Post processing scheme for modeling the lithospheric magnetic field from satellite data

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We derived a model for the noise appearing in lithospheric magnetic field models obtained from satellite data. The noise model is developed for the case where three component vector magnetic data, acquired from a nearly polar orbiting satellite, are used. This case is relevant for e.g CHAMP satellite data. We show that the noise from internal or external origin cannot be distinguished, and that the lithospheric field model is contaminated at all wavelengths. The noise model is non-linear but it requires only few parameters to describe the noise at relatively high spherical harmonic degrees. We used this noise model in a post-processing scheme to improve a lithospheric field model derived from the full CHAMP satellite data set to SH degree 120. The approach stands as an alternative to the well known "along track filtering" technique. It can be easily extended to models derived from the three components of magnetic data or from data acquired on other terrestrial planets.