Geophysical Research Abstracts
Vol. 12, EGU2010-10567, 2010
EGU General Assembly 2010

The magnetic field over the Southern African continent: from core to crustal magnetic fields

Erwan Thébault (1), Pieter Kotze (2), Arnaud Chulliat (1), and Fotini Vervelidou (1)

(1) Institut de Physique du Globe de Paris, Geomagnetism, Paris, France, (2) National Research Foundation, Hermanus Magnetic Observatory, Hermanus, South Africa

Secular magnetic field evolutions do not proceed in a regular way all over the Earth. In some regions like Southern Africa, the field has been changing more rapidly than elsewhere. During the last five decades, the Earth's magnetic field has been represented in spherical harmonics from a series of measurements that were generally obtained at magnetic field observatories. Unfortunately, magnetic observatories are not evenly distributed over the Earth and are particularly scarce in the Southern Hemisphere. This situation results in low-resolution magnetic field models in space, in particular over the South African continent. An interesting and promising alternative to address this issue is to apply a regional modelling technique to represent all available magnetic data. We apply the Revised Spherical Cap Harmonic Analysis to represent observatory, repeat station and satellite data in an attempt to obtain a high spatial resolution main field model for the past 40 years. In addition, we show that by merging satellite and aeromagnetic compilations in this region, we are able to derive a multi-scale vector lithospheric field model. This approach is likely to give new insights into the very nature of magnetic field sources occurring in the Earth's crust at multiple spatial scales. This new model may also be compared with the known geology in Southern Africa and standard techniques inherited from the geophysical prospecting.