P16

3D ERT interpretation of a segment of Sudetic Marginal Fault: towards recognition of fault kinematics using resistivity survey and trenching

Hartvich Filip[1,2], Táborík Petr[1,2], Štěpančíková Petra[1]

[1]*Institute of Rock Structure and Mechanics, Academy of Sciences of the Czech Republic, Prague*

[2]*Faculty of Science, Charles University in Prague, Czech Republic*

Sudetic Marginal Fault is one of the most prominent tectonic structures, limiting Bohemian Massif on the NE. This fault can be traced both in the morphology and in geological structures and spans more than 140 km from Hrubý Jeseník Mts. towards NW.

Recently, an extensive systematic research has been launched, aiming particularly to understanding the faulting history with possible implications to the potential future hazard. The fault and its vicinity was studied directly by trenching, however, it was impossible to cover area large enough to track the position of different geological units, forming the surroundings of the fault.

The ERT was used to extrapolate the knowledge on lithology distribution around the trenching site, covering approximately area 600 x 300 m. Altogether, 25 ERT profiles using Wenner-Schlumberger array were measured in an irregular network, with the highest density around the trenching site. The measured profiles were inverted using Res2DInv64 software by Geotomo.

The 3D compilation of more than 30 000 measured resistivity points, forming one of the largest ERT datasets in such a small area, was processed in Voxler 2, using a 3D interpolation algorithm. As a result, an interactive blockdiagram of resistivity distribution was created and visualised, showing the 3D distribution of lithological units around the fault. The two main units, weathered crystalline rocks and Miocene clays have suitably very different resistivity (200-800 Ωm vs. 10-80 Ωm). Another unit important for interpretation consisted of rather high-resistivity (>1500 Ωm) alluvial deposits, covering the bedrock under thin layer of soil.

Due to that significant resistivity response difference, it was possible to trace the fault within the modelled block. Furthermore, the fault-cut and displaced alluvial deposits allowed, together with absolute dating and the results of the trenching, to reconstruct the offset amount and slip rate of the late Pleistocene/Holocene faulting.