

## An Inverse Magnetization Problem on the Sphere with Localization Constraints

*Wednesday, 22 September 2021 12:00 (20 minutes)*

We study an inverse magnetization problem arising in geo- and planetary magnetism. This problem is non-unique and the null space can be characterized by the Hardy-Hodge decomposition. The additional assumption that the underlying magnetization is spatially localized in a subdomain of the sphere (which can be justified when interested, e.g., in regional magnetic anomalies) ameliorates the non-uniqueness issue so that only the tangential divergence-free contribution remains undetermined. In a previous reconstruction approach, we addressed the localization by including an additional penalty term in the minimizing functional. This, however, requires the coestimation of the undetermined divergence-free contribution. Here, we present a first attempt at more directly including the localization constraint without requiring such a coestimation. In addition, we show that the localization constraint is closely connected to the problem of extrapolation in Hardy spaces.

**Primary authors:** KEGELES, Alexander (TU Bergakademie Freiberg, Institute of Geophysics and Geoinformatics); GERHARDS, Christian (TU Bergakademie Freiberg, Institute of Geophysics and Geoinformatics); HUANG, Xinpeng (TU Bergakademie Freiberg, Institute of Geophysics and Geoinformatics)

**Presenter:** HUANG, Xinpeng (TU Bergakademie Freiberg, Institute of Geophysics and Geoinformatics)