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Lithosphere thermal evolution in the buried structures of the deep-sea basin of the Black Sea and assessment of organic matter maturity

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The GALO basin modeling system was applied to restore numerically a thermal history of sedimentary cover and the basement of the Black Sea. It allowed to construct the variant of the basin development which included an evolution of different structures of the sea: the western and eastern depressions of the sea with oceanic type of the crust and the Shatsky and Andrusov ridges with continental crust. The variant of the basin development includes a high heat flow at the end of the Cretaceous, three stages of the sea deepening up to its present-day depth, low heat flow at the sea bottom, measured in the deep part of the sea and relatively high thermal regime of the mantle with the thickness of the basin lithosphere of about 60 km. An analysis confirmed that sedimentation can not explain a decrease in bottom heat flow up to 32 -34 mW/m^2. It shown that an invasion of the salt warm heavy water from the Mediterranean sea into the Black sea about 7 – 5 thousands years ago helps to understand an origin of low bottom heat flow in the deep parts of the Black sea.