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# Error Distribution in Regional Modeling

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Modeling of potential fields is a major task in geophysics. Often the available data are not distributed over the whole Earth but are bound to a certain region, e.g. aeromagnetic or satellite measurements. Thus the need for regional or local modeling arises. In these cases it is necessary to have a clear knowledge of the errors resulting from the incomplete data base and its bound distribution in space.

This work pursues the question how inversion errors in regional modeling using satellite data are distributed depending on the size of the modeled region, the location within the region, satellite height and noise level. When reconstructing an inverted signal the optimal number of summands (i.e. weighted basis functions) is determined for every point of the modeled region. Starting with the investigation of a 2D case, i.e. a circle, the study will extended to the consideration of different regions on a sphere (belts and caps). One group of functions that will be investigated are Slepian functions on a sphere, i.e. functions that are defined on a belt of a sphere only and thus by definition localized.

Furthermore it is of interest if Slepian functions can be used in geomagnetic main field modeling to overcome the lack of vector data in the polar regions and compute main field models on the remaining belt only.