Fault-block structure of intermontane depressions of Gorny Altai according to geoelectrical data

Nevedrova N.N., Sanchaa A.M.

Federal State Budgetary Scientific Institution Trofimuk Institute of Petroleum Geology and Geophysics of Siberian Branch of Russian Academy of Sciences, Novosibirsk, Russia

e-mail: NevedrovaNN@ipgg.sbras.ru

The controlled-source resistivity surveys are successfully used to study the deep structure of depressions in different mountain areas. The largest depressions of Gorny Altai are Chui, Kurai, and Uimon belong to Cenozoic structures and share a similar history of neotectonics and deposition. As is known, this region is seismically active. In connection with the study of the consequences of the Chuya earthquake in 2003 with M = 7.3, in 2004 a new phase of work was started in IPGG SB RAS using electrical survey methods, first in the Chui and Kurai basins, and then in the Uimon. The complex of measurements included the methods of direct and alternating current. In addition to basic deep methods, such as vertical electrical sounding (VES), transient electromagnetic (TEM), electrotomography was used to study the upper part of the section to depths of 50-100 m. A large amount of VES and TEM profiles were collected in the Chui and Kurai basin in the 1960—1980s. We also used this material for data interpretation. Geophysical measurements in the Uimon basin were performed for the first time. Currently, this basin is aseismic, but the multiple traces of ancient earthquakes indicate its high seismic potential. The research results show that all the Altai depressions have a block structure. Inferred from electromagnetic data interpretation, geological, seismological information, the probable fault zones are identified. On geoelectric sections they are characterized by lower values of electrical resistivity, a sharp change in sediment thickness. Distinguished faults were verified by three-dimensional numerical modeling using programs developed at IPGG SB RAS. Based on complex data, block geoelectric models of sedimentary fill and the upper part of the basement of depressions were constructed, the location of faults overlapped with Cenozoic sediments was determined. The obtained new information on the depressions structures is important for analyzing the results of regular electromagnetic observations of variations in geoelectric parameters under the influence of seismic events occurring in the areas of Gorny Altai activation.