



Electromagnetic study of lithospheric structure in Trans-European Suture Zone in Poland

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The area covered by magnetotelluric surveys in Poland is mostly related to the Trans-European Suture Zone (TESZ), the largest tectonic boundary in Europe. Numerous 1D, 2D, and pseudo-3D and 3D models of the electrical resistivity distribution were constructed, and a new interpretation method based on Horizontal Magnetic Tensor analysis has been applied recently. The results indicate that the TESZ is a lithospheric discontinuity and there are noticeable differences in geoelectric structures between the East European Craton (EEC), the transitional zone (TESZ), and the Paleozoic Platform (PP). The electromagnetic sounding is a very efficient tool for recognizing the lithospheric structure especially it helps in identification of important horizontal (or lateral) inhomogeneities in the crust. Due to our study we can clearly determine the areas of the East European Craton of high resistivity, Paleozoic Platform of somewhat lower resistivity value, and transitional TESZ of complicated structure. At the East European Craton, we observe very highly resistive lithosphere, reaching 220-240 km depth. Underneath, there is distinctly greater conductivity values, most probably resulting from partial melting of rocks; this layer may represent the asthenosphere. The resistivity of the lithosphere under the Paleozoic Platform is somewhat lower, and its thickness does not exceed 150 km. The properties of the lithosphere in the transition zone, under the TESZ, differ significantly. The presented models include prominent, NW-SE striking conductive lineaments. These structures, that related with the TESZ, lie at a depth of 10–30 km. They are located in a mid-crustal level and they reach the boundary of the EEC. The structures we initially connect to the Variscan Deformation Front (VDF) and the Caledonian Deformation Front (CDF). The differentiation of conductivity visible in the crust continues in the upper mantle.