

Experience of the solution of engineering and environmental tasks using the CSRMT method

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SUMMARY

We have an experience of application of the controlled source radiomagnetotelluric (CSRMT) sounding method in the solution of engineering and environmental tasks in remote regions. Here the radiomagnetotelluric (RMT) cannot be successfully applied because of limited possibilities of measurements of radio transmitter's signals. As a source in the CSRMT method we use a horizontal electrical dipole, which ensures measurements of field components in a frequency range of 1-1000 kHz at a significant distance (up to 3–4 km) from the source. The extended frequency range of the CSRMT method compare to the RMT one (10-1000 kHz, depth of investigations up to 30-50 m) permit us to study deeper horizons of sections up to 100-150 m. An example of the study of a landfill of industrial wastes in the Vyborg area (Leningrad region) using the CSRMT method is considered. The high conductivity and a relative large thickness of the wastes did not allow us to map the bottom of the landfill by the RMT method. Also, a small amount of signals from radio transmitters reduced the informative value of the RMT method when studying the top part of the section (first meters). Results of the CSRMT method show its high efficiency in the study of the top and deep parts of the landfill. An example of application of the CSRMT method is obtained in the area of a railway bridge construction in the Northern part of Siberia (Yamalo-Nenets region). The aim of this survey was the estimation of the depth of solid sands serving as a basement for bridge piles. The resistivity model derived from the CSRMT data shown a good correlation with the existing boreholes information. The presented results were obtained with the support of the Russian Science Foundation, project No 21-47-04401.

Keywords: Controlled source radiomagnetotellurics, Waste site, Bridge construction