

West Greenland Iceberg Drift and Ocean Current Investigations

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Another experiment using the Nimbus 6 RAMS was conducted to obtain iceberg drift and ocean current data in the Davis Strait, off the coast of Greenland. This experiment was designed to determine the feasibility of mathematically modeling iceberg drift, and to investigate drift patterns that would affect possible oil spills.

This effort was financed by the West Greenland Petroleum Concessionaires, which included several U.S. companies. The Concessionaires hold the West Greenland offshore concessions.

Initially, four buoys manufactured by PRL were deployed in the Davis Strait in the summer of 1976. Deployment was made in pairs, one tethered to an iceberg and the other free drifting with a current drogue. (See fig. 48.) Only RAMS position data were provided.

To tether the buoys to the icebergs, a 24-mm polypropylene rope about 750 m long was trailed from the ship and towed around the iceberg as seen in figure 49. The free end of the rope was retrieved, closing the loop around the iceberg, and approximately 200 m of the rope was hauled aboard the ship. The buoy was attached to the free end, and the other end spliced into the standing part. The result was a loose closed loop around the iceberg, with the buoy attached to the end of a 200-m tail.

The remaining two buoys were deployed to drift free with "window shade" drogues suspended from the bottom of the buoy. Depth was selected so that the buoy would be influenced primarily by the same sea currents as a typical iceberg (100-m draft).

Buoy 0577 was deployed at $64^{\circ}25' N$, $54^{\circ}24' W$, in June 1976, tethered to a tabular iceberg 20 m high, 130 m long, and estimated to displace 900 000 tons. The average drift until July 12 was roughly parallel to the 200-m depth

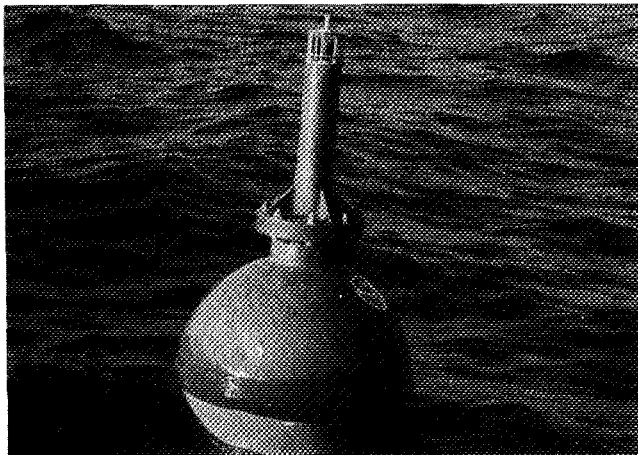


Figure 48.—Drift buoy and current drogue.

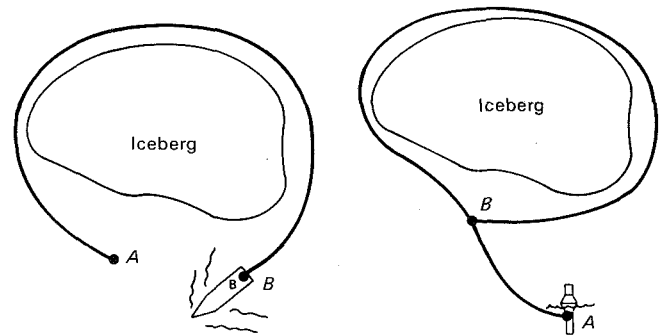


Figure 49.—Deployment of iceberg drift buoys.

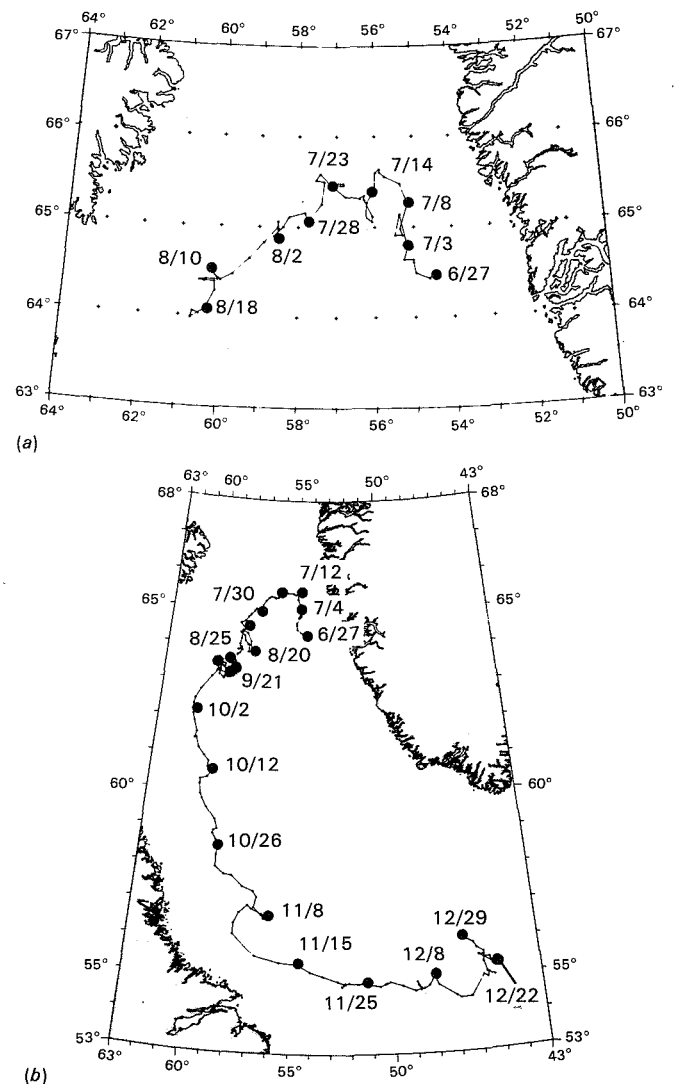


Figure 50.—Drift of two buoys deployed near each other on June 26, 1976. (a) Buoy 0577, tethered to iceberg; last data August 21, 1976. (b) Buoy 1137, with current drogue; last data December 29, 1976.

contour for 85 n. mi. After an erratic drift pattern up until July 24, the buoy drifted southwesterly until it stopped transmitting with no prior decay in signal quality in late August. (See fig. 50.) This buoy was recovered.

Buoy 1137 was deployed with a current drogue at the same time and location as 0577. The drogued buoy drifted in the same direction as the tethered buoy, but not as rapidly. It turned westerly after July 12, and from August 21, southward, until December 29 when it stopped transmitting. The buoy was recovered 2 years later east of Scotland in the North Sea by a fishing trawler, and has since been shipped to La Habra, Calif.

There was no significant difference in the drift of the two

buoys deployed as a pair. However, the length of time the drogue and/or tether remained attached is unknown.

In general, the drift patterns of the buoys confirm the current patterns reported in oceanographic atlases for the Davis Strait; i.e., a north-flowing West Greenland Current that branches to the west and joins the south-flowing Labrador Current.

The lagrangian drift data are very unique and are believed to be the first such data for this area. When combined with the eulerian data collected by moored current meters, these data should enhance understanding of the complex Davis Strait sea current regime, particularly with respect to iceberg drift and oil spill migration.