two months provided scientists with an opportunity to make observations that will greatly add to our understanding of this remote and hostile environment. Our future ability to be able to cope with this next frontier will in part be based on our wise use of these data.