



## **GRACE gravity solutions using a combination of spherical harmonics and surface density grids**

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CNES/GRGS has been committed for the last twelve years to computing spherical harmonics models of the Earth gravity field from the GRACE dataset. Due to the tradeoff that has to be found between spatial resolution and stability of the solutions, it is difficult with spherical harmonics to accurately model the strong but narrow signals like, for instance, the ocean-continent gravity contrast along the coastlines. In order to overcome this limitation, CNES/GRGS is exploring, after some other groups ( JPL, GSFC, GET...) but with a slightly different method, the possibility to use surface gravity grids in combination with spherical harmonics for the GRACE solutions. In our case the spherical harmonics model is used for the static part of the gravity field and the direct gravitational attraction of a surface regular grid for the time-varying part. Not ignoring the caveats on the interpretation of EWH or surface mascons raised by Chao (2016), we will present the results obtained from simulation studies and from the use of actual GRACE measurements. In particular a comparison between the “direct attraction” approach and the “energy integral” approach will be made and, in the first case, between a purely spherical harmonics solution and a “spherical harmonics + surface grid” solution.