

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

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ICCC 2023

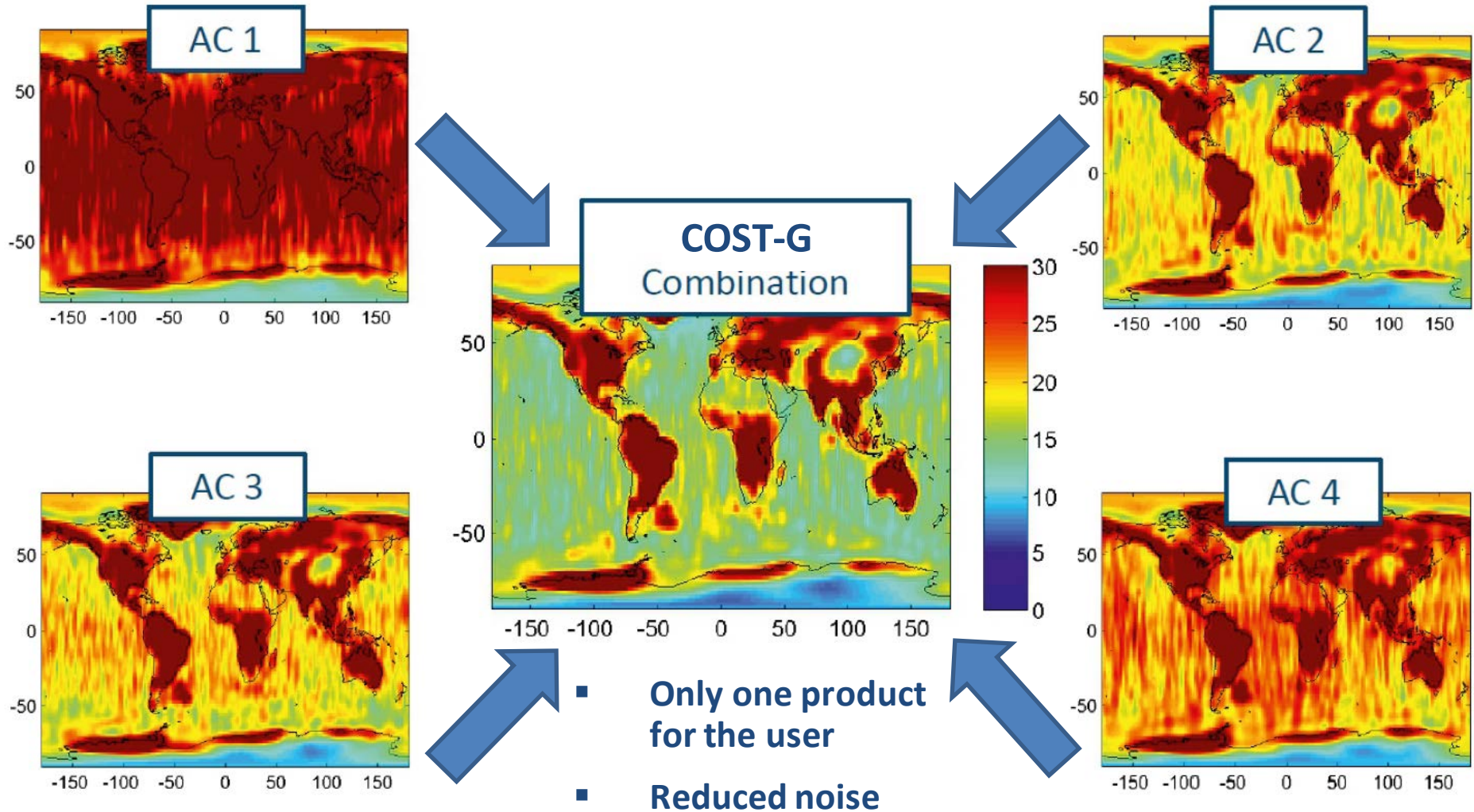
Session 04 – GRACE, Hydrology and Ice Mass Balance



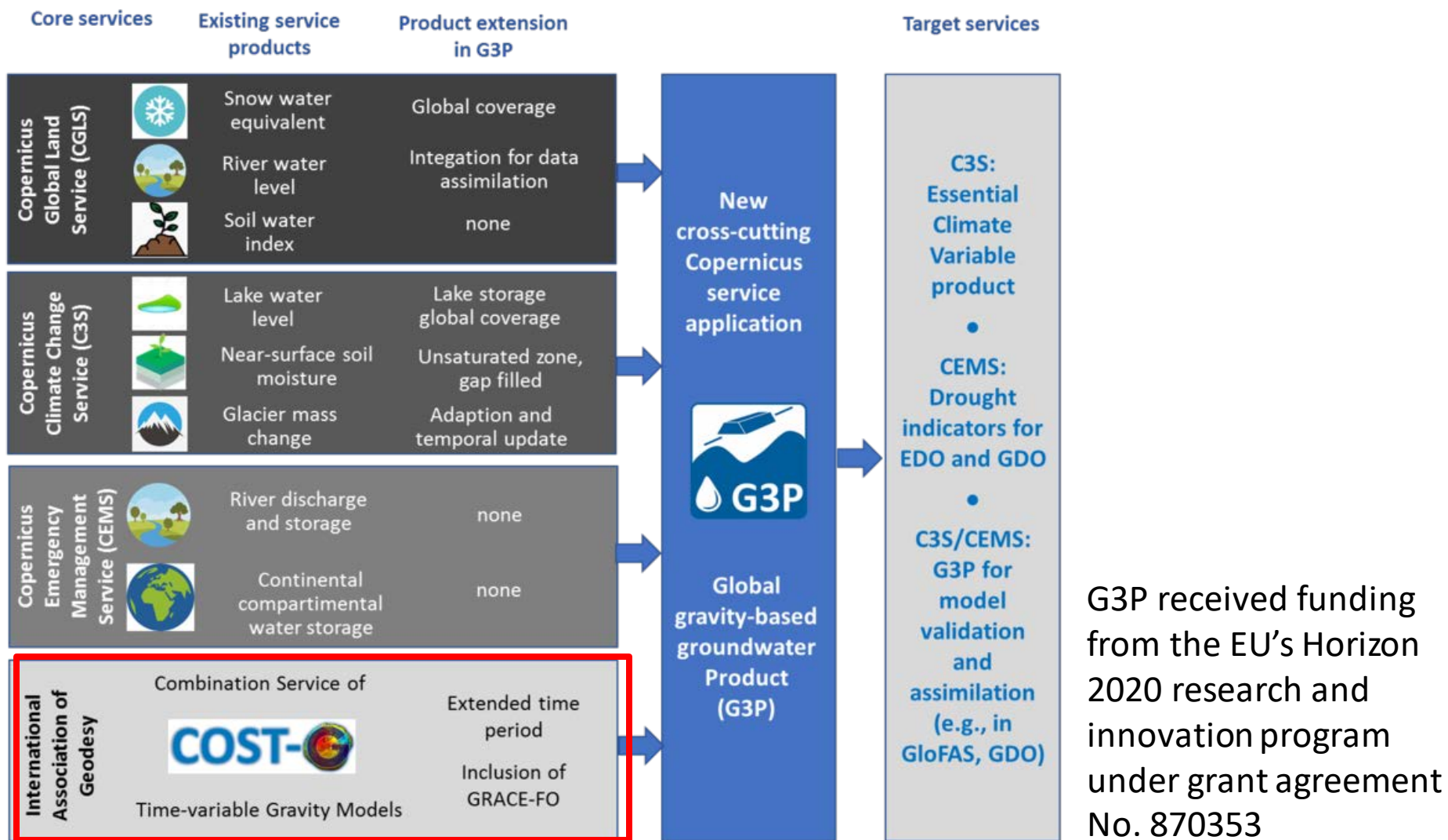
Contents

- Introduction to COST-G
- COST-G GRACE-FO RL02 developments:
 - weighting scheme
 - accelerometer transplant product
 - new time-series
- Validation/Dissemination

COST-G: Concept

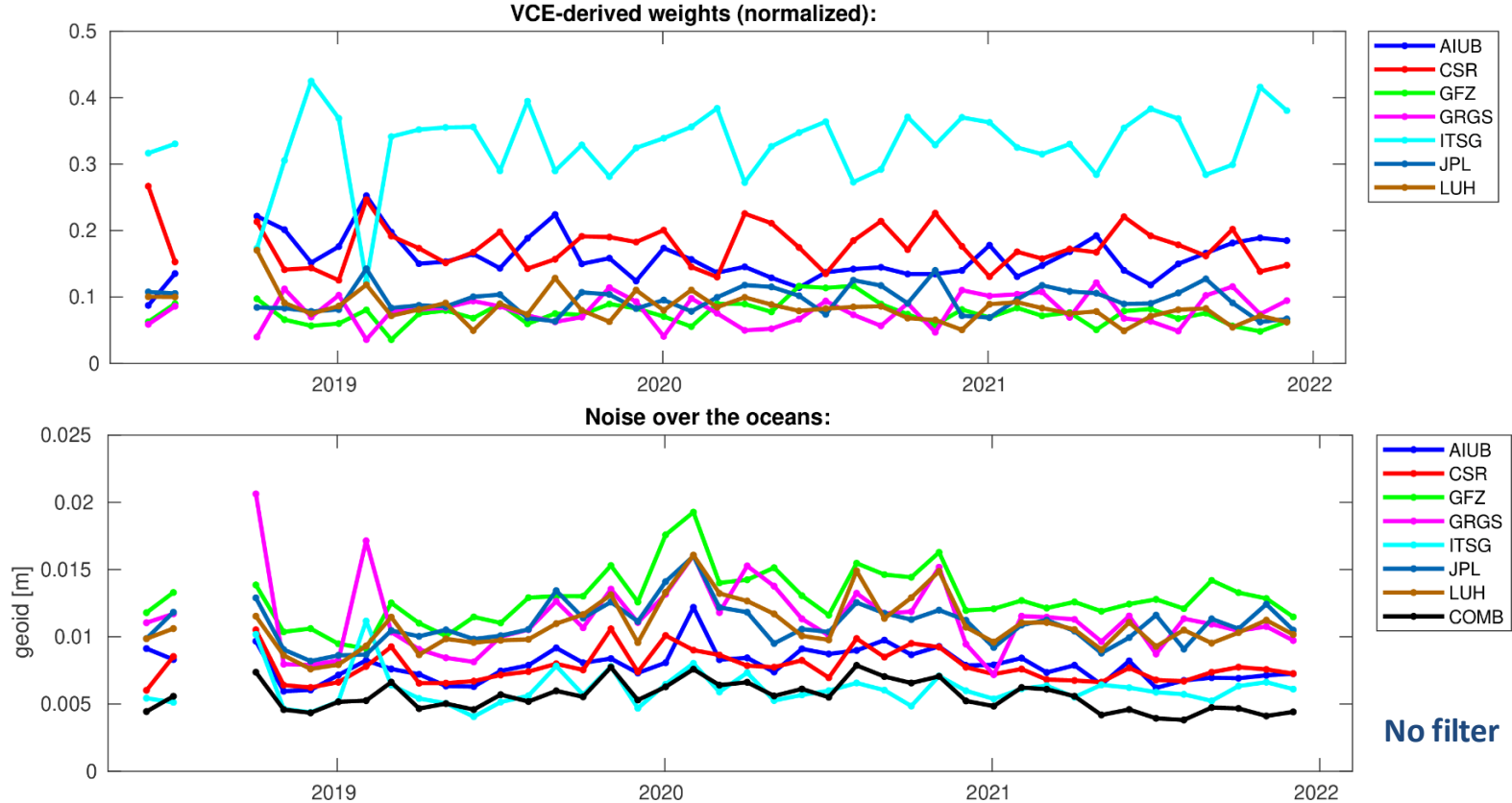


COST-G within the G3P project



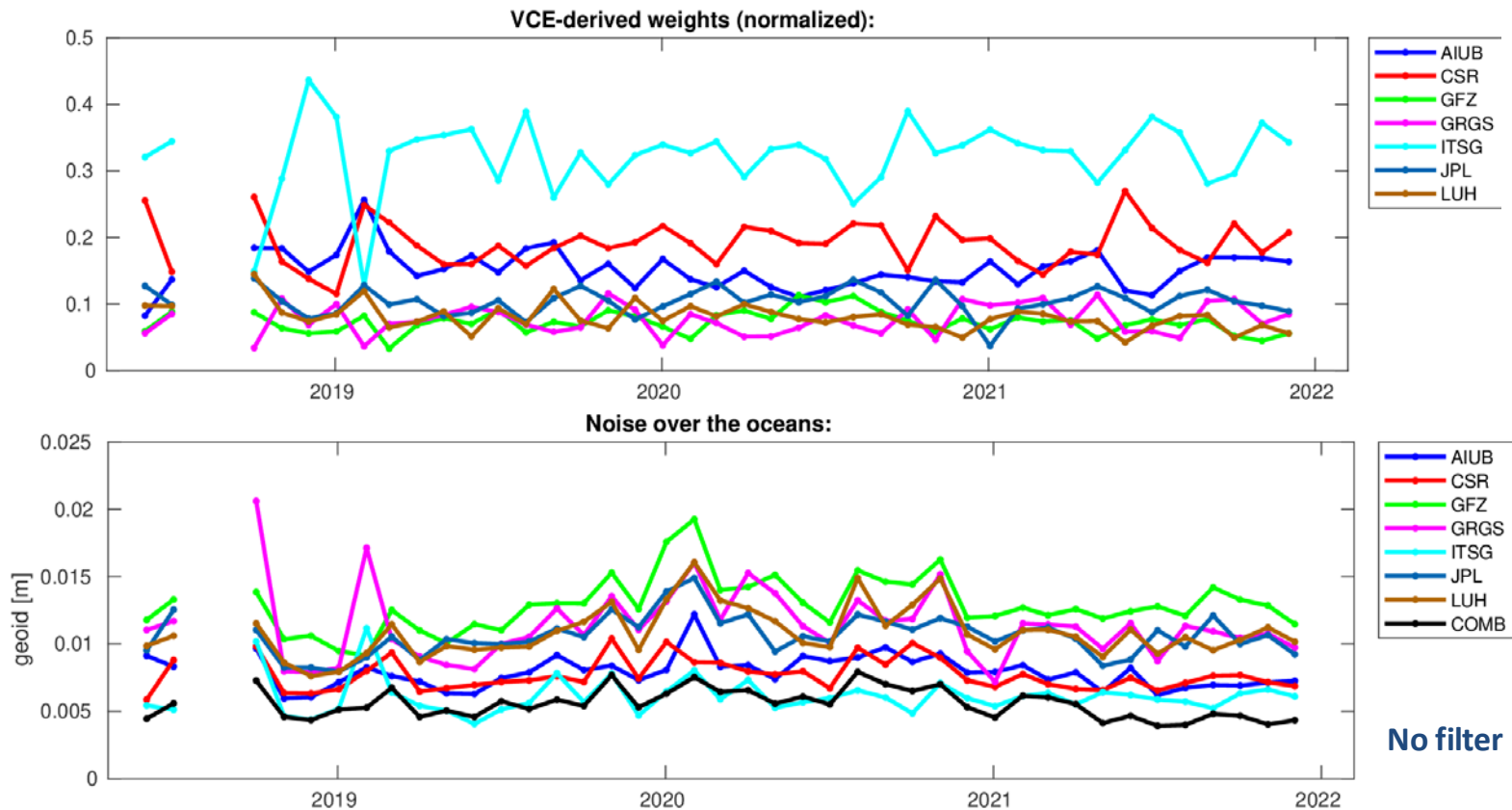
G3P received funding from the EU's Horizon 2020 research and innovation program under grant agreement No. 870353

Further Improvements of the Combined Solution



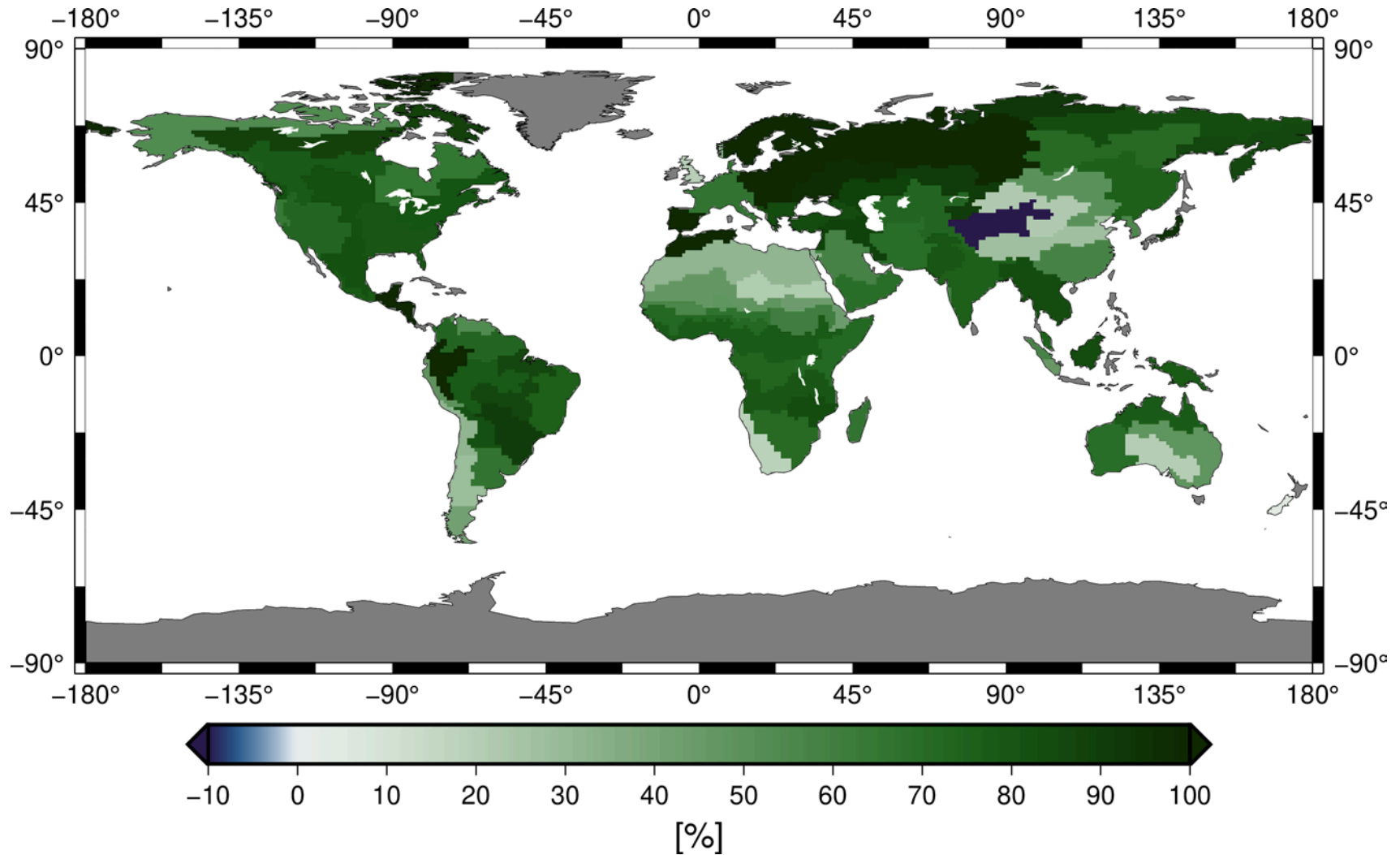
Empirical Noise Modeling of **AIUB** AC solution (Ph.D. work of M. Lasser)
GFZ time-series based on ACT product from G3P (as AIUB, GRGS, ITSG, LUH)
=> Combination outperforms all individual solutions in 2021

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



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)

Model/Month	March			April			June			December		
	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)

ICGEM

Gravity Field Solutions for dedicated Time Periods

The following gravity field time series are presently available:

GRACE and Grace-FO solutions from the Science Data System centers CSR, GFZ and JPL				collapse all
- CSR				Center for Space Research at University of Texas, Austin
CSR Release 05		monthly	UTCSR Level-2 Processing Standards Document, Rev 4.0 May 29, 2012	
CSR Release 06	DOI	monthly	UTCSR Level-2 Processing Standards Document, Rev 5.0 April 18, 2018	
CSR Release 06 (GFO)	DOI	monthly	UTCSR Level-2 Processing Standards Document, V 1.1 June 6, 2019	
- GFZ				Helmholtz Centre Potsdam German Research Centre for Geosciences
GFZ Release 05		monthly	weekly	GFZ GRACE Level-2 Processing, Revised Edition, January 2013
GFZ Release 06	DOI	monthly		GFZ GRACE Level-2 Processing Standards Document for Level-2 Products, Rev. 1.0, October 26, 2018
GFZ Release 06 (GFO)	DOI	monthly		GFZ GRACE Level-2 Processing Standards Document for Level-2 Products, Rev. 1.0, June 3, 2019
- JPL				Jet Propulsion Laboratory
JPL Release 05		monthly		JPL Level-2 Processing Standards Document, Release 05.1 November 3, 2014
JPL Release 06	DOI	monthly		JPL Level-2 Processing Standards Document, Release 06.0 June 1, 2018
JPL Release 06 (GFO)	DOI	monthly		JPL Level-2 Processing Standards Document, v 1.0 May 28, 2019

The processing standards to generate the GRACE Level-2 products of CSR, GFZ and JPL are also available in the Document Section of the GRACE archives at [GFZ ISDC](#) or [JPL PO.DAAC](#)

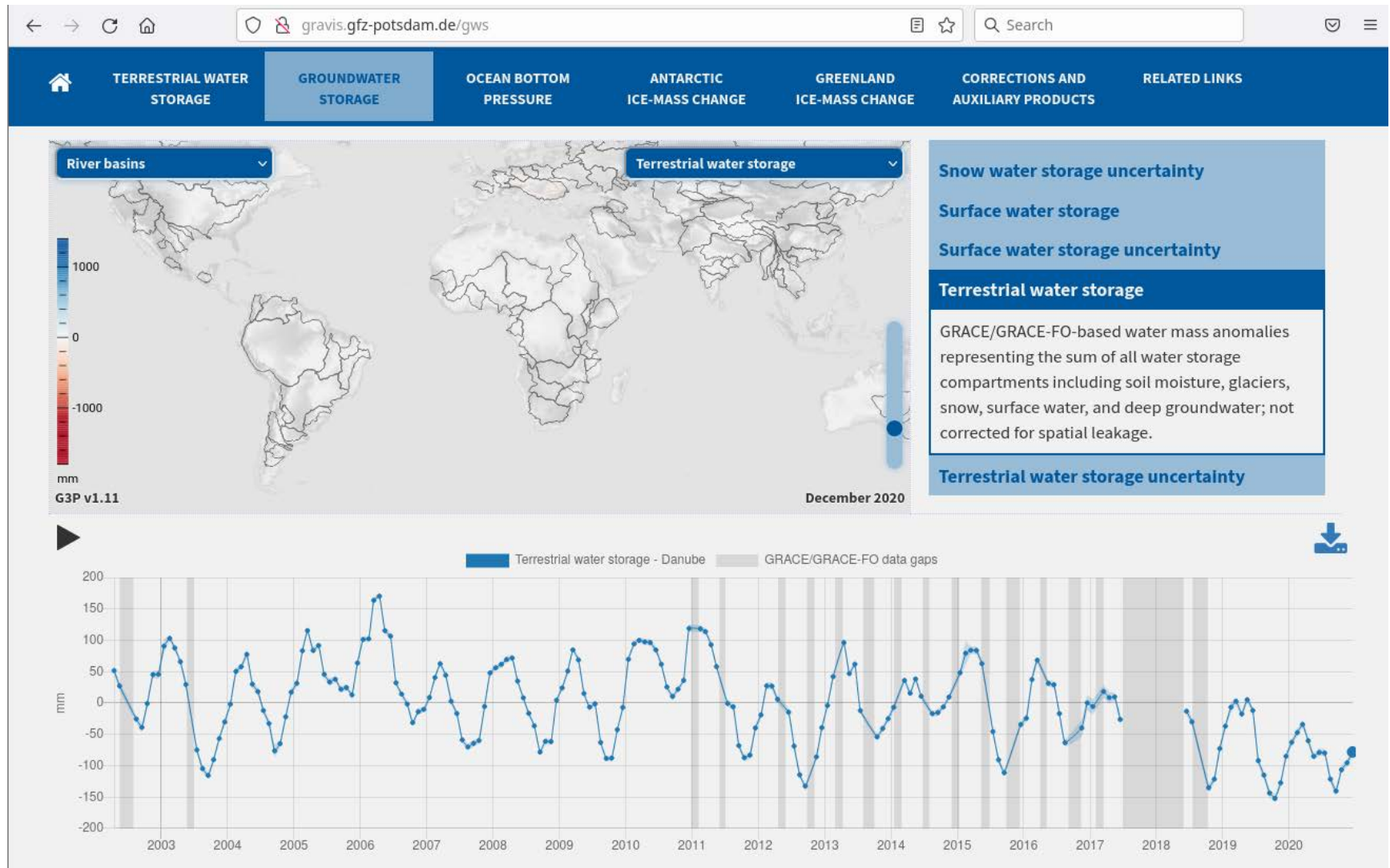
COST-G (International Combination Service for Time-variable Gravity Field)				collapse all
FSM	DOI	quarterly	Fitted Signal Model	
Grace-FO-RL01	DOI	monthly		
Grace-FO-RL02		monthly		
Grace-RL01	DOI	monthly		
Swarm	DOI	monthly		

03 other		expand all
+ AIUB	Astronomical Institute University Bern	
+ CNES	Centre national d'études spatiales	
+ EGSIM	European Gravity Service for Improved Emergency Project	

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



Summary and Outlook

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