HIGH-DEGREE MODELING OF THE EARTH'S INTERNAL MAGNETIC FIELD

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While high-degree global models of the gravity field have been produced for decades, the break-through for magnetic models has only been achieved in the last few years. This is primarily due to three reasons: (1) Long wavelength control for a global model requires highly accurate satellite measurements at low orbital altitudes. These have only recently become available with the ongoing CHAMP mission. (2) Due to the secular change of the Earth's core field, marine and airborne magnetic surveys have unknown offsets which make it difficult to integrate 60 years of surveys into a common global field model. (3) The geopotential can conveniently be inferred from measurements of the gravity acceleration by direct integration. In contrast, the magnetic potential is not completely determined by measurements of the anomaly of the total intensity, and it has to be estimated in an iterative scheme. Here, we present our modeling approach starting with the determination of the long-wavelength lithospheric field from CHAMP data then merging the marine and aeromagnetic data into the EMAG2 global magnetic anomaly grid which then provides the basis for the estimation of the NGDC-720 model (http://geomag.org).

Magnetic field model, magnetic reference model

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