Geophysical Research Abstracts
Vol. 18, EGU2016-9500, 2016
EGU General Assembly 2016

Sensitivity of satellite magnetic measurements to mantle magnetization

Wolfgang Szwillus (1), Jörg Ebbing (1), and Eldar Baykiev (2)

(1) Kiel University, Geosciences, Geophysics, Kiel, Germany (szwillus@geophysik.uni-kiel.de), (2) Norwegian University of Science and Technology, Department of Petroleum Engineering and Applied Geophysics , Trondheim, Norway

Satellite magnetic measurements provide global coverage and increasing resolution, which allows studying the large-scale magnetic properties of the lithosphere. The long-wavelength component of the magnetic field can be used to estimate the maximum depth of magnetic sources. Often, it is assumed that the base of the magnetic lithosphere coincides with the Moho boundary.However, the Curie temperature might also lie below the Moho, allowing for mantle magnetization, provided magnetizable minerals are present in the mantle lithosphere.

We tested whether sources in the magnetic lithosphere are detectable with satellite magnetic measurements. To this end we constructed a simple, global lithospheric model based on gravity, seismological and heat-flow data. Results form forward calculation of the magnetic field can be compared with the observed field at satellite height.

Our results show that for some parts of the world it is reasonable to assume upper mantle magnetization. There are large anomalies observed at satellite height that cannot be explained with only crustal magnetization. However, interpretation is difficult, because the very long wavelength component of the lithospheric field is veiled by the core field.