

External influences in regional magnetic surveys

M. Korte

GeoForschungsZentrum Potsdam¹

A b s t r a c t: Magnetic repeat station surveys offer a good source of data for spatially detailed studies of the geomagnetic field secular variation. The main sources of secular variation lie in the Earth's core, but there might be contributions from the lithosphere. With the change of the geomagnetic field, conductivity anomalies in the Earth's lithosphere could lead to time-varying magnetic anomalies, which should appear as anomalies in the observed secular variation. However, the amplitudes of such anomalies would be no greater than few nanoteslas per year. The results of magnetic repeat station surveys mostly contain errors of that order of magnitude. These errors are dominated by contributions from external magnetic variations. Traditionally the measured values are reduced to annual means by the recordings of the nearest geomagnetic observatory. Reduction errors arise because the external variations are not identical at the repeat stations and at the observatory. In August 1999 magnetotelluric measurements were carried out simultaneously at nine German repeat stations around the Fürstfeldbruck geomagnetic observatory. The magnetic recordings at these stations are compared to the recordings of the observatory. The sources and orders of magnitude of the reduction errors are shown and methods for their minimisation are discussed.

Key words: geomagnetic external variations, geomagnetic surveys

¹ Telegrafenberg, 14473 Potsdam, Germany
e-mail: monika@gfz-potsdam.de