



Study of the magnetic anomalies from WDMAM 2007 in the geothermal area of alpine folding (Italy and Tyrrhenian Sea)

Alevtina Petrova (1) and Maxim Petrishchev (2)

(1) SPbF IZMIRAN, Russian Academy of Sciences, St.-Petersburg, Russia (aa_petrova@rambler.ru), (2) SPbF IZMIRAN, Russian Academy of Sciences, St.-Petersburg, Russia (mp@izmiran.spb.ru)

WDMAM 2007 is a result of generalization of heterogeneous near surface measurements (hydro and aeromagnetic). Doubtless interest represents the study of the magnetic anomalies structure from WDMAM 2007, its comparison with hydromagnetic data and comparison among themselves the results of geological interpretation. The spectral-spatial analysis technique (SPAN) is applied for its interpretation that allows converting the spectral-spatial representation of the geomagnetic field into the deep geomagnetic section. It demonstrates the articulation's character of the Earth's crust blocks and deep features of faulting that shows as contact surfaces of the different magnetization rocks.

As example it is used the data $(\Delta T)_a$ obtained from the measured total intensity of geomagnetic field through hydromagnetic profile in the Mediterranean Sea and data from WDMAM 2007. This profile sects the strongly differentiated anomalous magnetic field in East-Balearic and Tyrrhenian Seas. We compared the magnetic anomalies and its geomagnetic sections taken from WDMAM 2007 and $(\Delta T)_a$. Irrespective of differences in intensity and detail of anomalies definition on WDMAM 2007 in comparison with hydromagnetic surveying, the basic features of morphology and structure of the anomalous geomagnetic field, nevertheless, are kept in WDMAM 2007. Geomagnetic section using WDMAM data constructed in the relative units keeps the main features of magnetic heterogeneities distribution in the basement and the location of the rheologic weaken layers in the Earth's crust that are usually shown in seismic horizons in the basement.

For East-Balearic Sea it is well known the low velocity channel for a depth range 30-60 km. On geomagnetic sections it can be seen as a powerful feebly magnetic layer. Besides, on geomagnetic section using WDMAM 2007 data it is clearly contouring the vertical feebly magnetic permeable zone that shows a way of uplifting heat flow from the mantle to a surface. Similar track of uplifting fluidized flow is traced in the east part of Tyrrhenian Sea. It uplifts from the depth 10-12 km and goes to the Italy coast near Naples. On geomagnetic sections it can be seen the area of possible fluid feed from the depth about 30 km in the lobe of Ionian Sea. For the contouring of fluidized channels areas in the geothermal area of Alpine Folding we completed 2D model of magnetization distribution for the depth 5 and 10 km. Well-known Larderello geothermal power plant is located on one of these areas. Submeridional geomagnetic section based on WDMAM 2007 data through a zone of the mantle earthquake's focuses has revealed the powerful fluid channel of northeast bearing traced from depth about 28 km. The channel uplifts to a surface to 100 km northern from the Larderello geothermal power plant.

Thus, the geomagnetic sections based on WDMAM 2007 data well trace the rheologic weaken layers with a low magnetization in the Earth's crust and uplifting heat flow channels. WDMAM can be used for the regional forecast of the deep geothermal deposits with a fluid feed from deep reservoirs of the Earth's crust.