

Revision of the paper entitled:

Analysis of Geomagnetic Observatory Data and Detection of Geomagnetic Jerks with the MOSFiT Software Package

The basic purpose of MOSFiT, a software package for the presentation and filtering measuring data of Earth's magnetic field, is isolating and analyzing secular variations (SV). It is a tool for researchers working on the models of the Earth's magnetic field or the person who is preparing the data for this purpose. The software package is an important contribution to the development of measuring data processing. During the latest decades the quantity of measurement data has increased enormously.

SV is a time change, calculated as the first-time derivative of the geomagnetic field, calculated on the basis of monthly or yearly means values thereof. The second-time derivations of the geomagnetic field are called geomagnetic jerks (GJ). SV appears as a series of straight-line segments separated by GJ. As the vast majority of the magnetic field originates in the interior of the Earth, this indicates that GJ are of internal origin and their short-time duration that is due to a change in the fluid flow at the surface of the Earth's core.

MOSFiT is also intended to determine the properties of the external magnetic field and control the quality of data about the variation of them, which are measured at an individual observatory or magnetometric station. In addition to data quality control, it also makes possible an easier reestablishment of measuring systems after they have been broken down for various reasons. For this purpose, in addition to the minute mean values, the daily mean values have been calculated additionally. Due to exclusion of extreme values, the median values are a better solution. Even the data, from which the influence of space has been extracted, are useful for research of the local magnetic field as well as the quality of data, measured at an individual observatory or magnetometric station.

Geomagnetic impulses are also the second-time derivations, but they are based on daily acceleration of the Earth's magnetic field, measured at an individual observatory or magnetometric station. They present not only an unpredictable change on graph but also accelerations in the change of the energy density of the geomagnetic field [J/m^3]. These accelerations are caused by the conversion of magnetic energy in the upper layers of the Earth. The treatment of the Earth's magnetic field, measured at an individual point on its surface, on the bases of physical quantities expands its research above the comparison of measurement data of geomagnetic field. For a single measurement point on the Earth's surface it is difficult to predict geomagnetic impulses because with today's technical means it is impossible to measure changes in the Earth's interior precisely enough. But tracking changes of energy density of the geomagnetic field has already demonstrated some importance in further research.

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