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CHALLENGES IN GEOMAGNETIC DATA PROCESSING FOR A BETTER UNDERSTANDING OF GEOMAGNETIC FIELD EVOLUTION

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Geomagnetic studies require accurate and precise measurements of the Earth's magnetic field carried out from ground and space. It implies a wide range of measures starting from locating specific sites for establishment of non-magnetic pavilions with geomagnetic equipment to sophisticated data processing to produce high-quality geomagnetic data products as well as data mining applications to reveal hidden patterns in geomagnetic records. Herein we focus on several specific issues dealing with geomagnetic data handling and processing and give an overview of recent achievements in the fields of:

1. Advanced approach to storing and handling continuously transmitted data for geomagnetic field monitoring;
2. Automated realtime recognition of anthropogenic disturbances in observatory and satellite data based on fuzzy logic;
3. Operational correction of geomagnetic variations and production of quasi-definitive data;
4. Coordination and combined processing of satellite and on-ground observations;
5. New data mining techniques for studying geomagnetic secular variation using on-ground observations;
6. New approach to data visualization.

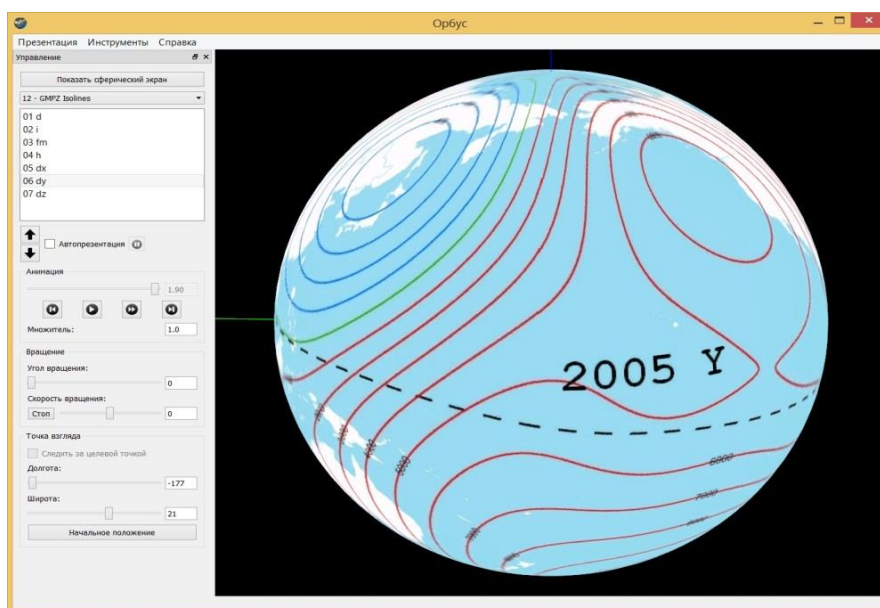


Fig.1 Example of the visualization of the Magnetic Field using ORBUS software (component Y, year 2005).

Along with fundamental studies high-quality geomagnetic data are crucial in several industry sectors. In this paper we elucidate challenges in oil and gas industry strongly influenced by a proper separation of internal and external field contributions in geomagnetic recordings. Supported by Grant No. 14.607.21.0058 of the Ministry of Education and Science of Russia.

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