



Application of Adjusted Spherical Harmonic Analysis (ASHA) for modeling the Central European reference magnetic field

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The paper aims at the mapping of core contribution of the geomagnetic field over Central Europe. The main data sources of the study are the three component repeat station data and observatory annual means of the area provided by the Edinburgh World Data Center for Geomagnetism. Traditionally, the normal reference fields for small countries are compiled by polynomial adjustment of the vector field observations. Here, we apply the adjusted spherical harmonic analysis (ASHA) for the modelling of the core contribution of the geomagnetic field. ASHA provides a physically more relevant shape from the regional field than the polynomial fits. Its targeted area is a spherical cap centred in Central Europe. The main free parameters of ASHA are the half angle of the applied spherical cap, T , and the number of maximum degree, K , of the spherical expansion. Our aim is to find the parameters by which the best fit between the ASHA model and the core magnetic reference field can be achieved on the basis of real repeat station and observatory measurements. A synthetic test is carried out in which the measurements are surrogated by Enhanced Magnetic Model (EMM2010) data up to degree and order of 720, while the core field is represented by the same model expansion truncated at degree and order of 15. The goodness of the ASHA(T , K) fits were measured through the residuals and the correlation coefficients computed between the model (i.e. ASHA) and core field (EMM2010 ($N < 15$)) data.