WESTERN PACIFIC GAS HYDRATE BELT

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Abstract
Western an eastern margins of Pacific Ocean presents numerous gas hydrates sites, distributed as Gas hydrates Provinces (referred to the sea’s title) which can be combined to Circum Pacific Gas hydrate Belt. Gas (mainly methane) hydrates accumulation induced by varies active geological features determined by geodynamic and tectonic type and seismic state’s of Pacific and adjoining lithosphere plate’s borders. Bering Sea, Okhotsk Sea, Japan Sea, East-China Sea, Sea of Vietnam, Celebes and Sulu Seas and southward to New Zealand offshore presents Western Pacific Gas hydrate Belt and exposed methane hydrates distribution in sediments. Hydroacoustic, seismics, coring were a prime methods applied to gas hydrate searching and exploration. Methane hydrates was explored since 88-th (Okhotsk Sea). Gas hydrates supplying fluid within the thick Cenozoic sediment basins (up to 10 km thickness) are linked to multiple hydrocarbon accumulations: mainly oil and gas deposits, and gas (methane) hydrates – proved for the Bering, Okhotsk and Japan Seas. Submarine gas seepage usually accompanied by contrast seismic and acoustic anomalies in the sediments and water column (e.x. up to 700 gas “flares” prior to 2010 indicates gas hydrate fracture type accumulation in western Okhotsk Sea). High hydrocarbons were found as well, but methane is dominated everywhere. Methane sources discussed as mixture of thermogenic and biogenic origin. Gas hydrate occupies mainly 20-45% of pore volume. BSR was found globally, but this border means not gas hydrate stability zone only. Methane resources trapped in Western Pacific gas hydrates estimated based on latest investigations at least for \(5 \times 10^{13}\) cubic meters.

Keywords: Pacific Gas Hydrate Belt, gas hydrates, Pacific Ocean, active margin, oil-gas deposits

INTRODUCTION
The purpose of article is further developing the geological point of view to submarine gas hydrate occurrence. For the last 50 years nice explorations toward gas hydrate occurrence were conducted by international scientific and petroleum community (Ginsburg and Soloviev, 1994; Sloan, 1998; Suess et al., 1999; Max, 2000; ODP Legs; Mallik Production Well and many other research). Geophysical, and geochemical gas hydrates features were studied deeply and allow us to conduct present work. Authors also participated in gas hydrate projects personally for last 15 years (Okhotsk and Japan Seas).
Numerous gas hydrates findings (Fig. 1) dictates ological zoning of this phenomena. Gas hydrates found circum around the Pacific Ocean Margins on the water depth from 300 (Okhotsk Sea) to 2000 meters (Gulf of Mexico) and even 2,800 m (Bering Sea). The hydrate stability zone linked to the depth-pressure and temperature are actually vary from 300 to 1500 meters and cover huge horizontal areas. Direct sampling and drilling extent in situ gas hydrate presence from year to year. Same time, we have to note, that BSR is just usefull seismic feature, which can not warranty the fact of hydrates occurrence. In some seas, such as Okhotsk, Japan Sea, BSR can reflect also sediment transformation border (e.x. opal CT – cristobalite) and stratigraphy borders. Modelled gas hydrates distribution show same promising areas (Fig. 2) as in situ data.
The Pacific Ocean encompasses approximately one-third of the Earth's surface, having an area of 179.7 million square kilometers - larger than Earth's landmass entire. In that case any widely distributed natural phenomena in Pacific Ocean (high seismicity, volcanic activity, oceanological features etc.) has significance influence on environment realm. Extending approximately 15,500 kilometers (9,600 miles) from the Bering Sea in the Arctic to the northern extent of the