



Figure 3. Location map of all piston, trigger, and Phlegercorers retrieved aboard ARA *Islas Orcadas* cruises 0775, 1176, 1277, 1578, and 1678.

Ship operations, Deep Freeze 80

COMMANDER P. R. TAYLOR
U.S. COAST GUARD

U.S. Naval Support Force, Antarctica
Port Hueneme, California 93043

Three U.S. Coast Guard icebreakers operated in Antarctica during Deep Freeze 80. USCGC *Polar Sea* from Seattle, Washington, performed the channel break-in to McMurdo, escorted the USNS *Maumee* into Winter Quarters Bay, supported science and provided transport for passengers and cargo enroute Ushuaia, Argentina, via Palmer Station, and supported science in the Weddell Sea. USCGC *Northwind* from Wilmington, North Carolina, called at Campbell Island, supported Ross Sea science, and assisted with the McMurdo icebreaking and channel tending. USCGC *Glacier* from Long Beach, California, supported Ross Sea science,

provided resupply ship assistance, towed the ice wharf to sea, and called at Campbell Island. The dry cargo ship USNS *Pvt. John R. Towle* and tankship USNS *Maumee* provided the cargo and fuel resupply to McMurdo. The McMurdo ice-breaking and resupply ship operations were accomplished as originally planned. There was no ship ice damage.

Ice conditions during the shipping season were generally light. The Ross Sea was open water except for the western area extending south to Ross Island. A light band of pack, approximately 5 nautical miles wide, ran in a NNW/SSE direction from Cape Bird to Beaufort Island and north, joining the ice pack in the western Ross Sea. The coastal area west of Cape Adare was unusually light and open, which allowed *Glacier* to conduct an extensive bathymetry and piston coring program in this normally impregnable area. The fast ice edge in McMurdo Sound extended north of Hut Point (McMurdo) 16.5 nautical miles in early January. Neither *Maumee* nor *Towle* required an icebreaker escort through the Ross Sea or McMurdo Sound. Icebreaker escort through the channel was required. By 12 February, when McMurdo shifted to winter-over operation, all fast ice had broken out and there was open water to the Ross Ice

Shelf; Scott Base (New Zealand) was ice free. Several bergs resulting from Ross Ice Shelf calving were in evidence.

Icebreaker operations. USCGC *Polar Sea* departed Seattle on 10 November 1979 and arrived Wellington, New Zealand, on 14 December. She departed on 26 December with two New Zealand scouts (K-36) aboard. The evening of 2 January *Polar Sea* arrived at the fast ice edge, McMurdo Sound. At 0800 on 3 January *Polar Sea* commenced the channel break-in with the Commandant, U.S. Coast Guard, Admiral John B. Hayes aboard. Hut Point was abeam 17 hours 44 minutes and 35 seconds later. Progress in the fast ice was continuous through up to 2.5-meter thick ice, except for occasional stopping to clear the sea chests of brash and slush. Upon reaching Hut Point, *Polar Sea* turned around and cut a nearly parallel track to the east of her original track. The eastern track terminated at the fast ice edge approximately 500 yards east of her original inbound track. *Polar Sea*, *Northwind*, and *Glacier* nested at the ice edge; *Northwind's* aviation detachment transferred to *Polar Sea*, and JP-5 from *Northwind* was transferred to *Glacier*. *Polar Sea* moored to the ice wharf at McMurdo for 2 days conducting machinery maintenance and checking for icebreaking damage; on 9 January she was underway for channel tending and cutting out the turning basin. She moored again on 15 January to load cargo for Palmer Station. *Polar Sea* escorted *Maumee* through the loose brash and small floes to McMurdo on 16 January. She refueled from *Maumee*, embarked science events S-034, S-308, S-312, and Palmer Station passengers, and departed McMurdo on 18 January enroute Ushuaia, Argentina, via Palmer Station. Two French iceberg tracking beacons (S-312) were placed on icebergs at 75°08'S 164°04'W and 75°32'S 160°52'W.

Polar Sea called at Palmer Station on 29 January, discharged 2 tons of cargo and transported passengers ashore, loaded 5 tons of retrograde cargo for the continental United States, and departed the same day.

Between 29 January and 1 February, the U.S. Antarctic Treaty Inspection Team (S-308) visited the following stations: Rothera (United Kingdom), General Bernardo O'Higgins (Chile), Esperanza and Almirante Brown (Argentina), Henri Arctowski (Poland), and Bellingshausen (U.S.S.R.). A visit to Frei Station (Chile) was cancelled due to surface fog.

Polar Sea arrived Ushuaia, Argentina, on 4 February, disembarked S-034 and S-308, loaded stores, and departed on 7 February enroute the Weddell Sea for science support with S-200 and S-205 embarked. Project S-200 recovered two current meters in the southern Weddell Sea and took oceanographic stations through the south and central Weddell Sea and west of the South Orkney Islands in the Scotia Sea; S-205 collected ice cores from floes and bergs and placed four data buoys on floes and bergs.

On 10 February *Polar Sea* had problems with her ship service generators. Through the efforts of Coast Guard Icebreaker Support Facility Seattle, USDAO Buenos Aires, and Argentina Air Force C-130 aircraft, critical parts were obtained and *Polar Sea* was able to continue operations. She crossed 60°S on 5 March and arrived in Seattle on 12 April 1980, completing her first Deep Freeze deployment.

USCGC *Northwind* departed Wilmington on 3 November 1979. Upon arrival in Wellington on 15 December, she refueled, completed voyage repairs, loaded stores and Campbell Island cargo and passengers, embarked science events S-013, S-034, and S-255, and departed on 19 December. *Northwind* anchored in Perseverance Harbor, Campbell Island, on 22 December, transported passengers and cargo ashore via LCVP, and departed on 23 December. Ross Sea science (S-013, S-034, and S-255) was supported until the evening of 2 January, when *Northwind* arrived at the fast ice edge. From 3 to 5 January *Northwind* cut a "backdoor" channel to just south of Tent Island, completed S-013 in the Ross Sea, and returned to the McMurdo area on 9 January, where she assisted the *Polar Sea* channel tending, except for 2 days of maintenance at the ice wharf. On 18 January, *Northwind* refueled alongside *Maumee* and departed for the Ross Sea to make one last attempt to recover two current meters placed by USCGC *Burton Island* during Deep Freeze 78. (*Glacier* had been unsuccessful in recovering them during Deep Freeze 79.) Efforts were still unsuccessful and *Northwind* headed for Wilmington via Melbourne and Brisbane, Australia, and Suva, Fiji, crossing 60°S on 24 January. *Northwind* provided transport from McMurdo to Melbourne for 11 Australian personnel from Casey Station and arrived home on 24 March 1980.

USCGC *Glacier* departed Long Beach on 15 November 1979. She arrived Auckland, New Zealand, on 10 December, refueled, completed voyage repairs, and embarked Campbell Island passengers and cargo science event S-207. Equipment for science event K-12, to be used at the end of the season, was also loaded, and *Glacier* departed on 15 December. The Campbell Island passengers and cargo were flown ashore on 19 December and *Glacier* headed for the Victoria Land coast to support S-207. During this period *Glacier*, with unusually light ice conditions, conducted an extensive bathymetry program along the coast west of Cape Adare. Soundings in this area were sparse to nonexistent. In addition to the piston coring and bottom-grab projects, several significant submarine canyons were discovered. Helicopters were used to obtain iceberg and glacier sediment samples. From 6 to 18 January *Glacier* continued support for S-207 in McMurdo Sound and the Ross Sea, then refueled from *Maumee*, and on 19 January unsuccessfully attempted to tow *Maumee* out of Winter Quarters Bay. Wind conditions caused the 8-inch towing hawser to part and *Glacier* temporarily grounded on the Hut Point shoal. *Maumee* subsequently was towed (bow-to-stern) under more favorable conditions on 24 January.

Glacier moored to the ice wharf and personnel conducted a sounding survey of Winter Quarters Bay using the Arctic Survey Boat. The ice wharf face was blasted and *Glacier* sheared the face in preparation for *Towle's* arrival. *Glacier* escorted *Towle* through loose pack into Winter Quarters Bay and then departed for the Cape Adare area for continuation of S-207. *Glacier* returned to McMurdo on 5 February and embarked personnel for event K-12 and Campbell Island passengers. Cargo operations were completed on the following day, but due to wind conditions *Towle* was not towed out of the bay until the 7th. As with the *Maumee*, the

bow-to-stern method was employed. *Glacier* returned and towed the deteriorated and cracked ice wharf to sea. Science events K-12 and S-207 were supported until 12 February, when *Glacier* headed for Wellington via Campbell Island. Three days later, in severe weather, *Glacier's* LCVP (Landing Craft Vehicle Personnel) was carried away—all that remained was the keel. While anchored in Perseverance Harbor on 18 February, the Campbell Island discharge and pickup of passengers was accomplished using one helicopter and *Glacier's* motor surf boat. *Glacier* arrived in Wellington on 21 February, departed on 29 February, and arrived in Long Beach on 24 March 1980.

Resupply Ship Operations. USNS *Maumee* arrived in Winter Quarters Bay under escort of *Polar Sea* on 16 January. The channel transit was essentially ice-free except for small floes in the vicinity of Hut Point. *Maumee* discharged her cargo of petroleum products at McMurdo Station, refueled *Polar Sea*, *Northwind*, and *Glacier*, and was ready to be towed on 19 January. When *Maumee* took in her lines and started to move, the hawser parted, due both to heavy strain and to riding against *Glacier's* flight deck stanchion. *Glacier* temporarily grounded on the Hut Point Shoal. Four days later

another attempt was made, when *Maumee* and *Glacier* moored to each other, bow to stern—stern to bow or “Chinese style.” This was unsuccessful and *Maumee's* stern was set down on the shoal. The decision was made to attempt a bow-to-stern tow, which was successful; *Maumee* departed on 24 January, and arrived in Port Lyttelton, New Zealand, on 30 January 1980.

USNS *Pvt. John R. Towle* moored CBC Port Hueneme, California, on 23 December 1979, loaded cargo, and departed for Port Lyttelton on 4 January. *Towle* arrived Port Lyttelton on 21 January, worked cargo, and departed 2 days later. On 29 January *Towle* rendezvoused with *Glacier* in the vicinity of Tent Island and was escorted through the small floes to Winter Quarters Bay. *Towle* completed cargo operations on 6 February; however, departure was delayed until the next day due to unfavorable winds. *Towle* proceeded to Port Lyttelton with 113 passengers and arrived on 13 February 1980.

The cargo ship operations were supported by National Science Foundation Interagency Agreement CA-165. Ice-breaker operations were supported by a National Science Foundation agreement with the U.S. Coast Guard.

Antarctic activities of Holmes and Narver, Inc.

ROBERT L. MURPHY

*Antarctic Support Division
Holmes and Narver, Inc.
Orange, California 92668*

Holmes and Narver, Inc. (H&N) completed its 12th year of providing scientific support services to the United States Antarctic Research Program (USARP) during the 1979-80 season. During this season H&N deployed over 200 employees to the three stations and two field camps it operated, to the McMurdo area, and on board the R/V *Hero*.

The winter-over season of 1979 was considered one of the most successful yet for contractor operations of South Pole, Siple, and Palmer Stations. Interpersonal relationships among individuals of the H&N support crews and the scientific teams seemed excellent. Facilities were maintained in accordance with the scheduled preventive maintenance program and turned over to the incoming teams in generally better condition than when the winter had begun.

The winter fly-in period (WINFLY) crew deployed by H&N in the McMurdo area was the largest ever provided by a contractor organization in Antarctica. This crew of 46 craftspeople and support personnel not only provided assistance to the science activities while preparing facilities to receive the main deployment, but also rushed completion of two

new 50-person dormitories begun the season before, in an effort to provide increased and improved housing. Construction of the new Williams Field complex, adjacent to McMurdo Station, was reactivated during WINFLY, and modifications to the Naval Support Force Antarctica meteorology area was begun to prepare for a new computer.

Early in the season a new camp was constructed in the Ellsworth Mountains to serve as a base facility for a major scientific study of the geology and glaciology of this remote region. Aircraft problems and bad weather caused some delays, but after full activation, the camp provided outstanding support. The H&N crew was experienced, since most of them had served at the Darwin Glacier Camp the prior season.

The Dome Charlie Camp was reopened by virtually the same crew that had engineered the operation the season before. The scientific efforts and the support activities progressed successfully at Dome C, including evacuating four scientists at different times for various illnesses and minor accidents.

Williams Field. The new facility is a 155-person camp composed of mobile and relocatable buildings for supporting USARP air operations. The entire facility was designed, procured, and constructed by H&N. The elapsed time from conceptual engineering to beneficial occupancy was 3½ years. The facility was designed for frequent relocation because of the advancing and calving ice edge of the Ross Ice Shelf, and to keep the facilities from becoming deeply buried by the heavy annual snow drifting.

McMurdo. Two new 50-bed dormitories were turned over to the Commander, U.S. Naval Support Force Antarctica