

**U.S. DEPARTMENT OF THE INTERIOR  
U.S. GEOLOGICAL SURVEY**

**Marine Geology of the Bering Sea: Selected Bibliography of  
U.S. Geological Survey Studies (1970-present)**

By

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Open File Report 96-655

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## INTRODUCTION

THE BERING SEA covers more than 2,269,000 km<sup>2</sup> (876,000 mi<sup>2</sup>) and reaches depths of nearly 4000 m (13,000 ft.). Roughly two-thirds of it lies within the territorial boundaries of the United States. The U.S. Geological Survey has actively explored the geologic framework and sedimentology of the three principal physiographic provinces of the Bering Sea--Aleutian Arc, Aleutian Basin, and Bering Shelf (Figure 1). Studies have focused primarily on surface sediment distribution (Gardner et al. 1980), sedimentation processes (Karl et al., 1985), physical features of the seafloor (Carlson and Karl, 1988), environmental hazards (Carlson et al., 1991), climate change (Gardner et al., 1982), as well as geologic and structural framework of the Bering Sea crust (Cooper et al., 1987a,b) and tectonic evolution of the Bering Shelf (Marlow et al., 1994) and Aleutian Arc (Scholl et al., 1987). Many of these investigations are published in USGS literature or in national and international journals as listed in the attached bibliography.

The Western Marine and Coastal Geologic Surveys Team continues to pursue scientific programs in the region to address the concerns of state and federal agencies. The purpose of this report is to list various publications that USGS personnel have been involved with in the past 25 years. It shows not only the past accomplishments in the region but also our capabilities and interests. References are organized by physiographic province where applicable or are placed within the general location section if they are germane to more than one area. Overview, summary, or seminal references are indicated by bold typeface.

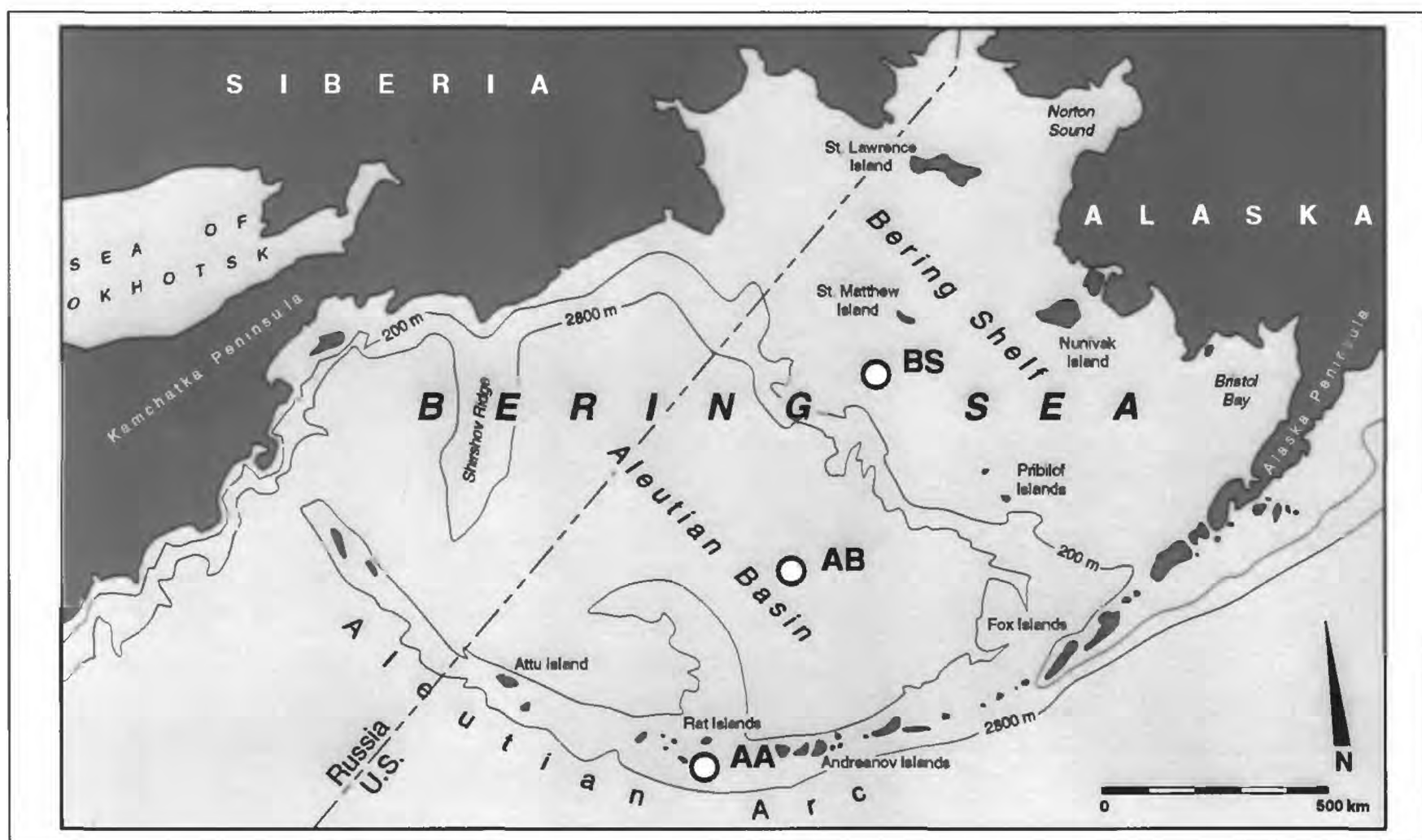


Figure 1. Locations of principal geographic features in the Bering Sea: AA, Aleutian Arc; AB, Aleutian Basin; and BS, Bering Shelf.

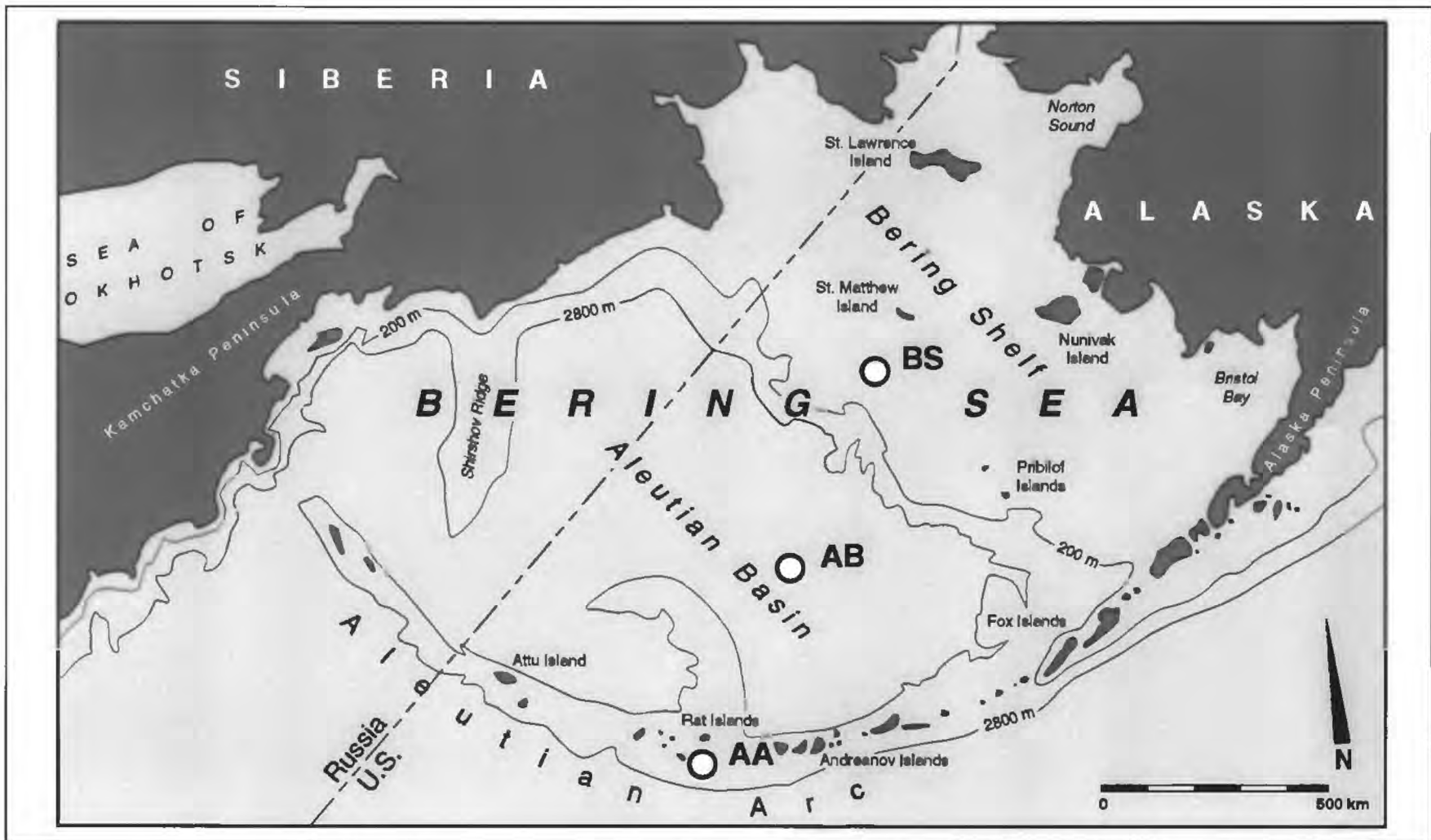


Figure 1. Locations of principal geographic features in the Bering Sea: AA, Aleutian Arc; AB, Aleutian Basin; and BS, Bering Shelf.

## REFERENCES AND SELECTED BIBLIOGRAPHY

(KEYED TO FIGURE 1)

### ALEUTIAN ARC

Scholl, D.W., Vallier, T. L., and Stevenson, A., 1983, Arc, forearc, and trench sedimentation and tectonics: Amlia corridor of the Aleutian Ridge, in Watkins, J. and Drake, C. (eds.), *Studies in Continental Margin Geology: American Association of Petroleum Geologists Memoir 34*, p. 413-439.

Scholl, D.W. T.L. Vallier, and A.J. Stevenson, 1987, Geologic evolution and petroleum geology of the Aleutian Ridge in Scholl, D.W., Grantz, A., Vedder, J., eds., *Geology and resource potential of the continental margin of western North America and adjacent ocean basins -- Beaufort Sea to Baja California: Circum-Pacific Council for Energy and Mineral Resources Earth Science Series*, v. 6, p. 123-156.

Vallier, T. L., Scholl, D. W., Fisher, M., Bruns, T., Wilson, F., von Huene, R., and Stevenson, A., 1994, Geologic framework of the Aleutian arc, Alaska, in Plafker, G. and Berg, H.C. (eds.), *The Geology of Alaska: Boulder, Colorado, Geological Society of America, The Geology of North America, Decade of North American Geology Volume 10*, p. 367-388.

### ALEUTIAN BASIN

Carlson, P. R. and Karl, H. A., 1984/85, Mass movement of fine-grained sediment to the deep-basin floor, Bering Sea, Alaska: *Geo-Marine Letters* 4, p. 227-234.

Carlson, P. R., Marlow, M. S., Parson, L. M., and Somers, M. L., 1987, GLORIA investigation of the Exclusive Economic Zone in the deep Bering Sea, M/V FARNELLA cruise F2-86-BS, 5 July to 4 August 1986: *U.S. Geological Survey Open File Report 87-72*, 15 p.

Cooper, A. K., Bailey, K. A., Marlow, M., Scholl, D. W., and Carpenter, C., 1976, Preliminary isopach map of the Bering Sea basin: *U.S. Geol. Survey Open-File Report 76-749*.

Cooper, A. K., Marlow, M. S., and Scholl, D. W., 1976, Mesozoic magnetic lineations in the Bering Sea marginal basin: *J. Geophysical Research*, v. 81, p. 1916-1934.

Cooper, A. K., 1977, Marine geophysical investigation in the Bering Sea basin: *USGS Circular 751-B*, p. 98-100.

Cooper, A. K., Marlow, M. S., and Scholl, D. W., 1977, Bering Sea - a multifarious marginal basin: in Island arcs, deep sea trenches and back-arc basins, *AGU Maurice Ewing Series*, v. 1, p. 437-450.

Cooper, A. K., Scholl, D. W., Marlow, M. S., Childs, J. R., Redden, G. D., Kvenvolden, K. A., and Stevenson, A. J., 1979, Hydrocarbon potential of Aleutian Basin, Bering Sea: *American Association of Petroleum Geologists Bulletin* 63, p. 2070-2087.

- Cooper, A. K., Childs, J. R., Marlow, M. S., Rabinowitz, P. D., Scholl, D. W., and Ludwig, W. J., 1977, Preliminary isopach and structure contour maps of the Bering Sea Basin: *USGS Map MF-907*.
- Cooper, A. K., 1978, Heat flow and organic gas measurements from the Aleutian Basin: *USGS Circular 772-B*, p. 92-94.
- Cooper, A. K., Scholl, D. W., Marlow, M. S., Childs, J. R., Redden, G. D., Kvenvolden, K. A., 1978, The Aleutian Basin, Bering Sea - a frontier area for hydrocarbon exploration: *Proceedings Offshore Technology Conference*, p. 353-362.
- Cooper, A. K., 1978, Hydrocarbon prospects for the frontier abyssal areas of the Bering Sea: *Oil and Gas Journal*, v. 76, no. 43, p. 196-202.
- Cooper, A. K., Scholl, D. W., Vallier, T. L., and Scott, E., 1980, Resource report for the deep water areas of proposed lease sale no. 70, St. George Basin, Alaska: *U.S. Geological Survey Open-File Report 80-246*, 90 p.
- Cooper, A. K., Scholl, D. W., Marlow, M. S., Childs, J. R., Redden, G. R., Kvenvolden, K. A., and Stevenson, A. J. 1979, Hydrocarbon exploration in the Aleutian Basin, Bering Sea: *AAPG Bulletin*, v. 63, p. 2070-2087.
- Cooper, A. K., Marlow, M. S., and Ben-Avraham, Zvi, 1981, Multichannel seismic evidence bearing on the origin of Bowers Ridge, Bering Sea: *GSA Bulletin*, v. 92, p. 474-484.
- Cooper, A.K. and M.S. Marlow, 1983, Preliminary results of geophysical and geological studies of the Bering Sea shelf during 1982: *USGS Open-file report 83-322*, 8 p.
- Childs, J. R., Cooper, A. K., and Wright, A. W., 1981, Residual magnetic map of Umnak Plateau region, Southeastern Bering Sea: *USGS Map GP-939*.
- Childs, J.R., Magistrale, H.W., and A.K. Cooper, 1985, Free-air gravity map of the Bering Sea, *USGS Miscellaneous Field Studies map*, MF-1728.
- Cooper, A.K., Scholl, D.W., and Marlow, M.S., 1987, Structural framework, sedimentary sequences, and hydrocarbon potential of the Aleutian and Bowers Basins, Bering Sea: in Scholl, D.W., Grantz, A., Vedder, J., eds., Geology and resource potential of the continental margin of western North America and adjacent ocean basins -- Beaufort Sea to Baja California: *Circum-Pacific Council for Energy and Mineral Resources Earth Science Series*, v. 6, p. 473-503.**
- Cooper, A.K., Marlow, M.S., and D.W. Scholl, 1987, Geologic framework of the Bering Sea crust: in Scholl, D.W., Grantz, A., Vedder, J., eds., Geology and resource potential of the continental margin of western North America and adjacent ocean basins -- Beaufort Sea to Baja California: *Circum-Pacific Council for Energy and Mineral Resources Earth Science Series*, v. 6, p. 73-103.**
- Gardner, J.V., Dean, W.E., Klise, D.H., and Baldauf, J.G. 1982. A climate-related oxidizing event in deep-sea sediment from the Bering Sea. *Quaternary Research*, v. 18, p. 91-107.

Hall, R.K., Karl, H.A., Carlson, P.R., Cooper, A.K., Gardner, J.V., Hunter, R.E., Marlow, M.S. and Stevenson, J., 1989, Bathymetric map of the Bowers Basin and Aleutian Basin east of the U.S.-U.S.S.R. 1867 Convention Line, Bering Sea: *U.S. Geological Survey Open File Report 89-548*, 8 p., 1 over-size sheet, scale 1:2,000,000.

**Karl, H. A., Carlson, P. R., and Gardner, J. V., Directors 1996 Aleutian Basin of the Bering Sea: styles of sedimentation and canyon development, in Gardner, J.V., Field, M.E., and Twichell, D. (eds) *The Geology of the United States' Seafloor: The View from Gloria* . Cambridge Press, Chpt 17, p. 305-332.**

Marlow, M. M., Carlson, P. R., Dadisman, S. V., Rearic, D. M., Maple, E. J., and Parson, L. M., 1987, GLORIA side-scan and geophysical surveys of the central Bering Sea in 1986: *U.S. Geological Survey Circular*, 998, p. 152-156.

Marlow, M. S., Cooper, A. K., Dadisman, S. V., Geist, E. L., and Carlson, P. R., 1990, Bowers Swell—Evidence for an extensive zone of compressive deformation concentric with Bowers Ridge, Bering Sea: *Marine and Petroleum Geology* 7, p. 398-409

Marlow, M. S., Cooper, A. K., Scholl, D. W., Vallier, T. L., and McLean, H., 1979, Description of dredge samples from the Bering Sea continental margin: *U.S. Geological Survey Open-File Report 79-1139*, 4 p.

Rabinowitz, P., and Cooper, A. K., 1977, Structure and sediment distribution in the western Bering Sea: *Marine Geology*, v. 24, p. 309-320.

Rearic, D. M., Williams, S. R., Carlson, P. R., and Hall, R. K., 1988, Acoustic evidence for gas-charged sediment in the abyssal Aleutian Basin, Bering Sea, AK: *U.S. Geological Survey Open File Report 88-677*, 40 p.

Scholl, D. W., and Cooper, A. K., 1978, VAMP's - Possible hydrocarbon-bearing structures in the Bering Sea: *Am. Assoc. Petro. Geologists Bulletin*, v. 62, p. 2481-2488.

#### BERING SHELF AND SLOPE

Carlson, P. R., Fischer, J. M., and Karl, H. A., 1983, Two newly discovered submarine canyons on Alaskan continental margin of Bering Sea: *U.S. Geological Survey Open File Report 83-24*, 37 p., I-map sheet, 1:250,000.

**Carlson, P. R., Golan-Bac, M., Karl, H. A., and Kvenvolden, K. A., 1985, Seismic and geochemical evidence for shallow gas in the sediment on the Navarin continental margin, Bering Sea: *American Association Petroleum Geologists Bulletin* 69, p. 422-436.**

Carlson, P. R., and Karl, H. A., 1981, Seafloor geologic hazards, sedimentology, and bathymetry. Navarin Basin province, northwestern Bering Sea: *U. S. Geological Survey Open-File Report 81-1217*, 149 p.

Carlson, P. R., and Karl, H. A., 1984, Discovery of two new large submarine canyons in the Bering Sea: *Marine Geology* 56, p. 159-179.

**Carlson, P. R., and Karl, H. A., 1988, Development of large submarine canyons in the Bering Sea indicated by morphologic, seismic, and sedimentologic characteristics: *Geological Society of America Bulletin* 100, p. 1594-1615 .**

Carlson, P. R., Karl, H. A., and Crane, R. X., 1983, High resolution seismic reflection profiles, trackline and sample location map, and digitized bathymetric data: Navarin Basin Province, northern Bering Sea: *U.S. Geological Survey Open File Report 83-618*, 4 p., 1 map sheet 1:1,000,000.

Carlson, P. R., Karl, H. A., and Edwards, B. D., 1982, Puzzling mass movement features in the Navarinsky Canyon head, Bering Sea: *Geo-Marine Letters* 2, p. 123-127.

**Carlson, P. R., Karl, H. A., and Edwards, B. D., 1991, Mass sediment failure and transport features revealed by acoustic techniques, Beringian Margin, Bering Sea, AK: *Marine Geotechniques* 10, p. 33-51**

Carlson, P. R., Karl, H. A., Fischer, J. M., and Edwards, B. D., 1982, Geologic hazards in Navarin Basin province, northern Bering Sea: *Proceedings 14th Offshore Technology Conference, Houston, TX., v. 1*, p 73-87.

Carlson, P. R. and Marlow, M. S., 1984, Discovery of a gas plume in Navarin Basin: *Oil and Gas Journal* 82(14), p. 157-158.

Cooper, A. K., Marlow, M. S., and Vallier, T. L., 1984, Summary geologic report for St. George outer continental shelf (OCS) planning area, Bering Sea, Alaska: *U.S. Geological Survey Open-File Report 84-418*, 81 p.

Davis, A. S., Pickthorn, L.-B. G., Vallier, T. L., and Marlow, M. S., 1988, Petrology, geochemistry, and K-Ar ages of volcanic arc rocks dredged from the continental margin of the Bering Sea: *U.S. Geological Survey Open-File Report 88-34*, 37 p.

Davis, A. S., Pickthorn, L.-B. G., Vallier, T. L., and Marlow, M. S., 1989, Petrology, geochemistry, and ages of volcanic-arc rocks from the continental margin of the Bering Sea: Implications for relocation of the plate margin: *Canadian Journal of Earth Sciences* 26, p. 1474-1490.

Drake, D. E., Cacchione, D. A., Muench, R. D., and Nelson, C. H., 1980, Sediment transport in Norton Sound, Alaska: *Marine Geology* 36, p. 97-126.

Fischer, J. M., Carlson, P. R., and Karl, H. A., 1982, Bathymetric map of Navarin continental margin, Bering Sea: *U.S. Geological Survey Open File Report 82-1038*, 11 p., 1 map sheet 1:1,000,000.

**Gardner, J.V., Dean, W.E., and Vallier, T.L. 1980. Sedimentology and geochemistry of surface sediments, outer continental shelf, southern Bering Sea. *Marine Geology*, v. 35, p. 299-329.**

Gardner, J. V. and Vallier, T. L., 1981, Faulting in the outer continental shelf region of the southern Bering Sea: *American Association of Petroleum Geologists* 65, p. 1568-1573.

- Gardner, J. V., Vallier, T. L., and Dean, W. E., 1978, Grain size, total carbon, mineralogy, and inorganic geochemical data from surface sediments of the Southern Bering Sea Outer Continental Shelf: *U.S Geol. Survey Open-File Report 78-923*, 31 p.
- Gardner, J. V., Vallier, T. L., Dean, W. E., Kvenvolden, K. A., and Redden, G. D., 1979, Sedimentology and geochemistry of surface sediments and the distribution of faults and potentially unstable sediments, St. George region of the Outer Continental Shelf, southern Bering Sea: *U.S. Geological Survey Open-File Report 79-1562*, 88 p.
- Gardner, J. V., Vallier, T. L., and Dean, W. E., 1978, Grain carbon, mineralogy, and inorganic geochemical data from surface sediments of the southern Bering Sea continental shelf: *U.S. Geological Survey Open-File Report 78-923*, 31 p.
- Gardner, J. V., Vallier, T. L., Dean, W. E., Kvenvolden, K. A., and Redden, G., 1979, Sedimentology and geochemistry of surface sediments and the distribution of faults and potentially unstable sediments, St. George Basin region of the outer continental shelf, southern Bering Sea: *U.S. Geological Survey Open-File Report 79-1562*, 88 p.
- Golan-Bac, M., and Kvenvolden, K. A., 1983, Hydrocarbon gases in sediments-- results from 1981 field season, in Karl, H.A., and Carlson, P.R., (eds.), Chapter 8, Surface and Near-surface Geology, Navarin Basin Province: Results of the 1980-81 Field Season: *U.S. Geological Survey Open-File Report 84-89*, p. 55-75
- Hampton, M. A., and Winters, W. J., 1983, Geotechnical framework study of the northern Bering Sea, Alaska: *U.S. Geological Survey Open-File Report 83-404*, 382 p.
- Hampton, M.A., Lee, H.J., and Beard, R.M., 1982, Geological interpretation of cone penetrometer tests in Norton Sound, Alaska: *Geo-Marine Letters* 2, pl 223-230.
- Karl, H. A. and Carlson, P. R., 1982, Large sand waves in Navarinsky Canyon head, Bering Sea: *Geo-Marine Letters* 2, p. 157-162.
- Karl, H. A. and Carlson, P. R., 1982, Location and description of sediment samples: Navarin Basin province, Bering Sea, 1980-81: *U.S. Geological Survey Open File Report 82-958*, 5 p., 2 map sheets 1:1,000,000.
- Karl, H. A., and Carlson, P. R., 1983, Seafloor hazards and related surficial geology, Navarin basin province, northwestern Bering Sea: *Final report RU #588. Alaskan continental shelf, Principal Investigators reports for year ending 1982, NOAA, OCSEAP, Boulder, CO*, 241 p.
- Karl, H. A., and Carlson, P. R., 1984, Surface and near-surface geology, Navarin Basin province: results of the 1980-1981 field seasons: *U.S. Geological Survey Open File Report 84-89*, 118 p.
- Karl, H. A., and Carlson, P. R., 1987, Surface current patterns suggested by suspended sediment distribution over the outer continental margin, Bering Sea: *Marine Geology* 47, p. 1-8.

- Karl, H. A., Cacchione, D. A., and Carlson, P. R., 1986, Internal-wave currents as a mechanism to account for large sand waves in Navarinsky Canyon head, Bering Sea: *Journal of Sedimentary Petrology* 56, p. 706-714.**
- Karl, H.A., Carlson, P.R., and Cacchione, D.A., 1983, Factors that influence sediment transport at the shelf break, in Stanley, D.J., and Moore, G., (eds.), *The Shelfbreak: critical interface on continental margins: Society Economic Paleontologists and Mineralogists Special Publication* 33, p. 219-231.
- Karl, H. A., Carlson, P. R., Johnson, K. H., and Rearic, D. M., 1987, Grain-size parameters and constituent grain composition of surface sediment in Navarin Basin Province, Bering Sea: *U.S. Geological Survey Open-File Report 87-64*, 24 p.**
- Kvenvolden, K. A., and Claypool, G. E., 1980, Origin of gasoline-range hydrocarbons and their migration by solution in carbon dioxide in Norton Basin, Alaska: *American Association of Petroleum Geologists Bulletin* 64, p. 1078-1086.
- Kvenvolden, K. A., Nelson, C. H., Thor, D. R., Larsen, M. C., Redden, G. D., Rapp, J. B., and Des Marais, D. J., 1979, Biogenic and thermogenic gas in gas-charged sediment of Norton Sound, Alaska: *Offshore Technology Conference, OTC 3412*, p. 479-486.
- Kvenvolden, K. A., Rapp, J. B., and Nelson, C. H., 1978, Low molecular weight hydrocarbons in sediments from Norton Sound: *American Association of Petroleum Geologists Bulletin* 62, p. 534.
- Kvenvolden, K. A., Redden, G. D., Thor, D. R., and Nelson, C. H., 1981, Hydrocarbon gases in near-surface sediment of northern Bering Sea: in: Hood, D. W. and Calder, J. A., eds., *The Eastern Bering Sea Shelf: U.S. Dept. of Commerce, Oceanography and Resources 1*, p. 411-424.
- Kvenvolden, K. A., Vogel, T. M., and Gardner, J. V., 1981, Geochemical prospecting for hydrocarbons in the outer continental shelf, southern Bering Sea, Alaska: *Journal of Geochemical Exploration* 14, p. 209-219.
- Kvenvolden, K. A., Weliky, K., Nelson, C. H., and Des Marais, D. J., 1979, Submarine carbon dioxide seep in Norton Sound, Alaska: *Science* 205, p.1264-1266.**
- Lee-Wong, F., Vallier, T. L., Hopkins, D., and Silberman, W., 1979, Preliminary report on the petrography and chemistry of basalt from the Pribilof Islands and vicinity, southern Bering Sea: *U.S. Geological Survey Open-File Report 79-1556*, 51 p.
- Marlow, M. S., Carlson, P. R., and Cooper, A. K., 1980, Anatomy of a basin- the exploration of Navarin Basin: *U.S. Geological Survey annual yearbook*, p. 50.
- Marlow, M. S., Carlson, P. R., Cooper, A. K., Karl, H. A., McLean, H., McMullin, R., and Lynch, M. B., 1981, Hydrocarbon resource report for proposed CCS sale No. 83 Navarin Basin, Alaska: *U. S. Geological Survey Open-File Report 81-252*, 75 p.

- Marlow, M. S., and, Cooper, A. K., 1985, Regional geology of the Beringian margin, in Nasu, N. et al., (eds.), *Formation of Active Ocean Margins*, Terra Scientific Publishing Company (Terrapub), Tokyo, p. 497-515.**
- Marlow, M. S., Cooper, A. K., Carlson, P. R., Karl, H. A. and Edwards, B. D., 1983, Supplemental resource report for OCS lease sale #83 Navarin Basin, Alaska: *U.S. Geological Survey Open File Report 83-707*, 45 p.
- Marlow, M. S., Cooper, A. K., and Fisher, M. A., 1994, Geology of the eastern Bering Sea continental shelf: in Plafker, G., and Berg, H. C., eds., *The Geology of Alaska: Boulder, Colorado, Geological Society of America, *Geology of North America Volume G-1*, p. 271-284.***
- Marlow, M. S., McLean, H., Cooper, A. K., Vallier, T. L., Gardner, J. V., McMullin, R., and Lynch, M., 1980, A preliminary summary of regional geology, petroleum potential, environmental geology, and technology for exploration and development for proposed OCS lease sale no. 75 in Bristol Bay Basin, Bering Sea Shelf, Alaska: *U.S. Geological Survey Open-File Report 80-653*, 44 p.
- Marlow, M. S., Vallier, T. L., Cooper, A. K., Barron, J., and Wingate, F., 1983, A description of dredge samples collected in 1982 from the Bering Sea continental margin west of Navarin Basin: *U.S. Geological Survey Open-File Report 83-325*, 5 p.
- Nelson, C. H., 1982, Holocene transgression in deltaic and non-deltaic areas of the Bering epicontinental shelf, in Nelson, C. H., and Nio, S. D., (eds.), *The Northeastern Bering Shelf: New Perspectives of Epicontinental Shelf Processes and Depositional Products: *Geologie en Mijnbouw* 61*, p. 5-18
- Nelson, C. H., 1982, Modern shallow-water graded sand layers from storm surges—a mimic of Bouma sequences and turbidite systems: *Journal of Sedimentary Petrology* 52, p. 537-545.
- Nelson, C. H., and Creager, J. S., 1977, Displacement of Yukon-derived sediment from the Bering Sea to Chukchi Sea during the Holocene: *Geology* 5, p. 141-146.
- Nelson, C. H., and Hopkins, D. M., 1972, Sedimentary processes and distribution of particulate gold in northern Bering Sea: *U.S. Geological Survey Professional Paper 689*, 26 p.
- Nelson, C. H., Hopkins, D. M., and Scholl, D. W., 1974, Cenozoic sedimentary and tectonic history of the Bering Sea, in Hood, D. W., and Kelley, E. J., (eds.), *Oceanography of the Bering Sea*: Institute of Marine Science, University of Alaska Press, Fairbanks, p. 485-516.
- Nelson, C. H., Johnson, K. R., and Barber, J. H., Jr., 1987, Extensive whale and walrus feeding excavation on the Bering shelf, Alaska: *Journal of Sedimentary Petrology* 57, p. 419-430.**
- Nelson, C. H., Kvenvolden, K. A., and Clukey, E. C., 1978, Thermogenic gases in near-surface sediments of Norton Sound, Alaska: *Offshore Technology Conference, OTC 3354*, p. 2623-2633.

- Nelson, C. H., Larsen, B. R., Jenne, E. A., and Sorg, D. H., 1977, Mercury dispersal from lode sources in the Kuskokwim River drainage, Alaska: *Science* 1198, p. 820-824.
- Nelson, C. H., Pierce, D. W., Leong, K. W., and Wang, F. H., 1975, Mercury distribution in ancient and modern sediments of northeastern Bering Sea: *Marine Geology* 18, p. 91-104.
- Nelson, C. H., Rowland, R. W., Stoker, S., and Larsen, B. R., 1981, Interplay of physical and biological sedimentary structures of the Bering Sea epicontinental shelf in Hood, D. W., and Calder, J. A. (eds.), *The Eastern Bering Sea Shelf: Its Oceanography and Resources*, NOAA-OCSEAP Juneau Regional Office, Seattle, University of Washington Press, v. 2, p. 1265-1296.
- Nelson, C. H., Thor, D. R., Sandstrom, M. W., and Kvenvolden, K. A., 1979, Modern biogenic gas-generated craters (sea-floor "pockmarks") on the Bering Shelf, Alaska: *Geological Society of America Bulletin* 90 Part 1, p. 1144-1152.
- Simpson, G., Vallier, T. L., Pearl, J., and Lee-Wong, F., 1980, Age and geochemistry of basalt dredged south of St. George Island, southern Bering Sea: *U.S. Geological Survey Circular* 804-B, p. 134-136.
- Thor, D. R., and Nelson, C. H., 1981, Sea ice as a geologic agent on the subarctic Bering shelf in Hood, D. W., and Calder, J. E., (eds.), *The Eastern Bering Sea Shelf: Its Oceanography and Resources*, NOAA-OCSEAP Juneau Regional Office, Seattle, University of Washington Press, v. 1, p. 279-291.
- Underwood, M. B., Vallier, T. L., Gardner, J. V., and Barron, J., 1979, Age, grain size, mineralogy, and carbon/carbonate content of Miocene and Pliocene samples from dredge hauls, DSDP holes 184B and 185, and the Sandy River well, southern Bering Sea continental margin and Alaska Peninsula: *U.S. Geological Survey Open-File Report* 79-450, 34 p.
- Vallier, T. L., Underwood, M. B., Gardner, J. V., and Barron, J. A., 1980, Neogene sedimentation on the outer continental margin Southern Bering Sea: *Marine Geology* 36, p. 269-287.**
- Vallier, T. L., Underwood, M. B., Jones, D. L., and Gardner, J. V., 1980, Petrography and geologic significance of Upper Jurassic rocks dredged near the Pribilof Islands, Southern Bering Sea Continental Shelf: *American Association of Petroleum Geologists* 64, p. 945-950.
- Vallier, T. L., and Gardner, J. V., 1977, Maps showing types and data of faults interpreted from seismic profiles in the St. George Basin, southern Bering Sea: *U.S. Geological Survey Open-File Report* 77-591, 14 p.
- Vallier, T. L., and Herman, B. M., 1987, Age, petrology, and original tectonic setting of basalt from the St. George Basin COST No. 1 well, Southern Bering Sea, in Hamilton, T.D., and Galloway, J. P., eds., *The United States Geological Survey in Alaska Accomplishments During 1986: U.S. Geological Survey Circular* 998, p. 165-169.

Vogel, T. M., and Kvenvolden, K. A., 1981, Hydrocarbon gases in Navarin Basin province sediments: in Carlson, P.R., and Karl, H.A., Seafloor Geologic Hazards, Sedimentology, and Bathymetry: Navarin Basin Province, Northwestern Bering Sea: *U.S. Geological Survey Open-File Report 81-1217*, p. 80-99.

#### GENERAL LOCATIONS IN THE BERING SEA

**Ben-Avraham, Z. and Cooper, A. K., 1981, The early evolution of the Bering Sea by collision of oceanic rises and North Pacific subduction zones, *Geological Society of America Bull.*, v. 92, p. 485-495.**

**Bering Sea EEZ-Scan Scientific Staff, 1991, Atlas of the U.S. Exclusive Economic Zone, Bering Sea: *U.S. Geological Survey Miscellaneous Investigations, Series I-2053*, 145 p.**

Carlson, P. R., Karl, H. A., Edwards, B. D., Gardner, J. V., and Hall, R., 1993, Mass movement related to large submarine canyons along the Beringian margin, Alaska, in Schwab, W. C., and Twichell, D. C. (eds.), Submarine landslides: selected studies by the U.S. Geological Survey: *U.S. Geological Survey Bulletin 2002*, p.104-116

**Cooper, A. K., Scholl, D. W., and Marlow, M. S., 1976, A plate tectonic model for the evolution of the eastern Bering Sea basin: *Geological Society of America Bull.*, v. 87, p. 1119-1126.**

Cooper, A. K., Marlow, M. S., Parker, A. W., and Childs, J. R., 1979, Structure contour map on acoustic basement in the Bering Sea: *USGS Map MF-1164*.

**Cooper, A.K., Marlow, M.S., Scholl, D.W., and A.J. Stevenson, 1992, Evidence for Cenozoic Crustal Extension in the Bering Sea Region, *Tectonics*, v. 11, No. 4, p. 719-731.**

Kvenvolden, K. A., and Redden, G. D., 1980, Hydrocarbon gas in sediment from the shelf, slope, and basin of the Bering Sea: *Geochimica et Cosmochimica Acta 44*, p. 1145-1150.

Marlow, M. S., Cooper, A. K., Parker, A. W., and Childs, J. R., 1979, Isopach map of strata above acoustic basement in the Bering Sea: *USGS Map MF-1165*.

Marlow, M. S., and Cooper, A. K., 1984, Summary geologic report for the North Aleutian Shelf (OCS) planning area, Bering Sea, Alaska (Sale 92): *U.S. Geological Survey Open-File Report 84-773*, 29p.

Scholl, D. W., Vallier, T. L., and Stevenson, A., 1986, Terrane accretion, production, and continental growth--a perspective based on the origin and tectonic fate of the Aleutian-Bering Sea region: *Geology 14*, p. 43-47.