

# St. Petersburg State University

## Geological faculty

### Center of electromagnetic methods

## MKRS-2 magnetic susceptibility logging system



#### Purpose

The MKRS-1 device is intended for measurements of magnetic susceptibility in ore boreholes of small diameter.

#### Description

The device allows investigating the boreholes with fluid, and also dry or plastic cased boreholes. Due of using of two coils probe the influence of near zone is decreased. Range of measured magnetic susceptibility allows characterize the properties of carbonate and sedimentary rocks. The device has a developed metrology. Calibration is fulfilled using standard signal. The special calibration unit is used for the control of standard signal value and linearity of the MKRS-1 system.

#### Applications

- magnetic susceptibility measurements
- data collection for models of target objects
- study of magnetic surveys anomalies
- rocks differentiation and correlation
- allocation of ore and hosting changed zone

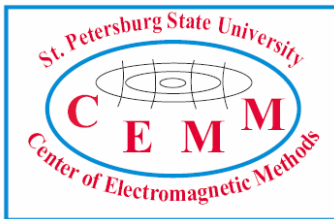
#### Technical parameters

Magnetic susceptibility range, 10 <sup>-5</sup> SI	1 ... 10000
Sensitivity, 10 <sup>-5</sup> SI	± (0.5 + 0.05 æ)
Operating frequency, kHz	1
Probe	0.2
- diameter, mm	42
- length, mm	1 600
- weight, kg	5
Maximum depth, m	up to 1500
Maximum temperature, o C	-10 ... + 50

#### Delivery set

- borehole probe;
- power supply block;
- calibration unit;
- user manual;
- certificate.

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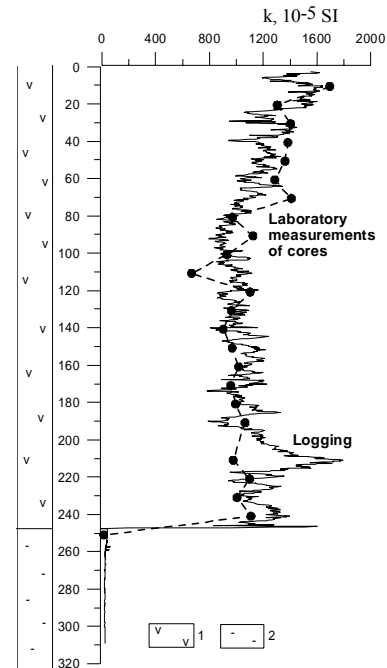
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## Features of measurements with the MKRS instrument

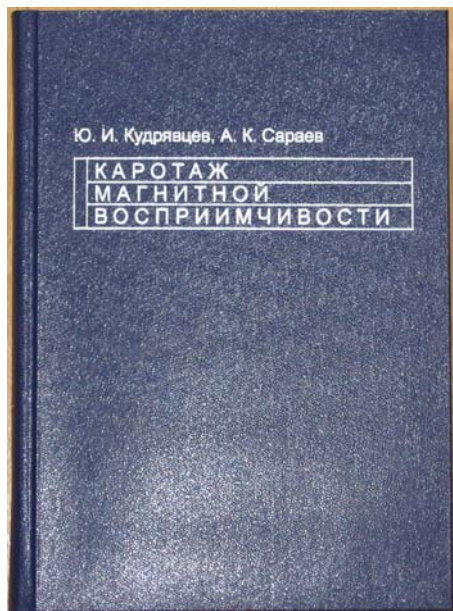
The MKRS-2 instrument was created on the basis of long-term complex researches on development of theoretical basement of the magnetic susceptibility logging (MSL), development of different variants of MSL instruments and significant experience of field works. The summarizing of results of the fulfilled works was made in the monograph «Magnetic susceptibility logging» (Fig. 1).

The developed tools of metrology allow receiving reliable data on magnetic susceptibility of rocks crossed by a well. It proves to be true by numerous comparisons in various conditions data of MSL and laboratory core measurements (Fig. 2).

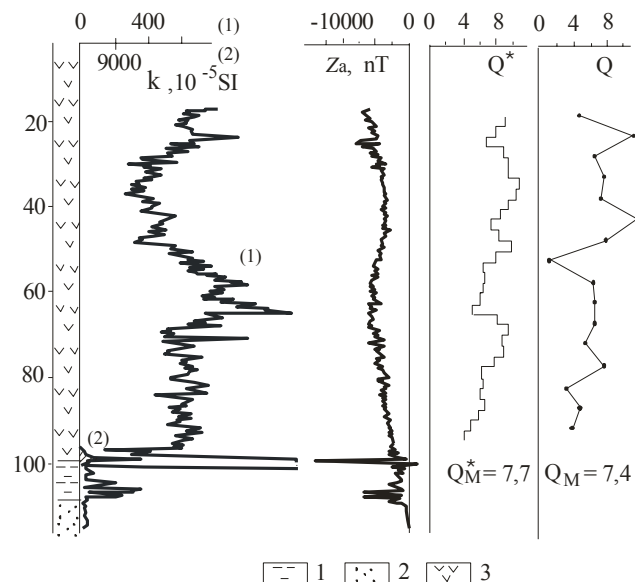
The complex measurements of magnetic susceptibility and internal anomalous magnetic field allow estimating values of the parameters  $Q$  of magnetized objects ( $Q = J_n / J_i$  - attitude of values of remanent  $J_n$  and induction  $J_i$  magnetization) (Fig. 3).



**Fig. 2. Comparison of logging data and laboratory core measurements.**  
**1 – dolerite, 2 – sedimentary rocks**



**Fig. 1. Monograph «Magnetic susceptibility logging».** - SPb.: Edit. Of St. Petersburg. un-ty, 2004.



**Fig. 3. Comparison of parameters  $Q^*$  on data of complex measurements of magnetic susceptibility and magnetic field  $Z_a$  and  $Q$  on laboratory core measurements.**  
**1 – siltstone, 2 – sand, 3 – dolerite.**

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