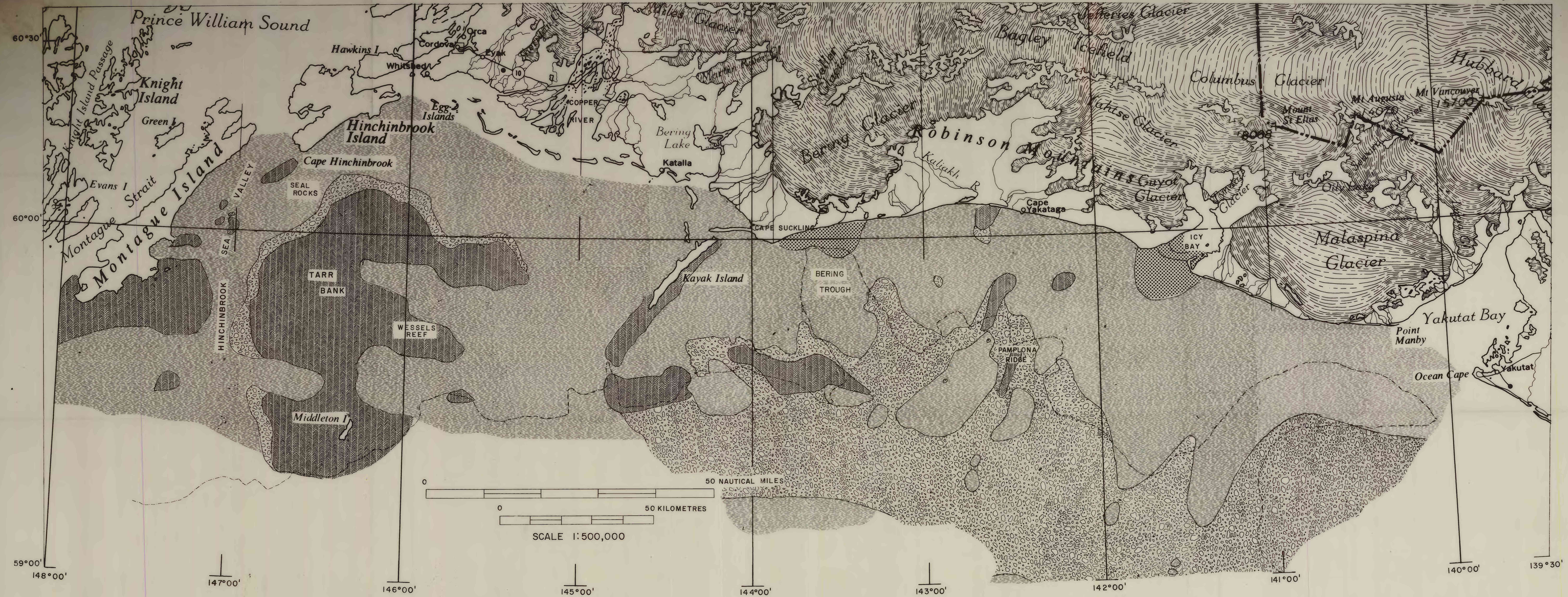
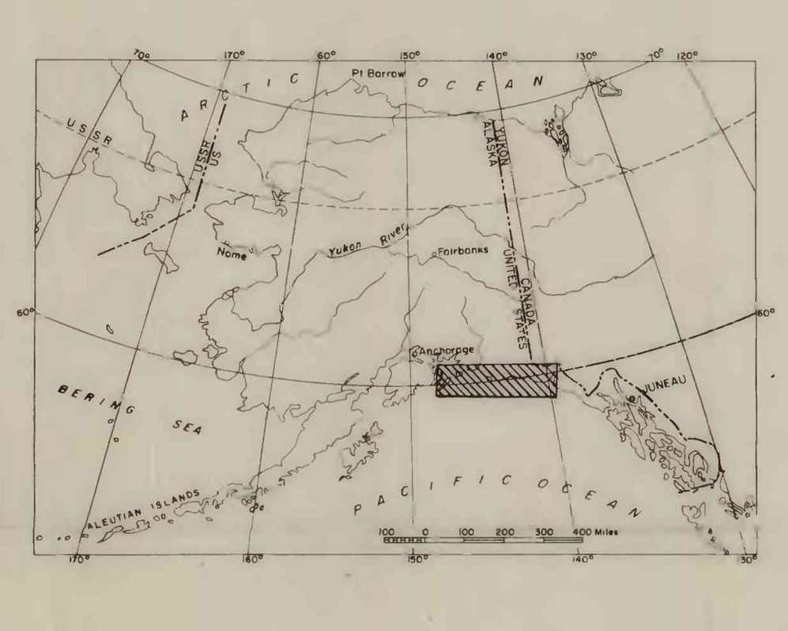
OFR - 75-505





Index showing location of map area.

- HOLOCENE SEDIMENTS
- HOLOCENE END MORAINE
- QUATERNARY GLACIAL MARINE SEDIMENT
- TERTIARY & PLEISTOCENE STRATIFIED DEPOSITS
- 200 METRE ISOBATH

During September and October 1974, high-resolution seismic profiles covering approximately 6500 km of tracklines (Inset 1) were collected from the northern Gulf of Alaska by the R. V. Thomas G. Thompson. Analysis of the profiles plus shipboard descriptions of surface sediment samples collected in May and June 1975 by the NOAA FRS Townsend Cromwell (Inset 2) were used to generate this surface sediment distribution map for the northern Gulf of Alaska between Montague Island and Yakutat Bay.

Four major sedimentary units occur on the sea floor of the continental shelf in the map area. These units, which are characterized by their seismic signatures, are: (1) Holocene sediments (Profile A); (2) Holocene end moraines (Profile B), (3) Quaternary glacial marine sediments (Profile C) and (4) Tertiary and Pleistocene lithified deposits (Profile D).

The ages used for material mapped are based on relative stratigraphic positions and not on any isotopic dates. The term Holocene is applied to sediment accumulating today and to end moraines formed in historic time. The term Quaternary is applied to glacial marine deposits which are interpreted as being deposited on the continental shelf during Pleistocene time when sea level was lowered eustatically. This unit also may include Holocene ice-rafted sediment. The Tertiary and Pleistocene ages applied to the stratified sedimentary rocks, which are often folded, faulted and truncated (Profile D) are based on similartiies in lithology and structure to onshore lithified deposits (Plafker, 1967). Stratigraphically, Holocene sediment when present always overlies Quaternary glacial marine sediment or Tertiary and Pleistocene lithified deposits. The Quaternary glacial marine material when present overlies the lithified material.

Holocene sediment blankets the entire near shore area between Hinchinbrook Island and the south end of Kayak Island. In addition, Holocene sediment comprises the surface fill in the Hinchinbrook Sea Valley and covers the area south of Tarr Bank and north of Middleton Island. East of Kayak Island, Holocene sediment again blankets the near shore area with the exception of Holocene morainal areas at Icy Bay and the Bering Glacier and an area of Tertiary and Pleistocene bedrock which crops out southwest of Cape Yakataga between Cape Suckling and Icy Bay. Holocene sediment also occurs in a series of isolated pods towards the outer edge of the continental shelf. Analyses of Cromwell samples show Holocene sediment to be predominantly clayey silt with a small sand component. The maximum thickness of Holocene sediment observed was about 300 m in the vicinity of the Copper River. Profile A shows a portion of this area.

Holocene end moraines are found at the mouth of Icy Bay and south of the Bering Glacier. A portion of the Bering Glacier moraine is shown in Profile B. Morainal sediments were also collected south of the Malaspina Glacier and at the mouth of Yakutat Bay. Until the latter two areas can be profiled in more detail and their limits delineated, they will not be included as end moraines on the sediment distribution.

Quaternary glacial marine sediments are found in a narrow arc which borders on the north and west side of Tarr Bank and in a large arc 20 or more km offshore which parallels the shoreline between Kayak Island and Yakutat Bay. Glacial marine sediment collected by the Cromwell is generally a pebbly or sandy mud. Profile C shows a characteristic area of glacial marine sediment.

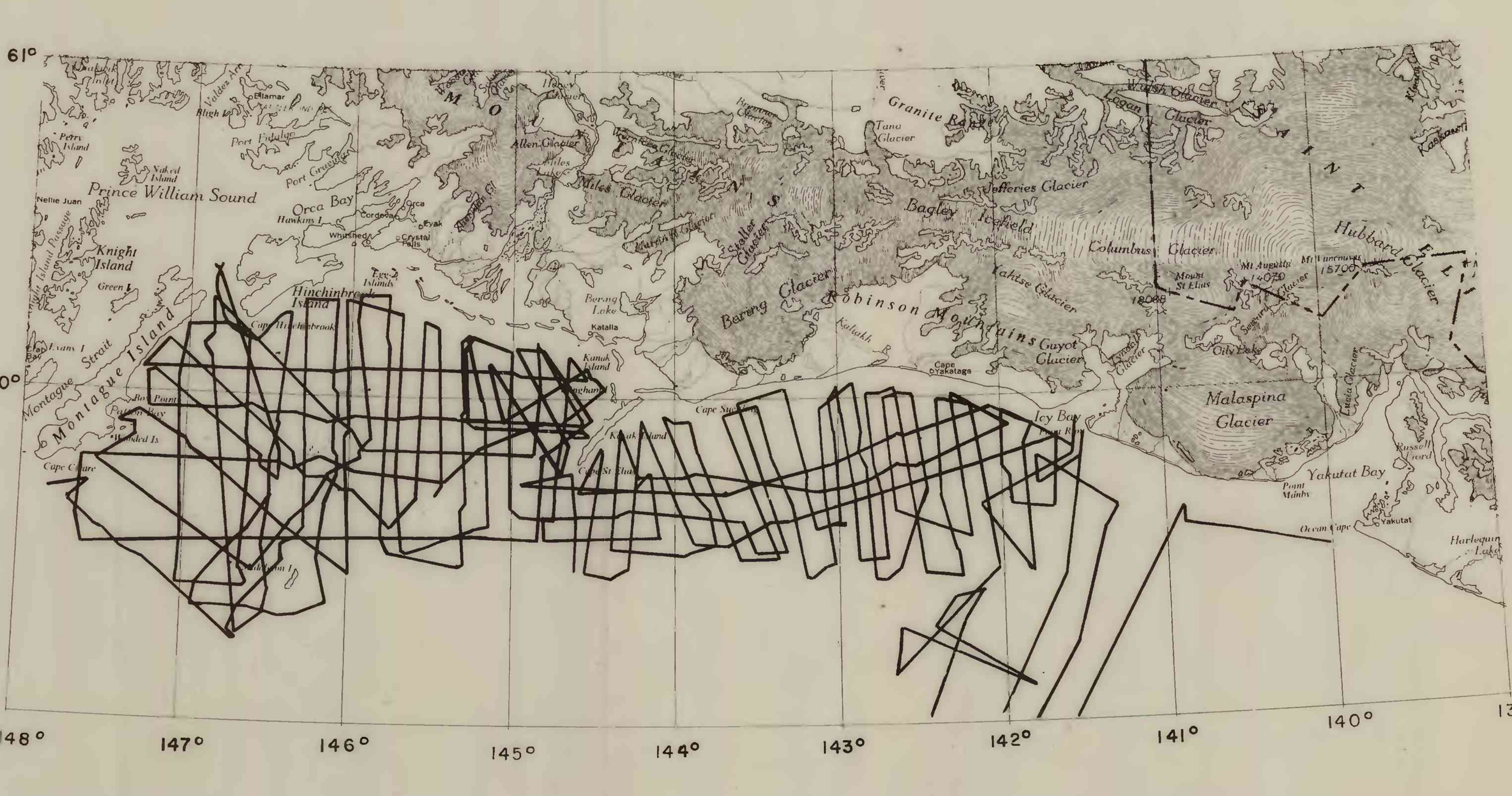
Tertiary or Pleistocene stratified sedimentary rocks, which often are folded, faulted and truncated, crop out on Tarr Bank, offshore of Montague Island and in several localities southeast and southwest of Cape Yakataga. In addition, bedrock was examined at two localities, between Cape Hinchinbrook and Middleton Island (Sea Rocks and Wessels Reef) in June 1975. Seal Rocks consist of well indurated sandstone and argillite that are indistinguishable from the Orca Formation of Montague and Hinchinbrook Islands (Winkler, 1973). Wessels Reef is composed of friable sandstone and granule conglomerate that is similar lithologically to rocks of the Katalla Formation on Kayak Island (Plafker, 1974; Winkler, pers. commun., 1975). Dart cores were attempted at many of the outcrop areas during the Cromwell cruise. Frequently, the dart core barrel was dented but no sample was recovered. Additional sampling is needed to better characterize the nature of the lithified deposits. Folded stratified deposits on Tarr Bank are shown in Profile D. Sampling on Tarr Bank revealed a number of areas covered by a thin veneer (approximately one metre in thickness) of modern sediment. This veneer of sediment is not detectable on the seismic profiles because of the transparency of the sediments and/or the limited resolutions (≈2m) of seismic systems and is not shown on the sediment distribution map.

References Cited

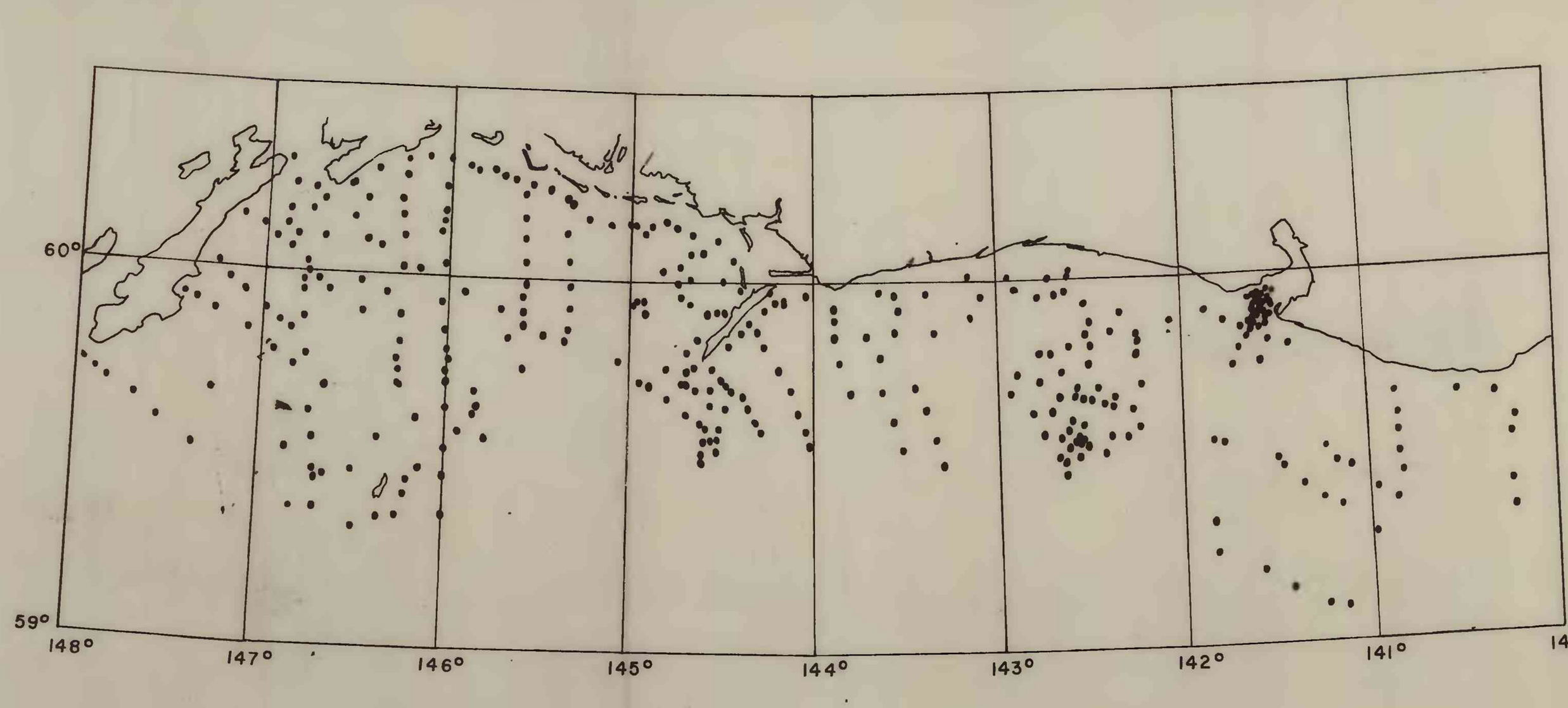
Plafker, George, 1967, Geologic Map of the Gulf of Alaska Tertiary Province, Alaska: U. S. Geol. Survey, Miscl. Geol. Inv. Map I-484.

Plafker, George, 1974, Preliminary Geologic Map of Kayak and Wingham Islands, Alaska: U. S. Geol. Survey, Open File Map 74-82.

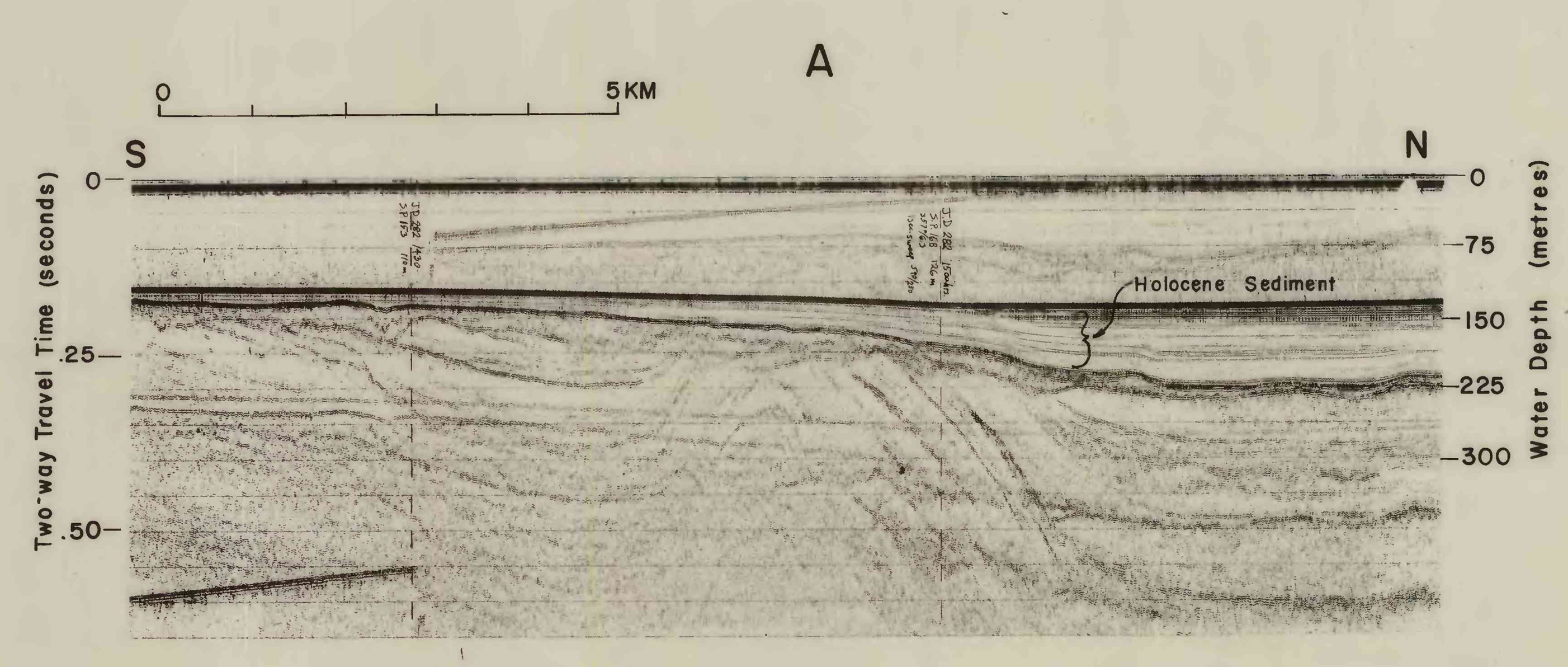
Winkler, G. R., 1973, Geologic Map of the Cordova A-7, A-8, B-6, B-7 and B-8 quadrangles (Hinchinbrook Island), Alaska: U. S. Geol. Survey, Miscl. Field Studies Map MF-531.



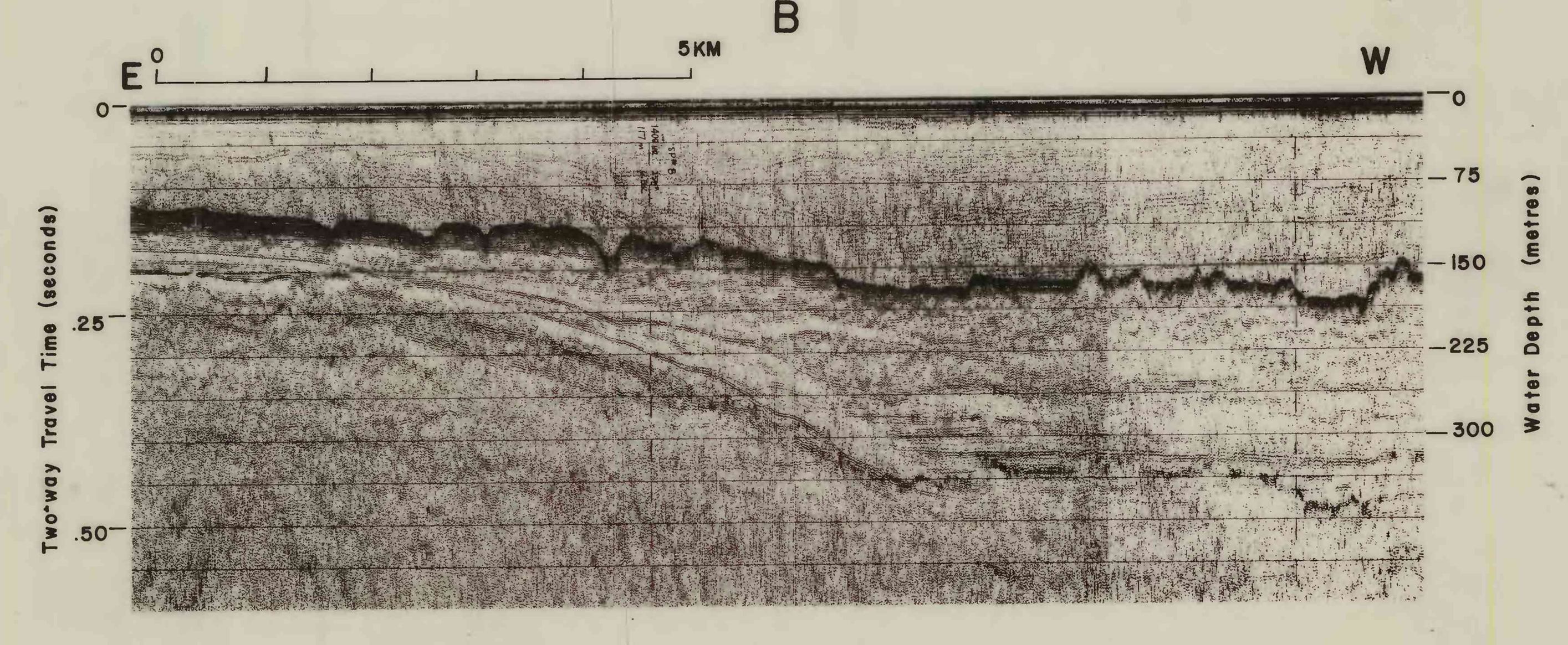
1. Trackline map of the R/V THOMAS G. THOMPSON cruise (September-October, 1974).



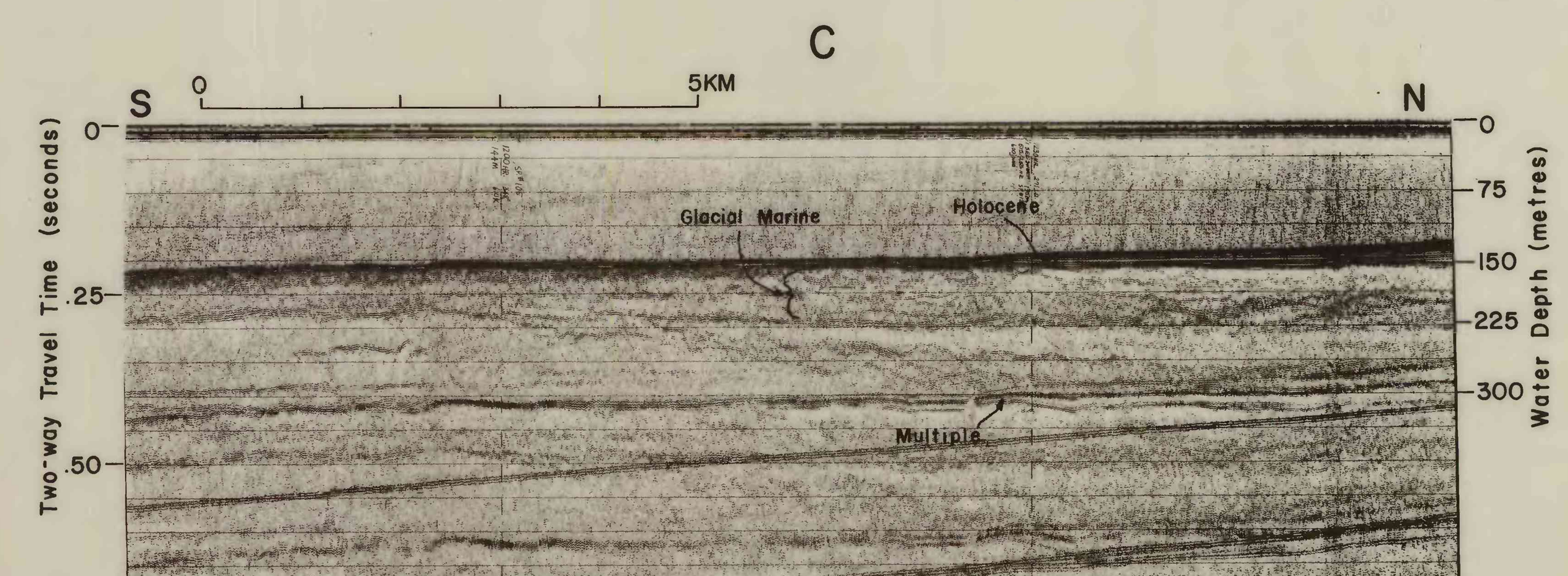
2. Location map of samples collected during the F.R.S. TOWNSEND CROMWELL cruise (May-June, 1975).



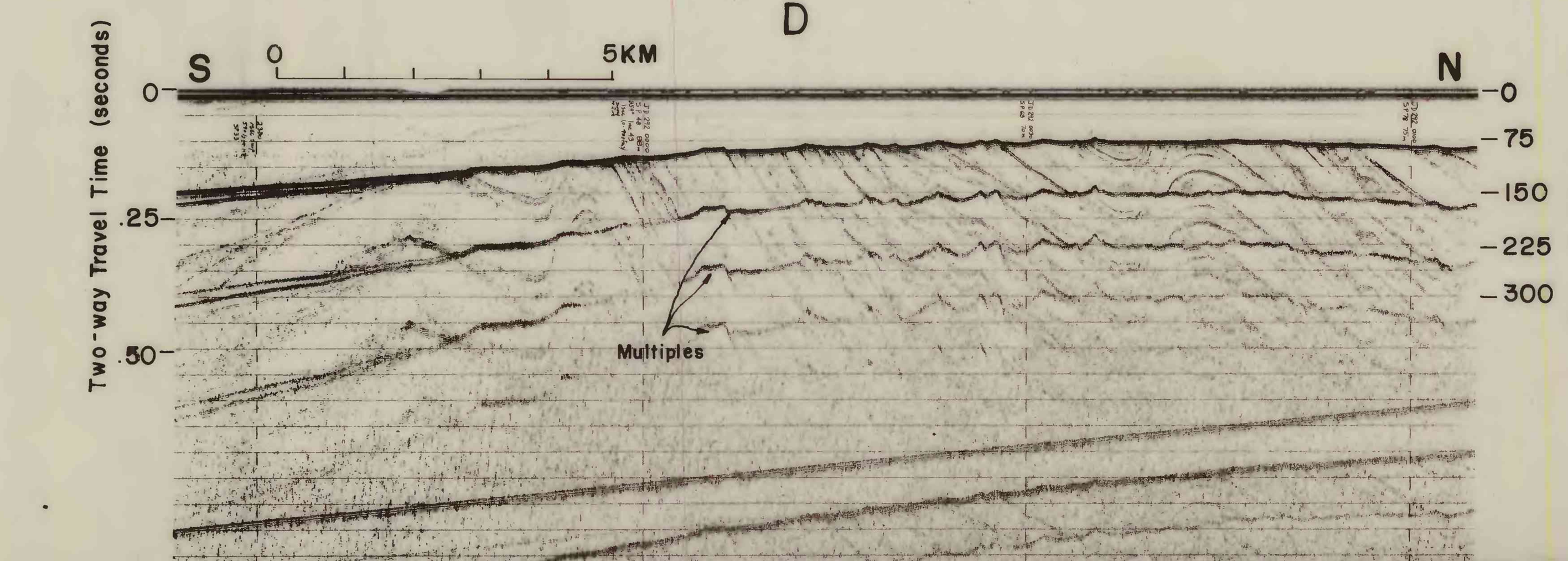
A. Holocene sediment overlying folded stratified deposits south of Copper River (Vertical Exaggeration ≈ 9X)



B. A portion of the Holocene Bering Glacier end moraine (V.E. ≈ 9X).



C. Quaternary glacial marine sediment filling Bering Trough (V.E. ≈ 9X).



D. Seismic profile showing folded Tertiary and Pleistocene stratified deposits on Tarr Bank (V.E. ≈ 9X).

SURFACE SEDIMENT DISTRIBUTION MAP, NORTHERN GULF OF ALASKA

By

Bruce F. Molnia and Paul R. Carlson

1975

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey standards and nomenclature.

U.S. GEOLOGICAL SURVEY
OPEN FILE MAP 75-505