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Regional wavelet modelling of the GOCE gradients

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Since 2009, GOCE provides highly accurate gradients of the Earth's geopotential down to $\sim$ 90 km resolution. They are usually modelled using spherical harmonics, that are well-suited for deriving global models of the gravity field. However, regional approaches seem better suited for a local optimization of the geopotential models, and for a local combination of the GOCE gradients with heterogeneous surface gravity data. The obtained high resolution models can then be used for various applications, such as geoid determination or solid Earth structure investigation.

Here we show the interest of wavelets for regional modelling of the GOCE gradients. A regional wavelet model is computed over Europe from a least-squares inversion of the GOCE gradients. We then introduce ground gravity data in the inversion, and derive a local combined model. We use a dense gravity dataset, and the new gravimetric network realized by IGN over France, with about 1000 high quality gravity data including more than 200 absolute measurements. Our first results provide a joint validation of the GOCE gradients and the ground gravity over France.