



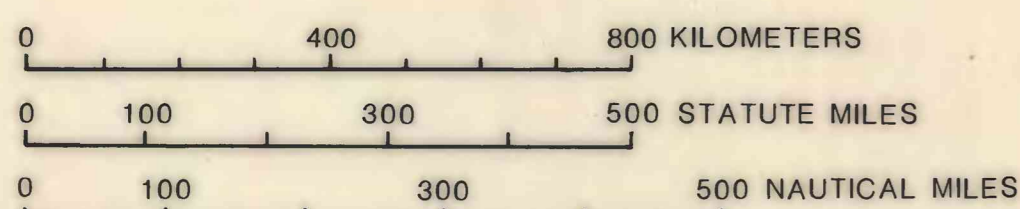
EXPLANATION

Natural-gas hydrates are solid, ice-like mixtures of natural gas (mainly methane) and water that are found in continental margin sediments at depths of water greater than about 500 m. The presence of gas hydrates in continental margins is commonly inferred from marine seismic surveys. The base of the gas-hydrate zone often correlates with an anomalous acoustic reflector which approximately parallels the sea floor and is often called a bottom simulating reflector (BSR). The sediment depths at which this reflector occurs can be predicted based on considerations of the pressure-temperature stability field for gas hydrates and the geothermal gradient. The reflector probably results from the velocity contrast between the sediment cemented with gas hydrate and the underlying sediment where lower velocities occur because of the absence of gas hydrate and the possible presence of free gas.

This map shows locations on the continental margins of the United States where seismic records indicate the presence of gas hydrates. The compilation includes only information from published or known "in press" sources as of 1983.

LEGEND

-  Areal extent of gas hydrates has been mapped.
-  Gas-hydrate reflector has been seen on individual seismic records, but the areal extent has not yet been mapped.



SCALE 1:10,000,000

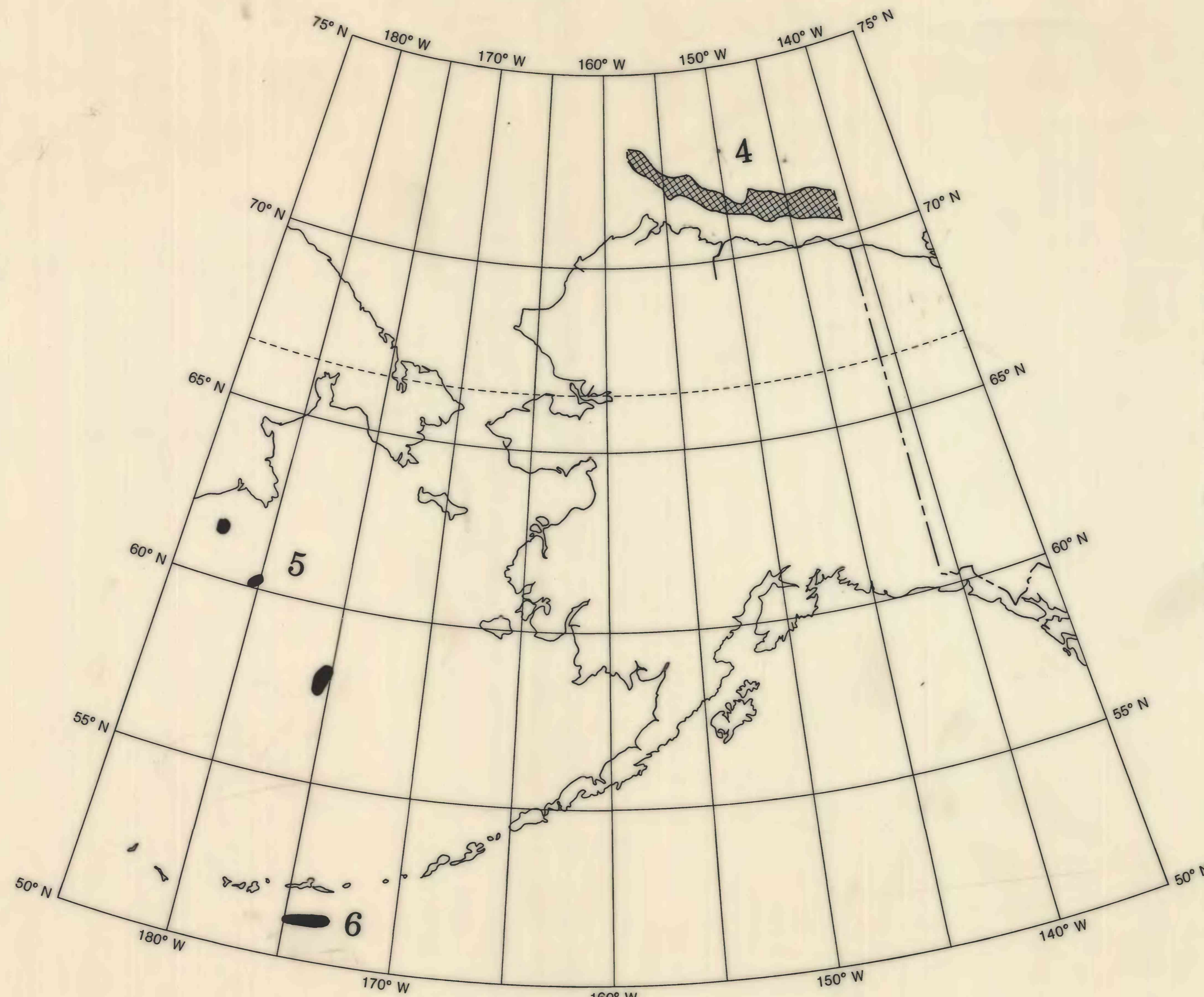
LAMBERT CONFORMAL CONIC PROJECTION  
BASED ON STANDARD PARALLELS 37° AND 65°

SOURCES OF DATA

- 1 Dillon, W.P., Grow, J.A., and Paull, C.K., 1980. Unconventional gas hydrate seals may trap gas off southeast U.S.: Oil and Gas Journal, v. 78, n. 1, p. 124-130.
- 1 Markl, R.G., and Bryan, G.M., 1983. Stratigraphic evolution of Blake Outer Ridge: American Association of Petroleum Geologists Bulletin, v. 67, p. 666-683.
- 1 Paull, C.K., and Dillon, W.P., 1981. Appearance and distribution of the gas hydrate reflection in the Blake Ridge region, offshore southeastern United States: U.S. Geological Survey, Misc. Field Studies, Map MF-1252.
- 2 Popenoe, P., Coward, E.L., and Cashman, K.V., 1982. A regional assessment of potential environmental hazards to and limitations on petroleum development off the southeastern United States Atlantic continental shelf, slope, and rise, offshore North Carolina: U.S. Geological Survey, Open-File Report 82-136, 66 p.
- 3 Tuchoke, B.F., Bryan, G.M., and Ewing, J.I., 1977. Gas-hydrate horizons detected in seismic-profiler data from the western North Atlantic: American Association of Petroleum Geologists Bulletin, v. 61, p. 698-707.
- 4 Grantz, A., and Dinter, D.A., 1980. Constraints of geologic processes on western Beaufort Sea oil developments: Oil and Gas Journal, v. 78, n. 18, p. 304-319.
- 4 Grantz, A., Dinter, D.A., Hill, E.A., May, S.D., McMullin, R.H., Phillips, R.L., and Reimnitz, E., 1982. Geologic framework, hydrocarbon potential, and environmental conditions for exploration and development of proposed oil and gas lease Sale 87 in the Beaufort and northeast Chukchi Seas: U.S. Geological Survey, Open-File Report 82-482, 71 p.
- 5 Marlow, M.S., Carlson, P., Cooper, A.K., Karl, H., McLean, H., McMullin, R., and Lynch, M.B., 1981. Resource report for proposed OCS Sale No. 83, Navarin Basin, Alaska: U.S. Geological Survey, Open-File Report 81-252, 65 p.
- 6 Scholl, D.W., Vallier, T.L., and Stevenson, A.J., 1983. Geologic evolution of the Aleutian Ridge: Journal of the Alaska Geological Society, (in press).
- 7 Field, M.E., Clarke, S.H., and White, M.E., 1980. Geology and geologic hazards of offshore Eel River Basin, northern California continental margin: U.S. Geological Survey, Open-File Report 80-1080, 80 p.

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

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GAS HYDRATES ON CONTINENTAL MARGINS OF THE UNITED STATES BASED ON  
OCCURRENCE OF BOTTOM SIMULATING REFLECTORS ON MARINE SEISMIC RECORDS

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1983