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Danube Fan gas hydrates: GEOHydrate project results

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This work outlines the theretical and field activities conducted under the Bulgarian Science Fund Project GEOHydrate: Geothermal evolution of marine gas hydrate deposits - Danube paleodelta, Black Sea. The purpose of this research is to enhance our understanding and perspectives of the study the connection between marine gas hydrate deposits formation and the measured *in situ* heat flow in seafloor sediments.

The aim of the GEOHydrate project is to prove the hypothesis about the existence on the seafloor of measurable temperature and heat flow (T&HF) anomalies above gas hydrates deposits (GHDs) and the possibility to restore the 4D-process of GHDs growth from these anomalies.

GEOHydrate data include 2D and 3D seismic and CSEM; *in situ* heat flow; hydro- and geo-physicochemical measurements; scientific drilling and logging. They are results from the projects BLASON, ASSEMBLAGE, GHASS and specially developed tools and methods for GHDs research from the German projects SUGAR I-III. The applied methods include seismic data interpretation; basin analysis; forward and inverse geothermal problems. The new heat flow approach continues to develop in the EU project DOORS with new cruise data and interpretation. Expected practical results are contribution to direct methods for GHDs search, resource estimation with a high signal-to-noise ratio, and a reduction in the future production costs from proper planning and reducing the number of production wells.

Results contribute to mitigating the effects of 3 modern global threats - climate change, clean air, and the cost of energy. European GHDs production is the most prospect and important for Bulgaria and Romania.

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