



Non-homogeneities in the accuracy of Earth gravity parameters from CHAMP, GRACE, and GOCE

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The diminished resolution of solutions for variations of the gravity field from the Gravity Recovery And Climate Experiment (GRACE) around 2004 was related to the short orbit repeat cycle of $R/D = 61/4$ for the GRACE A/B satellites ($R = 61$ satellite's nodal revolutions per $D = 4$ synodic days). Similar situations may be encountered in the future free fall of the GRACE orbit. We use recent models of atmospheric density to estimate min/max drag and the orbit decrease of GRACE, providing a warning of possible future degradation. The densities of the ground tracks of CHAMP (CHALLENGING Minisatellite Payload), GRACE or GOCE (Gravity Field and Steady-State Ocean Circulation Explorer) and several other satellites are investigated to get a better insight into how these patterns and accuracy of the solved-for gravity parameters, are related. The density depends strongly not only on a "distance" from a low order R/D repeat (i.e. on time), but also on geographic latitude. Implications for GOCE are discussed, too, with some suggestions for orbit choice or tuning for the measuring phases of this mission.