



Modelling and reducing systematic errors in the GOCE gravity gradients

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The error of the accurate GOCE gravity gradients is small and stochastic in the measurement bandwidth (MB). Below the MB, however, the errors increase and are systematic: harmonic oscillations are visible in the GOCE gravity gradient residuals at integer multiples of the orbital frequency, which degrade the gradient quality. We will show that by proper characterization of the instrument in orbit it is possible to model the systematic errors using only a few parameters. We will also assess the error of the gravity gradients once these have been reduced for the systematic errors. In particular we will demonstrate how to determine the effective MB before and after reduction of the systematic errors, that is, the frequency range in which the gravity gradients have good quality and are largely free of systematic errors.