



## **Improved GOCE Gradiometer Level 1b Data Processing – Impact on Gravity Gradients and Gravity Field Models**

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In the last year enhanced strategies for the GOCE gradiometer Level 1b processing have been developed, published and implemented within ESA's payload data ground segment. The novelties are (a) an improved method for the reconstruction of angular rates from gradiometer and star sensor data, (b) a new method for the determination of the inertial attitude quaternions, also based on a combination of gradiometer and star sensor data, (c) the use of all simultaneously available star sensor data and (d) an improved calibration of the gradiometer data that takes the time dependency of calibration parameters into account. At this point in time, the reprocessing of the gradiometer data is almost complete.

In this paper, a quality assessment of the reprocessed gradiometer data is performed for two selected periods: 01/11/2009 - 31/12/2009 and 08/06/2011 - 23/08/2011. This allows on the one hand a comparison of the reprocessed and original (first released) data. The improved quality of reprocessed data is demonstrated on the level of gravity gradients as well as gravity field models. On the other hand, the analysis of the two periods allows a comparison of the quality of gravity gradients that were obtained under different aerodynamic drag conditions. Since the launch in 2009, aerodynamic drag experienced by the GOCE satellite has increased as the solar cycle advances towards maximum solar activity expected in 2013. In this way, the importance of the reprocessing is stressed not only for gradiometer data measured until today, but also in the future.