



Resource potential of gas hydrate-bearing mud volcanoes in the Gulf of Cadiz

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Conditions for the gas hydrate formation in the Gulf of Cadiz is very complicate and depend on the followings: temperature of the near bottom water that varied from 12 (near Gibraltar and shelf) to 2-4 degree C (at the deep water areas) due to climate, shallow-water environment of the shelf water areas, and due an influence of the warm Mediterranean Outflow or cold Atlantic waters; both gas hydrates of cubic structures I and II are known in the Gulf o Cadiz that implies different PT conditions necessary for the hydrate formation; all known in the Gulf of Cadiz gas hydrate occurrences are associated with mud volcanism suggesting specific mechanism of the gas hydrate formation, and defining the size and shape of the gas hydrate accumulations. It is important, that most shallow water hydrates there was discovered at the water depth of 910 m (at the Ginsburg mud volcano) and it was represented of structure II hydrates (Mazurenko et al., 2002). The gas hydrate accumulation occurs at the water depth defining PT conditions which are close to boundary for the methane hydrate formation under the temperature of the bottom water of about 11 degree C. Thus, the upper boundary of the GHSZ is limited by 800-900 m isopach (for the structure II gas hydrates). For the formation of structure I hydrate the water depth must be greater. The lower GHSZ boundary is outlined by continental slop line. The deepest gas hydrate accumulation associated with the Porto mud volcano occurs at water depth of about 4000 m.

In the Gulf of Cadiz about 20 mod volcanoes are known within the limits of the GHSZ,

nine from them are proved to be gas hydrate-bearing. In fact number of the mud volcanoes situated within the limits of the GHSZ should be at list several times more. The sizes of the gas hydrate accumulations corresponding to sizes of mud volcanoes and approximates by circles with diameters varying from 1.5 to 4 km. Total gas budget captured by hydrates at these accumulations is estimated as much as $2.8 \cdot 10^{10}$ cubic meters of gas. It should be noted, that resource potential of gas hydrates of the Gulf of Cadiz must be greater because the number of discovered mud volcanoes is increased year by year.