



Historical records of the geomagnetic field

Patrick Arneitz (1), Balázs Heilig (2), Gergely Vadasz (2), Fridrich Valach (3), Peter Dolinský (3), Pavel Hejda (4), Karl Fabian (5), Christa Hammerl (1), and Roman Leonhardt (1)

(1) Central Institute for Meteorology and Geodynamics, (2) Geological and Geophysical Institute of Hungary, (3) Geomagnetic Observatory, Geophysical Institute, Slovak Academy of Sciences, Hurbanovo, Slovakia, (4) Institute of Geophysics, Academy of Sciences of the Czech Republic, (5) Geological Survey of Norway

Records of historical direct measurements of the geomagnetic field are invaluable sources to reconstruct temporal variations of the Earth's magnetic field. They provide information about the field evolution back to the late Middle Age. We have investigated such records with focus on Austria and some neighbouring countries.

A variety of new sources and source types are examined. These include 19th century land survey and observatory records of the Imperial and Royal "Centralanstalt f. Meteorologie und Erdmagnetismus", which are not included in the existing compilations. Daily measurements at the Imperial and Royal Observatory in Prague have been digitized. The Imperial and Royal Navy carried out observations in the Adriatic Sea during several surveys. Declination values have been collected from famous mining areas in the former Austro-Hungarian Empire. In this connection, a time series for Banska Stiavnica has been compiled. In the meteorological yearbooks of the monastery Kremsmünster regular declination measurements for the first half of the 19th century were registered. Marsigli's observations during military mapping works in 1696 are also included in our collection. Moreover, compass roses on historical maps or declination values marked on compasses, sundials or globes also provide information about ancient field declination. An evaluation of church orientations in Lower Austria and Northern Germany did not support the hypothesis that church naves had been aligned along the East-West direction by means of magnetic compasses. Therefore, this potential source of information must be excluded from our collection.

The gathered records are integrated into a database together with corresponding metadata, such as the used measurement instruments and methods. This information allows an assessment of quality and reliability of the historical observations. The combination of compilations of historical measurements with high quality archeo- and paleomagnetic data in a single database enables a reliable joint evaluation of all types of magnetic field records from different origins. This collection forms the basis for a combined inverse modelling of the geomagnetic field evolution.