

The second release of COST-G GRACE-FO combined monthly gravity fields

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Session 04 – GRACE, Hydrology and Ice Mass Balance







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- Introduction to COST-G
- COST-G GRACE-FO RL02 developments:
 - weighting scheme
 - accelerometer transplant product
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COST-G: Concept







COST-G within the G3P project



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COST

G3P received funding from the EU's Horizon 2020 research and innovation program under grant agreement No. 870353



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GRACE-FO Operational Combination



Weights do not reflect the noise over the oceans of AC solutions: Highest weight: AIUB Lowest noise: ITSG





Revision of the Weighting Scheme



Weights better reflect the noise over the oceans of AC solutions: Highest weight: ITSG Lowest noise: ITSG





Further Improvements of the Combined Solution



Empirical Noise Modeling of AIUB AC solution (Ph.D. work of M. Lasser) GFZ time-series based on ACT product from G3P (as AIUB, GRGS, ITSG, LUH) => Combination outperforms all individual solutions in 2021





Further Improvements of the Combined Solution



CSR and JPL RL06.1 time-series based on new JPL-ACT product; the main effect is on C30, which in case of using either the G3P-ACT or the new JPL ACT has not to be replaced by SLR-derived values.





Validation: Improvement of TWS Signal-to-Noise Ratio



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Validation: GOCE orbit fit

3D-RMS values [cm] of the orbit fit residuals (mean values from the involved arcs) Parametrization: 6 orbital elements, accelerometer biases 1/arc (3 directions)

	March			April			June			December		
Model/Month	2019	2020	2021	2019	2020	2021	2019	2020	2021	2019	2020	2021
COST-G FSM	5,53	5,77	6,30	5,37	5,72	6,39	5,39	5,86	6,63	5,48	6,05	7,78
COST-G operational	6,42	7,10	7,27	6,36	7,06	7,84	6,40	7,36	7,62	6,94	7,51	7,57
COST-G (G3P)	5,92	6,76	6,79	5,99	6,55	7,30	5,85	6,68	6,86	6,38	6,77	7,21
ITSG-Grace_operational_n96	5,94	6,95	7,11	5,93	6,69	7,08	5,68	6,33	6,77	6,17	6,95	7,36







COST-G products: Level-2 (spherical harmonic)







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COST-G products: Level-3 (post-processed grids/time-series)



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Summary and Outlook

- COST-G GRACE-FO RL02 Level-2 products (spherical harmonic coefficients) are available from ICGEM (<u>http://icgem.gfz-potsdam.de/series/02_COST-G/</u> Grace-FO_RL02).
- COST-G GRACE-FO RL02 Level-3 products for (grids/time-series) are available via GFZ's GravIS portal (<u>http://gravis.gfz-potsdam.de/gws</u>).
- COST-G GRACE RL02 consistent to GRACE-FO RL02 and including Chinese Analysis Centers is under preparation for presentation at IUGG 2023.





