Geophysical Research Abstracts
Vol. 17, EGU2015-2909, 2015
EGU General Assembly 2015
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Research of the acoustic influence on residual magnetization of rocks containing magnetite from the various geological structures of the Kola Peninsula

Anzhela Zhirova

Geological Institute of the Kola Science Center of the Russian Academy of Science, Apatity, Russian Federation (aaammm0000@mail.ru)

The aim of the study is influence of acoustic waves on the magnetization of rocks of Kola Peninsula under different experimental parameters. The results and further research in this field are of interest in the development of problems of nonlinear geophysics, as well as address some issues in materials science. To study the acoustic influence on the residual magnetization of rocks we used the samples of magnetite-calcite rocks with a high content of magnetite from the Kovdor massif, and weakly magnetic rocks: (a) ultramafic rock of the Kola composite terrane; (b) gabbro-norite from layered intrusions of Pana; c) metagabbro-norite of the Belomorsky mobile belt. The samples previously demagnetized by the time-variable magnetic field, subjected to three cycles of ultrasonic influence with increasing time of influence and further measurement of the residual magnetization. The dependence of the residual magnetization of the magnetite-calcite rock from the time of testing is determined. As a result of multiple influences on the samples of gabbro-norit, ultramafic rock and metagabbro-norit was obtained a weak change of the vector of the residual magnetization. Thus the study of the residual magnetization of the samples with different content of ferromagnetic mineral found a significant difference in the nature of the magnetic response of rocks. So the high magnetic magnetite-calcite rock from the Kovdor massif detects a significant increase of the magnetization from the first seconds of the ultrasound influence. The magnetic response of other rocks to external influence is weaker. The dependence of the residual magnetization of these rocks from the time of influence either not observed or observed on the last cycle of the experiment in terms of a significant increase of time of the acoustic influence. Magnetic properties of rocks associated with the ferromagnetic minerals. These minerals are usually dispersed in the form of small grains in total dia - and paramagnetic mass, which is the main volume of the rocks. The number of the dispersed (accessory) minerals determines the magnetic susceptibility and residual magnetization of rocks. Magnetite-calcite rock from Kovdor massif, for which the dependence of the magnetic state from the time of acoustic influence was determined, contains a significant amount of the ferromagnetic mineral. While in the others of the samples the content of the ferromagnetic does not exceed 1 - 2 %. As a result of three cycles of the experiment it is found that the magnetite-calcite rocks with the large crystals of magnetite and the complex domain structure reveals significant changes of the vector of the residual magnetization and its dependence on time of the influence of the elastic oscillations. While the magnetic properties of the samples with insignificant inclusions of the ferromagnetic minerals are more stable.
This study was supported by the Russian Science Fund (project nos. 14-17-00751).