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Numerical Modelling and Geological Interpretation of Geothermal Fields in Black Sea

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A numerical solution to the thermal conductivity equation was carried out along three profiles; the Varna-Sukhumi profile and two transverse profiles. The purpose of this paper is a more detailed study of the distribution in depth of the thermal field in the light of the latest geological and geophysical data concerning the age and structure of the sedimentary rocks and the Black Sea basement. Specified seismic and tomographic data about the sedimentary formation and the region basement were obtained and employed in order to precise the results obtained from the previous studies. Calculations were carried out along a geological profile using real properties of sedimentary rocks and basement and they have shown that the regional variation of temperature along the Moho plane varies from 420 to 754° . The heat flow along the same plane varies from 15-20 t 29-41 mW /m2. The part of the heat flow that is caused by radiogenic sources amounts to 17-30 mW/m2. The modelling results are presented as sections that illustrate the distribution of temperature and heat flow in depth.
his article is initiated by the fact that between 1st January 2009 and 12th December 2011, Project № 226592, entitled “UP-GRADE BLACK SEA SCIENTIFIC NETWORK”, was worked out as part of the Seventh Framework Program (FP7). A team from the University of Mining and Geology, Sofia, took part in the project developing a geothermal database for the Black Sea basin. Part of the data was employed for the modeling of then geothermal field along the Varna-Sukhumi Profile. A catalogue is being prepared that is going to comprise all geothermal data of the Black Sea that are available so far and that amount more than 750 at present.
The authors wish to thank the Project Management for the provided opportunity to work on this problem. The numerical modelling the analysis and interpretation of geothermal data will contribute to the study of the geological evolution of the lithosphere of the Black Sea depression.