Geophysical Research Abstracts
Vol. 19, EGU2017-6210, 2017
EGU General Assembly 2017

Workflow with pitfalls to derive a regional airborne magnetic compilation

Marco Brönner (1,2), Eldar Baykiev (2), and Jörg Ebbing (3)

(1) Geological Survey of Norway, Geophysics group, Trondheim, Norway (marco.bronner@ngu.no), (2) Department for Geoscience and Petroleum, NTNU, Trondheim, Norway, (3) Department of Geosciences, Christian-Albrechts-Universität, Kiel, Germany

Today, large scale magnetic maps are usually a patchwork of different airborne surveys from different size, different resolution and different years. Airborne magnetic acquisition is a fast and economic method to map and gain geological and tectonic information for large areas, onshore and offshore. Depending on the aim of a survey, acquisition parameters like altitude and profile distance are usually adjusted to match the purpose of investigation. The subsequent data processing commonly follows a standardized workflow comprising core-field subtraction and line leveling to yield a coherent crustal field magnetic grid for a survey area. The resulting data makes it possible to correlate with geological and tectonic features in the subsurface, which is of importance for e.g. oil and mineral exploration. Crustal scale magnetic interpretation and modeling demand regional compilation of magnetic data and the merger of adjacent magnetic surveys. These studies not only focus on shallower sources, reflected by short to intermediate magnetic wavelength anomalies, but also have a particular interest in the long wavelength deriving from deep seated sources. However, whilst the workflow to produce such a merger is supported by quite a few powerful routines, the resulting compilation contains several pitfalls and limitations, which were discussed before, but still are very little recognized. The maximum wavelength that can be resolved of each individual survey is directly related to the survey size and consequently a merger will contribute erroneous long-wavelength components in the magnetic data compilation. To minimize this problem and to homogenous the longer wavelengths, a first order approach is the combination of airborne and satellite magnetic data commonly combined with the compilation from airborne data, which is sufficient only under particular preconditions. A more advanced approach considers the gap in frequencies between airborne and satellite data, which motivated countries like Sweden and Australia (AWAGS) to collect high altitude- long distance airborne magnetic data for the entire country to homogenous the high-resolution magnetic data before the merger with satellite data. We present the compilation of a regional magnetic map for an area in northern Europe and discuss the problems and pitfalls for a common workflow applied.