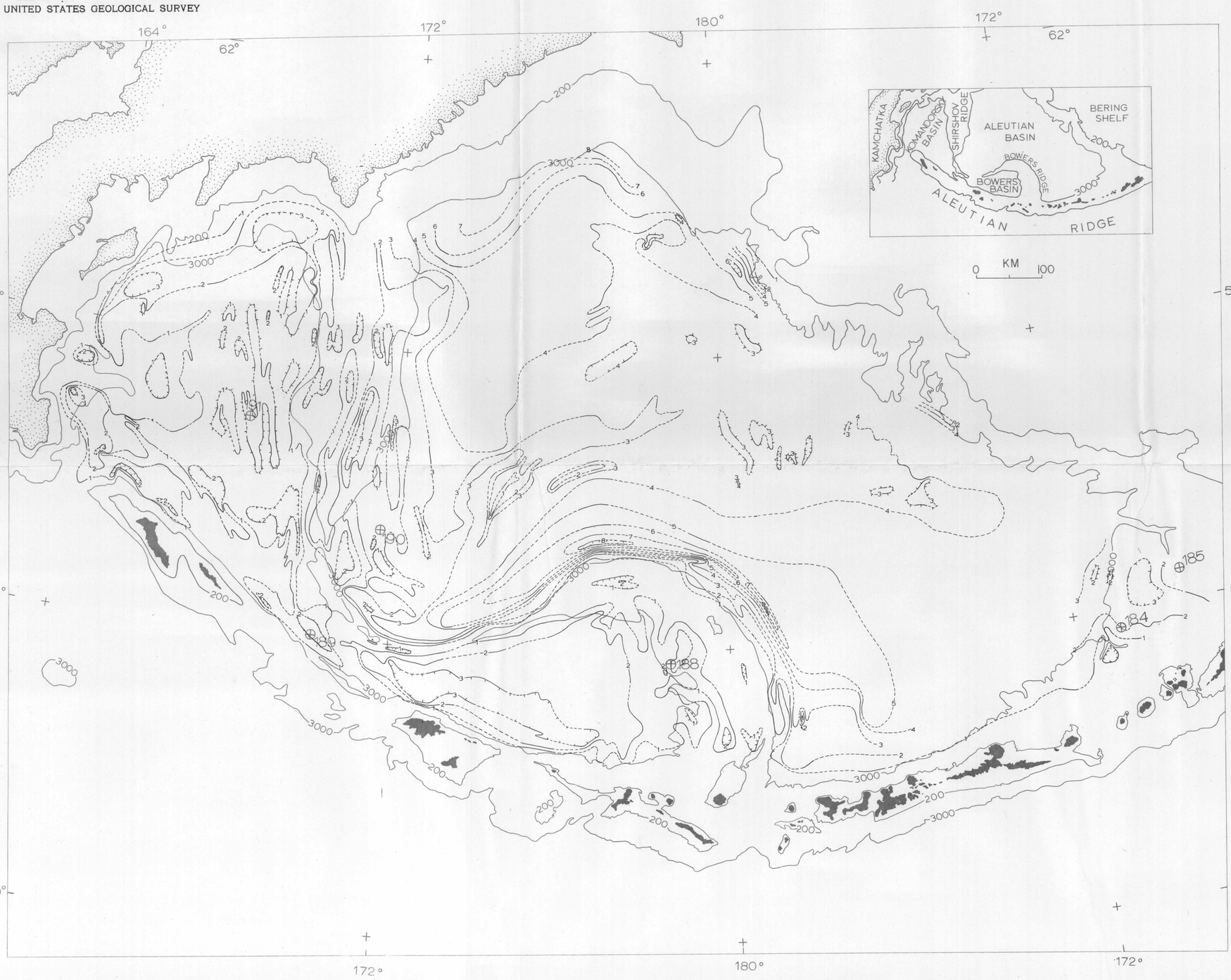
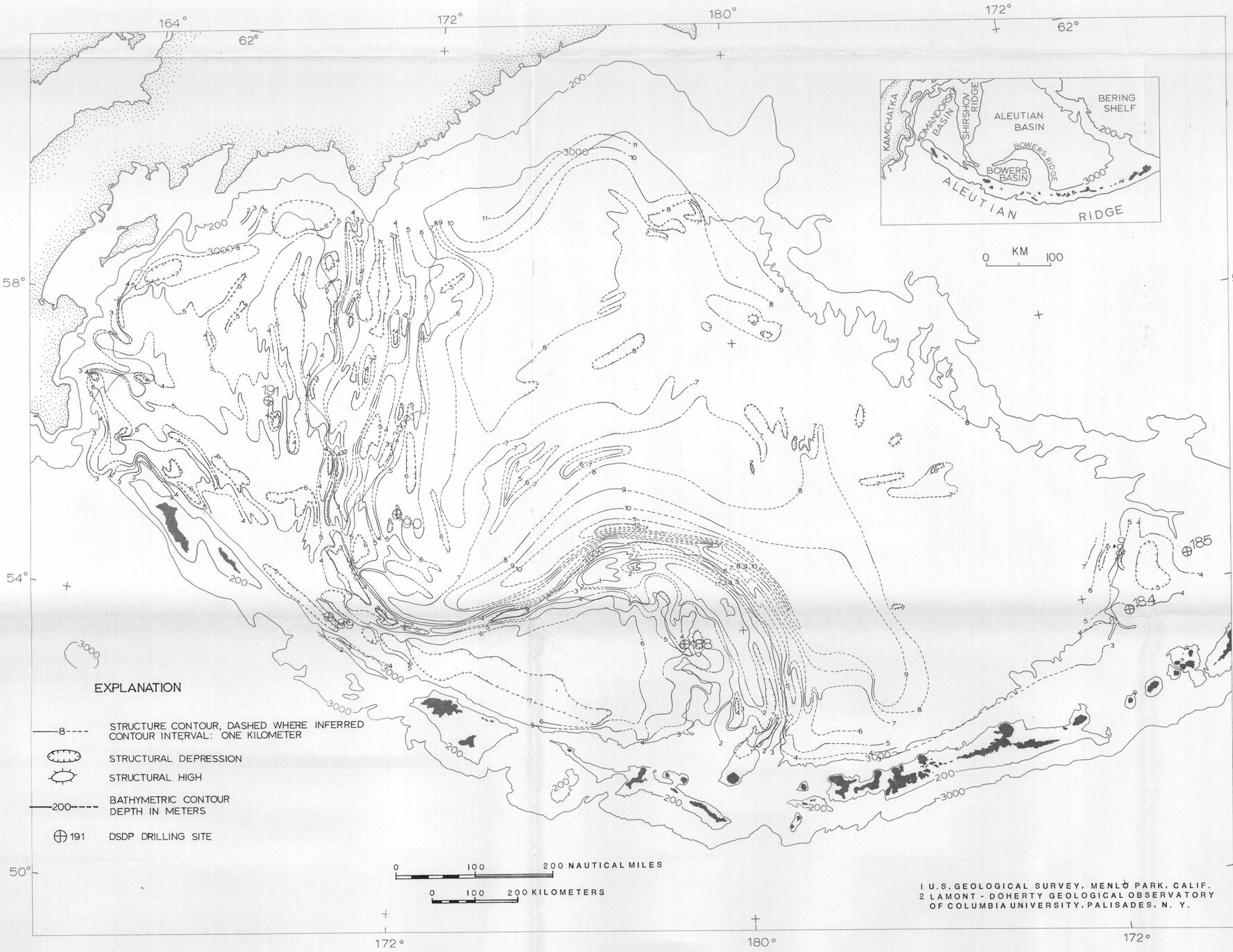
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

MISCELLANEOUS FIELD STUDIES
MAP MF – 907

COOPER AND OTHERS - PRELIM ISOPACH AND STRUCTURE MAPS, BERING SEA BASIN





EXPLANATION

- 8---- STRUCTURE CONTOUR, DASHED WHERE INFERRED CONTOUR INTERVAL: ONE KILOMETER
- STRUCTURAL DEPRESSION
- STRUCTURAL HIGH
- 200---- BATHYMETRIC CONTOUR DEPTH IN METERS
- ⊕191 DSDP DRILLING SITE

0 100 200 NAUTICAL MILES
0 100 200 KILOMETERS

Transverse Mercator Projection

PRELIMINARY ISOPACH AND STRUCTURE CONTOUR MAPS OF BERING SEA BASIN

BY

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1977

1 U.S. GEOLOGICAL SURVEY, MENLO PARK, CALIF.
2 LAMONT - DOHERTY GEOLOGICAL OBSERVATORY OF COLUMBIA UNIVERSITY, PALISADES, N. Y.

Interior--Geological Survey, Reston, Va.--1977
For sale by Branch of Distribution, U. S. Geological Survey
Box 25286, Federal Center, Denver, CO 80225

AND STRUCTURE MAPS, BERING SEA BASIN

Acoustic basement in the seismic reflection profiles is the reference horizon for both the structure contour map and the isopach map. Total depth to this horizon, below sea level, is depicted in the structure contour map; total thickness of sedimentary units overlying the acoustic basement is given in the isopach map. In areas that the acoustic basement can be identified beneath the thick section of flat-lying reflectors, it is a relatively strong acoustic horizon that often, but not always, has a hummocky or irregular appearance. Sonobuoy data indicate that the horizon corresponds with an increase in compressional wave velocities from V_p=3.5-4.3 km/sec to V_p=5.0-6.0 km/sec (Cooper et al., in prep). Tholeitic basalt recovered at DSDP site 191, Komandorsky Basin, (Creager et al., 1973) and theoretical magnetic studies in the Aleutian and Bowers Basins (Cooper et al., 1976) suggest the basement rocks beneath the three abyssal basins are basalt. The acoustic basement beneath Bowers and Shirshov Ridges differs from the basement in the abyssal basins in that it consists of altered andesitic tuffs (Scholl et al., 1975). The location of the transition from andesitic tuffs to basalt basement rocks is not known, although the transition probably occurs beneath the steep flanks of the ridges, where acoustic reflectors are difficult to follow.

The isopach thicknesses and structural depths have been determined by using a time-depth regression equation (Cooper et al., in prep) to convert reflection times to depths. The regression curve is:

$$TD = WD + 1.29T + 0.931T^2 - 0.073T^3$$

TD = total depth to reflector (km)
WD = water depth (km)
T = one-way reflection time from seafloor to reflector (sec)

The curve is a modified version of an earlier regression curve by Houtz et al.(1970) and is based on the published and unpublished data shown on the inset map.

REFERENCES

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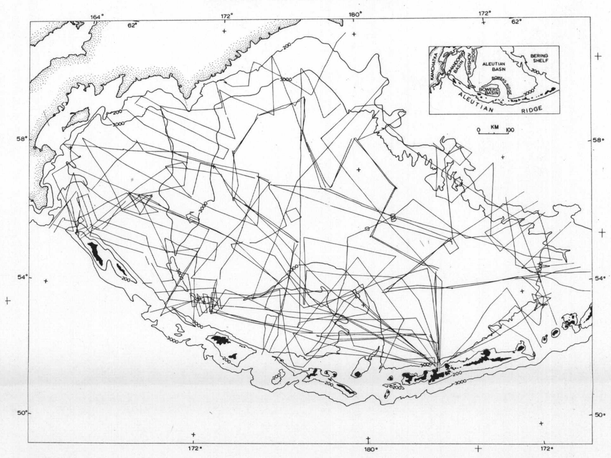
SHIP	ORGANIZATION	YEAR	NAVIGATION	SEISMIC SOURCE
Lee	USGS	1976	Satellite, Loran C-PP Doppler Sonar	Airgun-1326 cu. in.
Bent	USN	1972	Satellite, Loran	Arcer-60 kilojoules
Bartlett	USN	1972	Satellite, Loran	Arcer-30 kilojoules
Glomar Challenger	NSF (SIO)	1971	Satellite, Loran	Airgun-10 cu. in.
Conrad	L-DGO	1971	Satellite	Airgun-25 cu. in.
Bartlett	USGS (USN)	1970	Satellite	Arcer-160 kilojoules
Melville	SIO	1970	Satellite	Airgun-40 cu. in.
Conrad	L-DGO	1969	Loran	Airgun-25 cu. in.
Storis	USCG	1969	Satellite	Arcer-80 kilojoules
Hunt	USN	1968	Loran	Arcer- kilojoules
Conrad	L-DGO	1966	Loran	Airgun-25 cu. in.
Vema	L-DGO	1965	Loran	Airgun-25 cu. in.
Davis	USGS (USN)	1965	Loran	Arcer-38 kilojoules
Vema	L-DGO	1964	Loran	Airgun-25 cu. in.

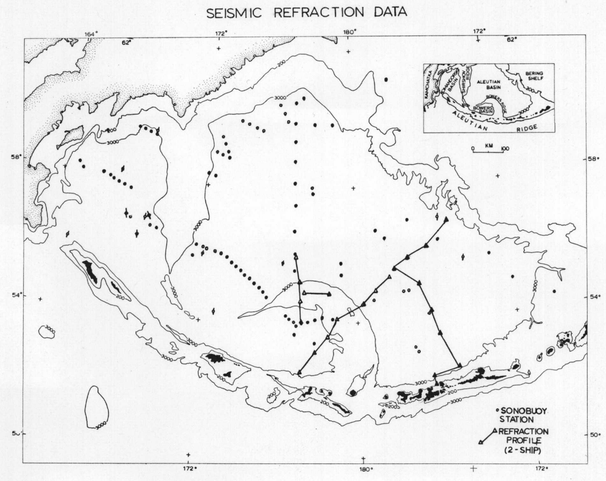
ORGANIZATIONS

L-DGO Lamont-Doherty Geological Observatory of Columbia University
USN: United States Navy
USGS: United States Geological Survey
USCG: United States Coast Guard
SIO: Scripps Institution of Oceanography
NSF: National Science Foundation

SEISMIC REFLECTION DATA



SEISMIC REFRACTION DATA



▲	Shor (1964)	SIO
Δ,O	Ludwig et al (1971)	L-DGO
◊	Hamilton et al (1974)	USN, USGS, SIO
◆	Shor and Fornari (1976)	SIO
O	Rabinowitz and Cooper (1977)	L-DGO
●	Cooper (unpublished)	USGS