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Local magnetic field modeling with wavelets

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We consider local magnetic field models, based on Poisson multipole wavelets (Holschneider et al., 2003). The advantage of using wavelets in local modeling, comes from the fact that they fulfil the expectations to represent long-wavelength fields in a similarly way as spherical harmonics, while in the same time they are able to resolve much better the short-wavelength contributions, known only for limited regions due to the data heterogeneity. The proposed approach allows to increase the resolution of local models by using regional surface data. It is based on a combined data-wavelet selection, which gives the freedom to use patial splitting of the area under consideration, according to the sizes of the wavelet scales. The obtained inverse problem is then solved by using iterative algorithm of Schwarz type, which is also highly parallelizable. Several numerical experiments with the proposed new method, using local magnetic data, are presented and analyzed.