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Swarm magnetic gradients for lithospheric modelling (SLIM)

Johannes Bouman (1), Jörg Ebbing (2,6), Stavros Kotsiaros (3), Marco Brönner (4,6), Roger Haagmans (5), Martin Fuchs (1), Nils Holzrichter (2), Nils Olsen (3), and Eldar Baykiev (6)

(1) TU Munich, DGFI-TUM, Munich, Germany, (2) Christian-Albrechts-University Kiel, Germany, (3) DTU, Denmark, (4) NGU, Norway, (5) ESA-ESTEC, Netherlands, (6) Norwegian University of Science and Technology, Norway

We present first results of a feasibility study to use magnetic gradient information derived from Swarm data for crustal field modelling. The study is part of ESA's Support To Science Element (STSE) Swarm+ Innovations. In a first step, magnetic gradients have been derived from the observations taken by the three Swarm satellites, with emphasis on the two side-by-side flying spacecraft. Next, these gradients are used to compute magnetic gradient grids at 450 km altitude (the present mean altitude of the lower Swarm satellites) for one example region, North-West Europe. The suggested area comprise both exposed basement geology in southern Sweden and Norway with crustal scale magnetic anomalies and the Sorgenfrei-Tornquist Zone, a well-studied large scale tectonic fault system. With sensitivity analysis we studied the added benefit of the information from the gradient grids for lithospheric magnetic field modelling. A wealth of aeromagnetic data and additional constraining information for the example area allows us to validate our modelling results in great detail.