Geophysical Research Abstracts,
Vol. 11, EGU2009-12776, 2009
EGU General Assembly 2009

Conductivity of the Earth's crust and upper mantle in Ukraine

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On the western slope of the Ukrainian Shield (USh) at the depth (H) from 3 to 6 km lies Volynian conductive anomaly (CA) with specific resistance () of the order of 10 Ohm•m. Chernovtsy-Korostenian CA on the USh territory, extending from the surface (the top of the conductor is at the depth of 50 m) to the depth of 1.5 km, manifests itself as two local sections with =10 Ohm•m. They are galvanically connected with submeridianal CA (H=3-15 km, =10 Ohm•m). Chernovtsy-Korostenian CA, outside of USh, was found on the southern part of Volyn-Podolian plate (VPP) (H=6-15 km, =10 Ohm•m). The anomaly gets deeper in the north (H=15-30km). Section of the anomaly with =5 Ohm•m is located within the borders of Rosinian and Podolian megablocks and contains an object with =1000 Ohm•m. Western part of CA (=20 Ohm•m) stretches out of the USh in two directions – south and southwest, along Podolian fracture zones till Golovanian seaming zone (SZ). In the northwestern part of USh, on the border of the Volynian and Rosinian blocks, in the Earth Crust (H=15-30 km) lies Korostenian CA (=30 Ohm•m).

Kirovogradian crustal CA stretches far beyond the central part of USh: in the north into the Voronezh massif and south under the Pre Black Sea depression (PBSd). To the north of Ingulets-Krivoy Rog SZ and the border of Dneeper-Donetz depression (DDd), two zones with =1 and 30 Ohm•m (H=10-13 km) can be distinguished. At the depth of 13-20 km their shapes and intensity almost do not change. In the south within the borders of PBSd lies sublatitudinal zone with =5-10 Ohm•m (H=10-25 km). Full scale CA of isometric shape H=20-25 km is fixed by two contours with different – 1 and 5 Ohm•m. CA extends over almost all of the eastern part of Ingulian megablock and Ingulets-Krivoy Rog SZ and western part of Middle Peridneprovian megablock of USh. In the interval of 25-30 km CA is an elongated from south to north – north-east structure (=5 Ohm•m). In the east USh is fixed by Periazovian CA (=50-100 Ohm•m, H= 2-20 km), which covers almost all the West Periazovian massif.

Geoelectrical parameters are also observed to be considerably non-uniform in the USh mantle. In the southwestern part of USh, a conductor with the top at the depth of 50-70 km and the resistivity of 25-30 Ohm•m was found. Its boundaries are: the northern boundary is along 500 northern latitude, the eastern is between 310 and 320 eastern longitude, the southern is undetermined, south from 480 northern latitude and the western is along 260 eastern longitudes. In the west, the conductor deepens to 90-100 km and is galvanically connected with the anomaly in the upper mantle of the Carpathian region.