

## **Validation of GOCE/GRACE satellite only and combined global geopotential models over Greece, in the frame of the GOCESaComb Project**

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With GOCE approaching the end of its mission the contribution and new insights that was brought to many fields in the geosciences is significant. GOCE managed to provide improved representations in the medium wavelengths of the gravity field spectrum to degree and order 210-240, resulting in advances in gravity field determination, dynamic ocean topography modelling, new outlooks in the Earth's interior, etc.

The GOCESaComb project, funded by ESA in the frame of the PRODEX program, aims to utilize GOCE data within combination schemes to achieve of high-quality and accuracy predictions related to Earth's gravity field, sea level and dynamic ocean topography. In this work, the results from the detailed validation of all available GOCE, GOCE/GRACE and combined global geopotential models are presented referring to all four releases of the models and the various strategies (TIM, DIR, SPW, GOCO) followed for their determination. The validation is performed following three approaches. The first one refers to the evaluation of the GOCE/GRACE based GGMs signal and error in the form of the provided degree and error variances. The second refers to an external evaluation of the GGMs against local gravity and GPS/Leveling data covering the entire Greek territory, for various degrees of GGM expansion. In this validation step we follow a spectral enhancement approach where, given the GOCE/GRACE GGM truncation degree, EGM08 is used to fill-in the medium and high-frequency content along with RTM effects for the high and ultra high part. The third validation approach is based on the evaluation of the spectral content of the GOCE/GRACE GGM via a wavelet- and FFT-based multi-resolution analysis. The idea behind the multi-resolution analysis (MRA) with wavelets is that the two-dimensional wavelet transform can give wavelet coefficients at different spatial scales  $L_i$ , while these scales are connected and directly related to the signal frequencies, i.e., harmonic degrees of expansion. Therefore the improved performance by GOCE could be detected in the targeted, by the mission, spectral bands.

### ***Theme 2: Gravity Field Determination and Applications***

#### ***Oral Presentation***