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Degradation in accuracy of CHAMP/GRACE-only Earth Gravity Field models,

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Latitude lumped coefficients have been used as spectral representation of radial cross-over residuals between satellite-based gravity field models and long-term averaged cross-over altimetry data. We have tested pre-Champ models (GRIM 5S1, C1, TEG04, EGM96, PGM 2000A) and recent models (EIGEN 1S, 2, 3p, TUG04, EIGEN-GRACE 02, UCPH2004). A degradation of the accuracy at the lowest orders has been revealed for the models based only on the CHAMP/GRACE data. Covariance matrices among the harmonic geopotential coefficients of these models require a degree-dependent (Schwintzer's) calibration but still significant decrease of the accuracy is indicated. Using our altimetry data, our tests provide significant results for CHAMP but as far as of GRACE we may already reached the limit of precision of our data (not the method). We attempt to explain this decrease by (i) the fact that the nearly polar orbits of CHAMP and GRACE A/B are inherently less sensitive to sectorial harmonics, (ii) the orbital arcs have been decorrelated in terms of initial values during processing of the gravity field models, (iii) in terms of configurational changes of the satellite data distribution in vicinity of resonances.