Electric conductivity of the Earth crust in the North-Eastern Part of the Alpine-Himalayan Orogenic Belt

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Regional anomalies of high electric conductivity in the depth of the Earth crust characterize alpine tectonic structures. This is also true of the Alpine-Himalayan orogenic belt (AHOB), the mountain formation that encompasses western part of South-Eastern Asia, north-east of Africa and south of Europe. It separates Eastern-European (EEP), Siberian, Chino-Korean and Southern-Chinese platforms from the Afro-Arabian and Indian platforms, it stretches from Gibraltar in the west and covers part of the western and southern Europe, Mediterranean See, northern Africa and Indonesian archipelago.

This belt splits into several branches. The main one stretches from Pyrenees through Alps and Carpathians to Balcanides and northern Anatolia, Caucasus, Kopet Dag and Himalayas. It was suggested that there is one more northern Dobrudzha-Crimean-Caucasian branch [Kulik, 2009].

Carpathian and adjacent regions from the geological standpoint include south-western part of EEP and alpine folding region of Carpathians together with frontline and inner Miocene depressions as well as pre-alpine epyrogenic zones (Scythian, Misian and Dobrudzha).

Tarkhankut conductivity anomaly (CA) was identified in the western Crimea [Kulik, Burakhovich, 1999] and has comlex configuration at the depth of 10 km. Its cumulative longitudinal conductivity (S) is 5000 Sm. Its most conducting parts are located in the Black See basin, Karkinit-North-Crimean depression and Almian-Cimmerian trench.

In the sub-latitudinal direction from Tarkhankut peninsula to Novoselov uplift stretches CA 20—30 km wide and with S = 500 Sm. It is located at the depth of 5 km. Further on it changes the direction to north-western and can be partially traced along narrow fin like slope of the crust foundation. In the mountainous Crimea there is an anomalous zone with S = 1000 Sm located in the region of converging isolines on the map of density of quake epicenters. Conductivity zone at the depth of 2 and 5 km with corresponding S equal to 2500 and 5000 Sm can be identified in the eastern part of Crimea. This zone geographically coincides with location of mud volcanoes of Kerch — Tamansk region that can be possibly controlled by tectonic fractures with roots lying at the depth of 5—7 km.

Northern Dobrudzha fold-shift structure 50 km wide stretches in the north-west direction for 200 km. It can be traced inside Black See basin at the distance of 50 km but it's not connected with mountainous Crimea. It is quite likely that struc-

tures of the Teisseyre — Tornquist zone already start taking part in formation of this branch of AHOB. In the north-east the folding formation wedges out near latitudinal Trotush fracture which separates Eastern and Southern Carpathians. In Peri-dobrudzha and Northern Dobrudzha at the depths of 10—20 km and 40—80 km there stretches CA with electric resistivity in a range of 40 to 100 Ω·m [Burakhovich et al., 1995].

An anomaly of electric conductivity in the earth crust of Western Carpathians is related to the juncture zone of Flysch Carpathians and inner units including Pennian and Marmarosh zones [Burakhovich, 2004]. In Southern Carpathians there is a CA located in the juncture zone of Inner nappies that separates Pannonia and Transylvania, and Southern Carpathians but not Peri-Carpathian depression. An anomaly of the western part of Ukrainian Shield (USh) and its slope is galvanically related with Flysch zone of Eastern Carpathians and Marmarosh belt. Western branches of the CA are located in a zone of deep Podolian fracture and the juncture of southwestern edge of EEP and Scythian platform. Dobrudzha is represented by a separate conducting object. It is absolutely obvious that in the studied region there is no universal and homogeneous asthenosphere.

Geoelectric models or crust CA do not always correspond to geology on a surface. For example, Pennian and Marmarosh belt as well as Flysch Carpathians are not a continuous CA in the Earth Crust. An anomaly of Precambrian USh and EEP wedges into alpine Carpathians. North-western branch of AHOB has some distinctive features characteristic to mobile belts; above all it's a week manifestation of the crust destruction in the beginning alpine stage of development.

A nature of a CA in the Earth Crust and Mantle can be different. First of all, it can be related to specifics of fluid (hydrothermal) regime deep in the Earth, to existence of melted rock phase in the crust. Second of all, it can be related to existence of inclusions with electronic conductivity. The most widespread representatives are graphite, sulphides bearing gneisses and shales which have graphite as one of their constituencies, graphite substance, pyrite, pyrrhotite and sometimes shungite. And finally, it can be due to a combination of inclusions with electronic conductivity and fluid which form an interconnected net of conducting channels.

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