REDUCTION OF EXTERNAL FIELD CONTRIBUTIONS TO MAIN FIELD VARIATION

INGO WARDINSKI[1], Richard Holme[2]

1. Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Section 2.3: Earth's Magnetic Field, Germany
2. University of Liverpool, Earth and Ocean Sciences, United Kingdom

Modelling of the Earth's magnetic field is set up as an inverse problem, where a globally valid representation is sought by fitting a set of spatially distributed data. Recent studies have shown that the impact of external field variation to the estimated main field variation (secular variation) can be reduced by applying anisotropic error-covariance matrices during the inversion. By this method it is possible to separate between less disturbed and disturbed directions in vector magnetic field measurements. The less disturbed direction shows a very detailed secular variation at many geomagnetic observatory sites, including clear evidence for almost all 7 geomagnetic jerks occurring in the last 50 years. In contrast, the disturbed directions show a clear correlation with geomagnetic activity indices, such as the DST index. However, the correlation varies with location, attributable in part to a lateral varying mantle conductivity. Here we discuss our findings based on the residuals from a continuous field model for the last 50 years. We explore methods to remediate the noise in the disturbed direction, and therefore to produce cleaner time series for studies of the effect of geomagnetic jerks on all three vector components of the data.

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Ingo Wardinski, 52.3827 North, 13.0637 East,
ingo@gfz-potsdam.de