



University of Cologne



Institute of Geophysics and Meteorology

**St. Petersburg State University
Faculty of Geology, Center of Electromagnetic methods,
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Mobile modification of the radiomagnetotelluric soundings system RMT-M



Recorder of the RMT-M system

Purpose: RMT-M equipment is intended for mobile (using car or off-road vehicle for on shore conditions and boat on water areas) radiomagnetotelluric (RMT) soundings method using electromagnetic fields of remote radio transmitters. On data of measurements of horizontal and mutually-orthogonal component of electrical and magnetic fields curves of apparent resistivity and impedance phase are calculated, which are used for inversion and plotting of geoelectric cross section.

Technical parameters:

Number of channels	4
ADC, bit	16
Frequency range, kHz	10-1000
Internal memory, Mb	2048
Connection to PC	Ethernet
Display LCD, monochrome, resolution,	320x240 pix.
Keypad	18 keys
Built-in accumulator, 5 A*hours, 12±2 V, operation,	8 hours
External power supply, V	12
Temperature range, deg. C	-20...+40
Dimensions and weight	340x295x155 mm 5.0 kg

Areas of application: Fast surveys at geological mapping, exploration, hydrogeological and building construction works, ecological investigations (mapping of hydrocarbon contaminations, investigation and mapping of landfills, detection of leakages, etc.).

Properties of the equipment:

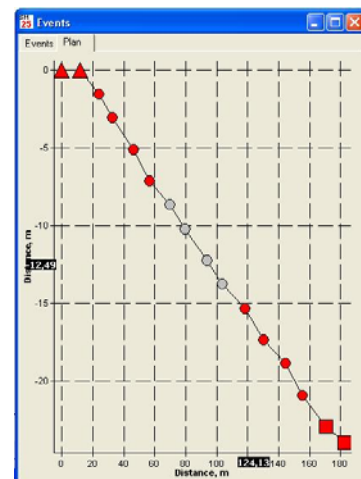
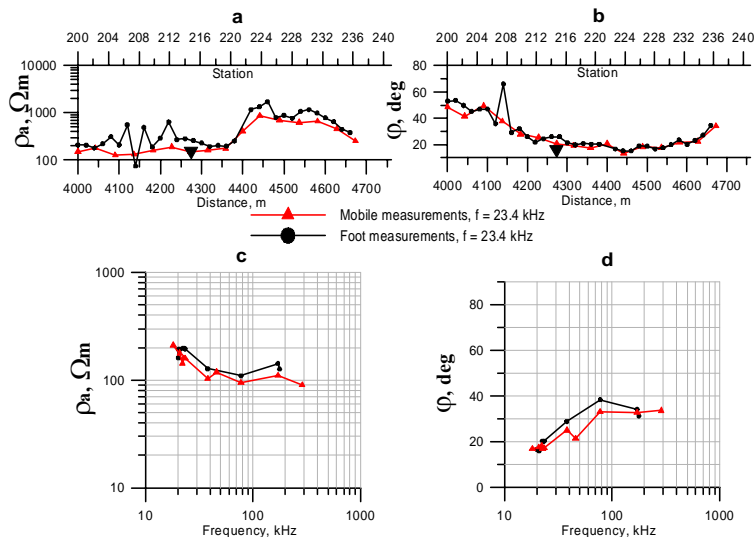
- time series or spectrograms of electric and magnetic fields signals recording, apparent resistivity and impedance phase calculation directly in the recorder, visualization of spectral parameters at the display and on-line estimation of the data quality, data recording into built-in memory or external PC;
- settings of measurement parameters using both keypad of the recorder and external PC, works with GPS receiver (coordinate and time determination), recording of coordinates at the vehicle movement;
- electric field measurements using an ungrounded (capacitive) electric line that allow fulfilling works in summer and winter time (on snow and ice) and at any type of surface (ground, asphalt, concrete, gravel) and at lack of roads;
- two- or three-components magnetic field and one-component electric field measurements with the RMT soundings curves calculation along a vehicle movement direction;
- data processing, unified with the foot RMT-F technique;
- used plane wave model ensures the reliable data interpretation, investigation depths is from 1-2 to 30-50 m;
- vehicle speed is 8-10 km/h, intervals 20-30 m between sounding stations, efficiency: 40-50 km of a profile per day.

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Features of measurements with the RMT-M system

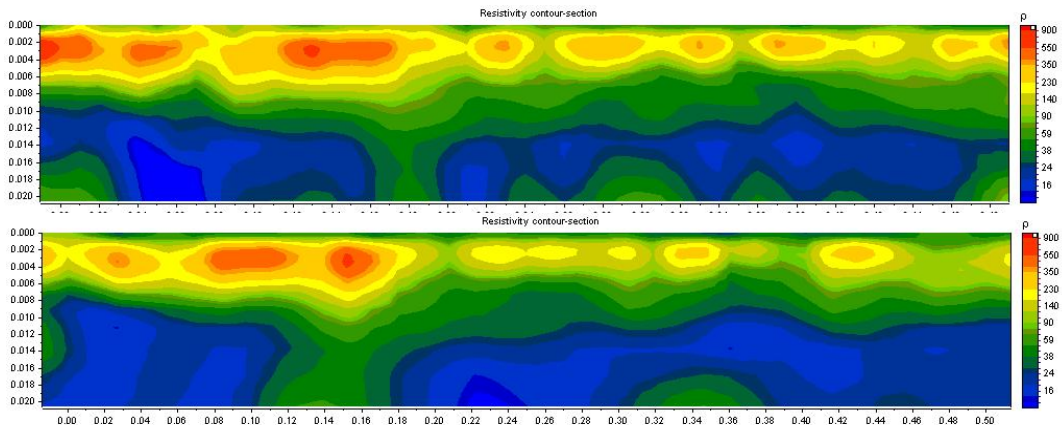


The towed facility of the RMT-M equipment with the fixed electric and magnetic sensors and preamplifier of electrical channels (at the left). Testing of boat-borne modification of the RMT-M equipment (at the right)



Comparison of the foot (black) and mobile (red) variants of the RMT method on one frequency at measurements along a profile (a, b) and soundings curves at one station (c, d).

Registration of sounding stations coordinates during movement.



Comparison of results of 2D inversion along a profile of 500 m length (up to the depth of 20 m) on data of foot (above) and mobile (below) measurements by the RMT method.