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Circum-Arctic mapping project: new magnetic anomaly map of the Arctic (to 60 degrees N)

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An international effort to compile Circum-Arctic geophysical and bedrock data has been conducted by several national agencies (Russia-VSEGEI and VNIIO, Sweden-SGU, Finland-GTK, Denmark-GEUS, USA-USGS, Canada-GSC, Germany-BGR and Norway-NGU) since 2005. This project aims to produce an atlas that will comprise geological and geophysical digital maps at a scale of 1: 5 million scale for the Arctic region limited by the 60 degree North latitude.
New published and classified magnetic anomaly gridded data from each participant group were gathered and converted to a common datum (WGS84) and format. The Greenland region magnetic anomaly grid (Verhoef et al., 1996) has been updated with new aeromagnetic surveys performed in West Greenland between 1992-2001 (Rasmussen, 2002), and in the Nares Strait area (Damaske & Oakey, 2006; Oakey & Damaske, 2006). The oceanic area east of Greenland (NE Atlantic) contains most of the aeromagnetic data used in the Verhoef et al., (1996)'s compilation (pre-1990) plus new aeromagnetic surveys over offshore Norway collected up to 2007 (Olesen et al., 1997; Olesen et al., 2007; Gernigon et al., 2008).
The gridded data has been upward continued to 1 km above ground or sea-level and trimmed around the areas of major overlaps. The Alaska USGS aeromagnetic compilation has been used as the "master grid" for merging the major gridded data sets together and the downward continued lithospheric magnetic field model MF6 derived from satellite data (Maus et al., 2008) has been used as a regional reference surface. We have used a blending function over the area of overlap in order to smooth the transition from one grid to the other (GridKnit, GEOSOFT). The resulting grid has been re-sampled to a 2 km grid cell.
In order to construct the final Circum-Arctic magnetic anomaly grid (CAMP-M) we have adopted the approach used by several research groups for compiling the World Digital Magnetic Anomaly Map (WDMAM) and used near-surface magnetic data for the short wavelength component of the compilation and the satellite derived magnetic anomalies for the long wavelength (Hemant et al., 2007; Maus et al., 2007). MF6 extends to spherical harmonics degree 120 (333 km wavelength) and therefore it is able to provide consistent long wavelength information between 300 and 400 km. This information is mainly related to regional deeper and/or thicker portions of the magnetic sources within the crust.
We have prepared two versions for the CAMP-M magnetic anomaly grid. The first one combines short wavelength components of regional grids (less than 400 km) with long wavelengths (400 km) of the MF6 model. The second one combines short wavelengths of regional datasets (obtained by filtering with a cosine squared taper to remove the wavelengths in the waveband between 307 and 333 km and larger, with the MF6 model (to degree 120). We have selected Model 1 as the new Circum-Arctic Magnetic Anomaly Map.