

Location of Natural Gas Hydrates

Methane hydrates have been found in two geological environments. The first is permafrost regions where cold temperatures dominate and the second is beneath the sea in sediments of the outer continental margins where high pressures dominate. Hydrates were first discovered in permafrost in 1964 and in ocean sediments in the 1970s. The range of subsurface or subsea depths where the temperature and pressure conditions allow a hydrate to form and remain stable is called the hydrate stability zone (see Figure 1). When hydrates are brought to the ocean or land surface and exposed, the hydrate melts and the gas escapes.

While hydrates are located both on and offshore, they are located predominately offshore. Onshore permafrost areas worldwide are estimated to hold only between 500 to 12,000,000 Tcf of natural gas in methane hydrate deposits. Corresponding estimates for offshore deposits range from 110,000 to 270,000,000 Tcf (Collett and Kuuskraa, 1998). (See Figure 2 for known deposits.)

In 1995, the United States Geological Service (USGS) released a report evaluating the US hydrate resource base (Gautier et al., 1995). The mean estimate was 320,222 Tcf. After further study of deposits, USGS researchers have lowered that estimated to 200,000 Tcf.

As with the US's conventional oil and gas resources, the US's stock of methane hydrates is not evenly distributed across the country (see Table 1). Virtually all of the US's hydrate deposits are located offshore in ocean sediments, with only a tiny fraction (0.2%) located onshore in Alaska's permafrost. Over half (52.6%) of the US's total hydrate deposits are located off the coast of Alaska. The offshore regions of Washington, Oregon, and northern California hold about 19% while the offshore regions of New Jersey, North Carolina, and South Carolina contain about 16%. Lastly, the deep waters of the Gulf of Mexico hold 12% of the US's total hydrate deposits.

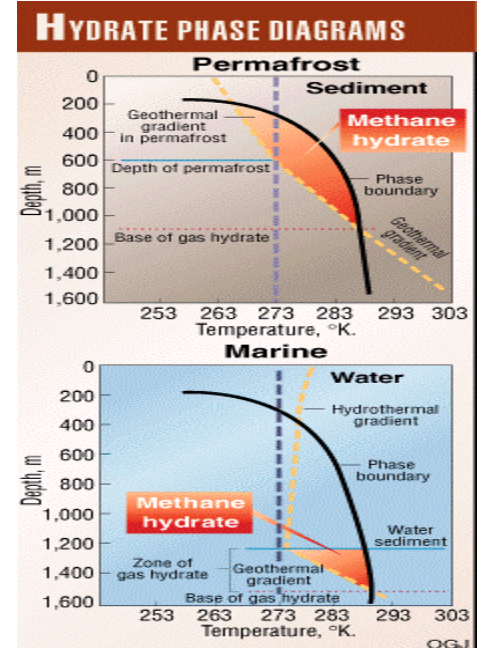


Table 1: Distribution of Hydrate Deposits in the United States

Region	Mean Estimate (TCF)	Percentage of Total US Hydrate Resource
Atlantic Ocean	32,375	16.1
Gulf of Mexico	23,893	12.0
Pacific Ocean	38,146	19.1
Alaska Offshore	105,217	52.6
Alaska Onshore	369	0.2
Total US	200,000	100

Source: Based on data from DOE, Office of Fossil Energy, 1998