USGS
science for a changing world

A Global Inventory of Natural Gas Hydrate Occurrence

ABSTRACT

Natural gas hydrate occurs worldwide in oceanic sediment of continental and insular slopes and rises of active and passive margins, in deep-water sediment of inland lakes and seas, and in polar sediment on both continents and continental shelves. In aquatic sediment, where water depths exceed about 300 m and bottom water temperatures approach 0° C, gas hydrate is found at the seafloor to sediment depths of about 1,100 m. In polar continental regions, gas hydrate can be present in sediment at depths between about 150 and 2000 m. Thus, natural gas hydrate is restricted to the shallow geosphere where its presence affects the physical and chemical properties of near-surface sediment.

This updated global inventory reports on natural gas hydrate recovered from 44 regions worldwide and includes 113 regions where the presence of gas hydrate has been inferred from geophysical, geochemical, and geological evidence. The potential amount of methane in natural gas hydrate is enormous, with current estimates converging around about 10 exagrams (10^4 gigatons) of methane carbon. This large reservoir of methane, located globally within 2000 m of the solid surface, is of major interest as a potential (1) energy resource, (2) factor in global climate change, and (3) geohazard.

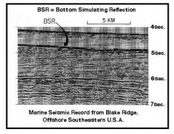
LEGEND

CODE	LOCATION	DESCRIPTION
P2	Middle America Trench (Costa Rica) DSDP Leg 84, Site 565. ODP Leg 170, Site 1041	Inclusions in mud and muddy sand. Disseminated and sheets
P4	Middle America Trench (Guatemala) DSDP Leg 67, Site 497 Site 495 DSDP Leg 84, Site 568 Site 570	Inclusion in sediment. Cement in coarse vitric sand. Inclusion in mudstone. Laminated ash; massive core
P5	Middle America Trench (Mexico) DSDP Leg 66, Site 490 Site 491 Site 492	Laminated ash and mud. Inclusions in mud. Laminated ash.
P7	Eel River Basin (California)	Layers, nodules in mud.
P8	Cascadia Basin (Oregon) DSDP Leg 146, Site 892 Hydrate Ridge	Aggregates, layers in silt. Layers, massive in carbonate crust.
P17	Okhotsk Sea (Russia) Paramushir Island	Layers in ooze.
P18	Okhotsk Sea (Russia) Sahkalin Island	Layers in silt and clay.
P20	Japan Sea (Japan) ODP Leg 127, Site 796	Crystals in sand with clay.
P24	Nankai Trough (Japan) ODP Leg 131, Site 808	Fragment in wash core.
P31	Peru-Chile Trench (Peru) ODP Leg 112, Site 685 Site 688	Fragments in mud. Grains in mud.
A6	Gulf of Mexico (Texas and Louisiana) DSDP Leg 96, Site 618 Green Canyon Garden Banks Mississippi Canyon Bush Hill	Nodules, crystals in mud. Nodules, layers in rubble. Nodules, layers in rubble. Pieces in coarse sediment. Mounds at seafloor.
A8	Blake Ridge (Southeastern USA) DSDP Leg 76, Site 533 ODP Leg 164, Site 994 Site 995 Site 997	Fragment in mud. Fragments in clay. Nodules, veins in mud. Massive core (~30 cm).
A15	Haakon-Mosby Mud Volcano (Norway)	Inclusions and plates.
A18	Niger Delta (Nigeria)	Nodules, dispersed in clay.
O1	Black Sea (Russia)	Veinlets in silty clay.
O2	Caspian Sea (Russia)	Laminated in clayey silt.
O3	Lake Baikal (Russia)	Disseminated in sand, silt.
O4 O5	Mediterranean Sea Amsterdam Mud Volcano Kula Mud Volcano	Not described. Not described.
C2	Mackenzie Delta (Canada)	Dispersed in sand, gravel.

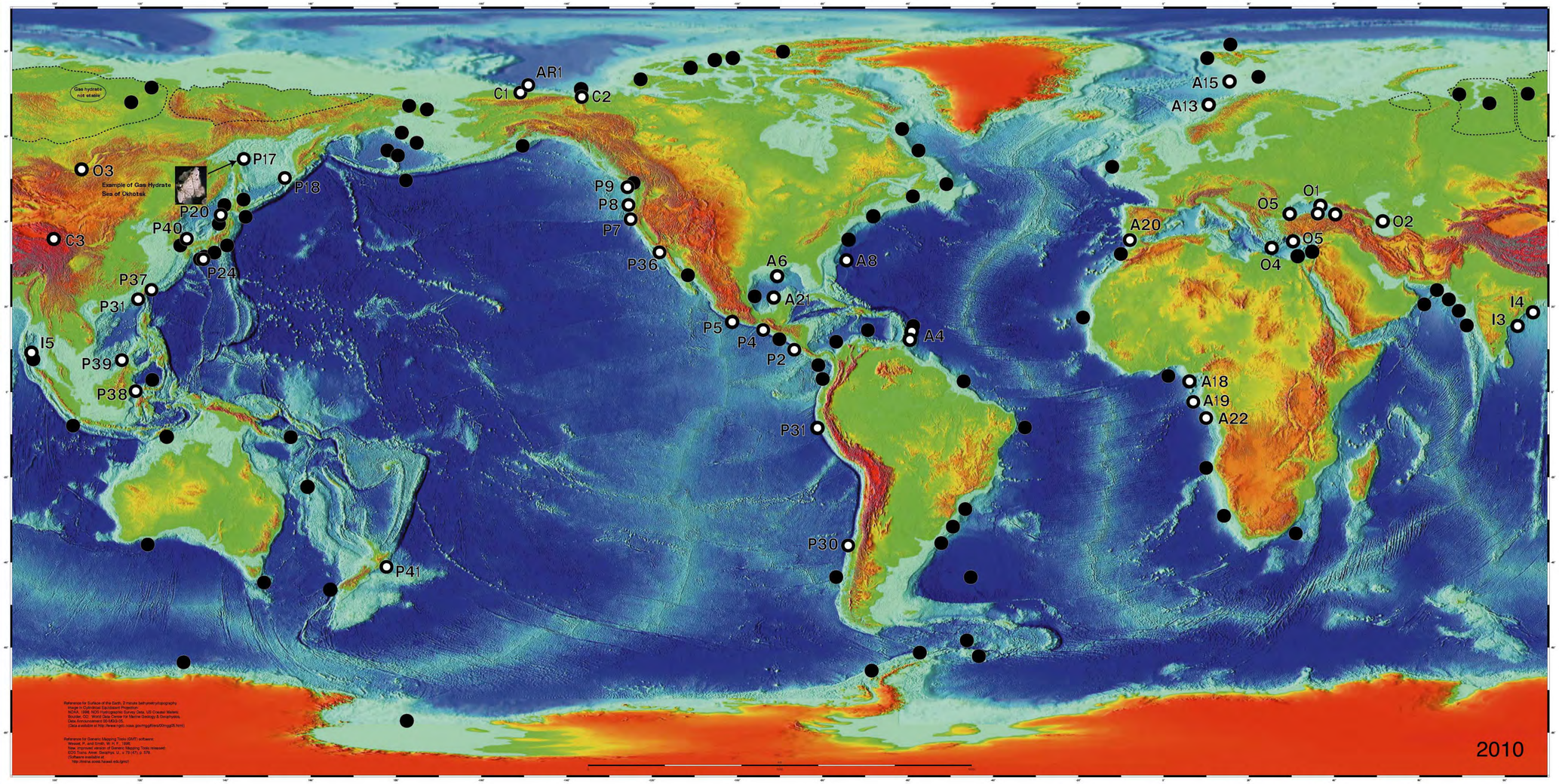
Recovered Gas Hydrate Samples (See Legend)

Inferred Gas Hydrate Occurrence Based on:
-BSRs
-Well Logs

Example BSR



Areas of Possible Gas Hydrate Occurrence In Russia



Keith A. Kvenvolden and Thomas D. Lorenson