COST-G

Combination Service for Time-variable Gravity Models

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
  - new time-series
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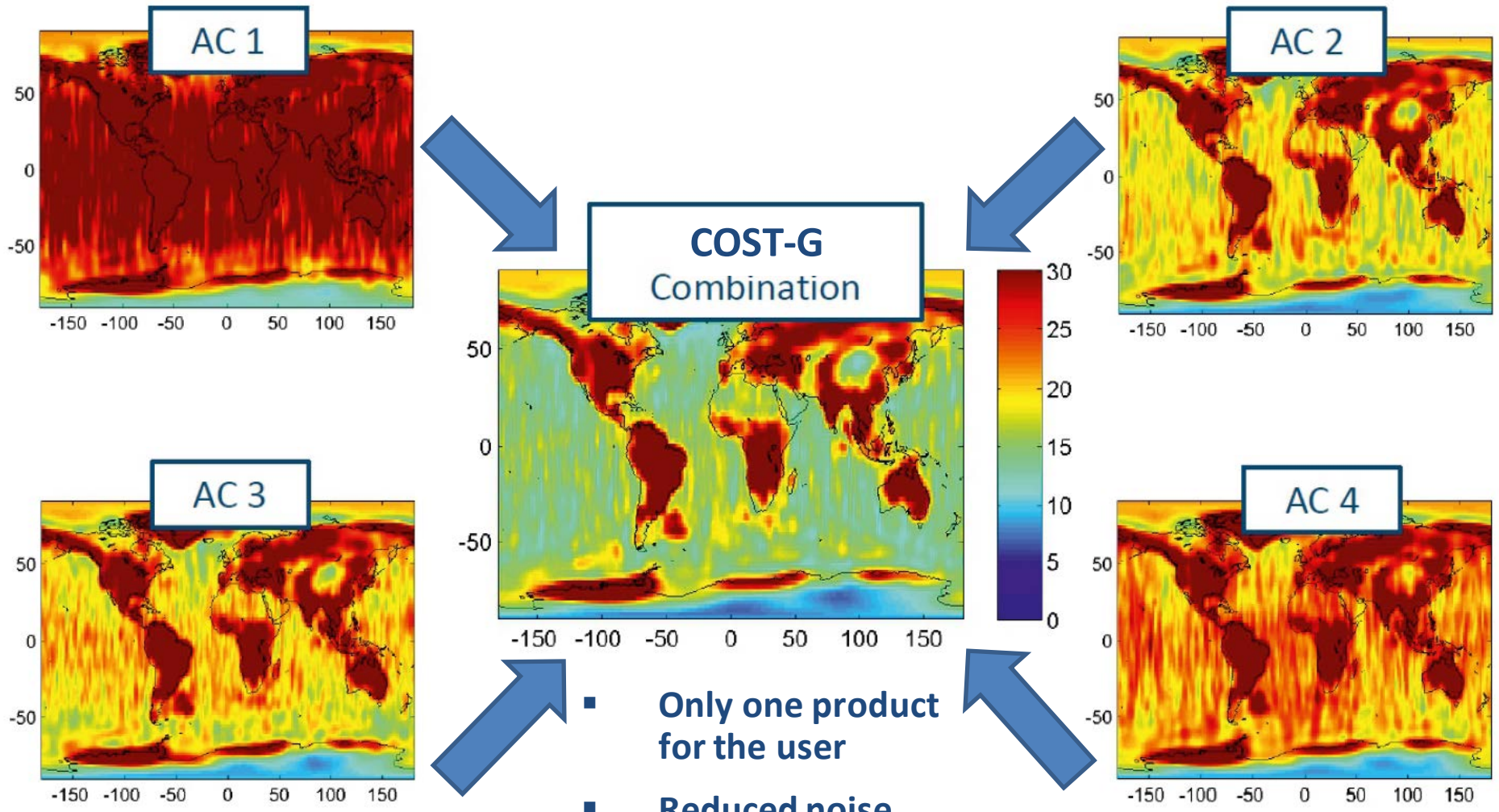
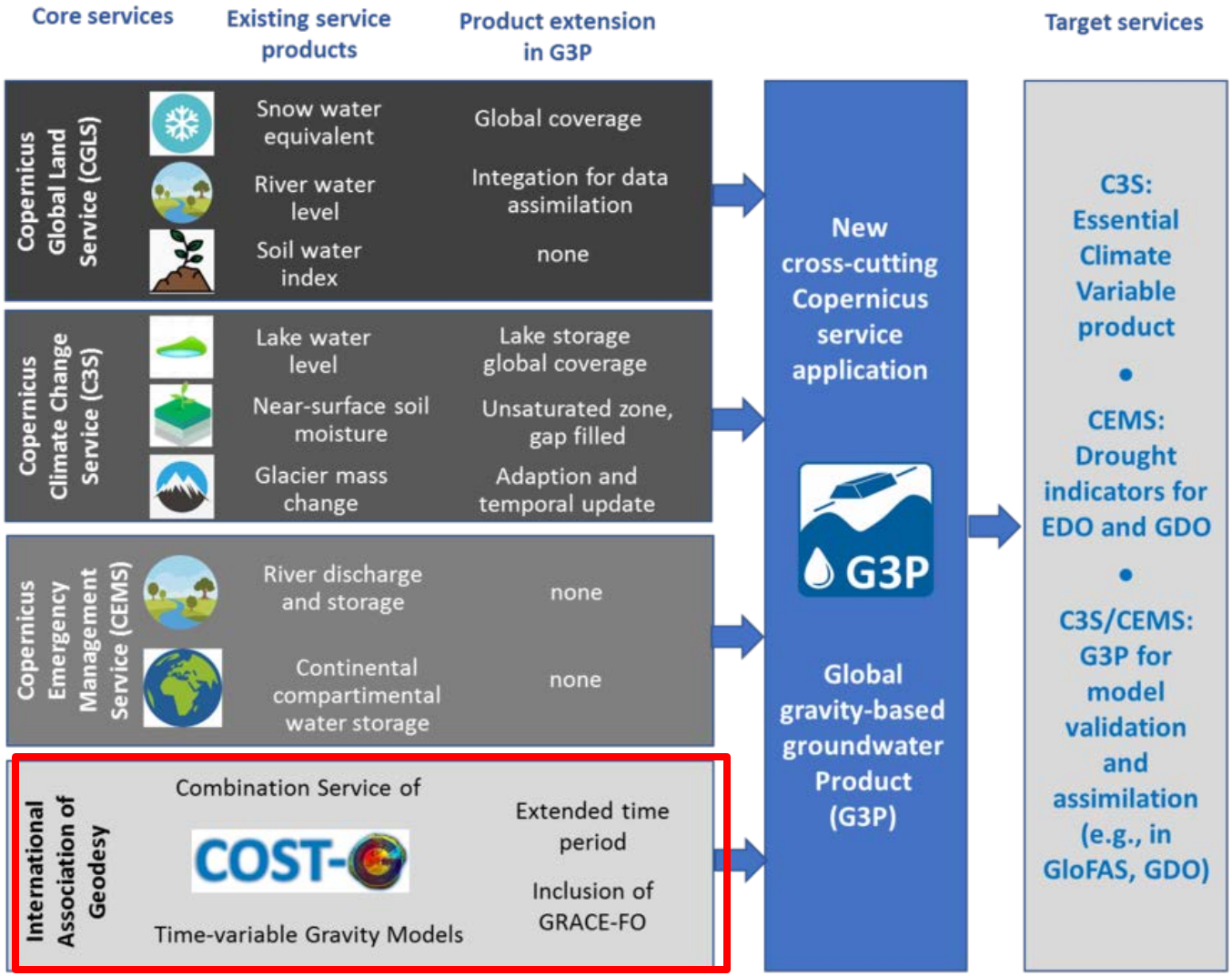
COST-G: Concept



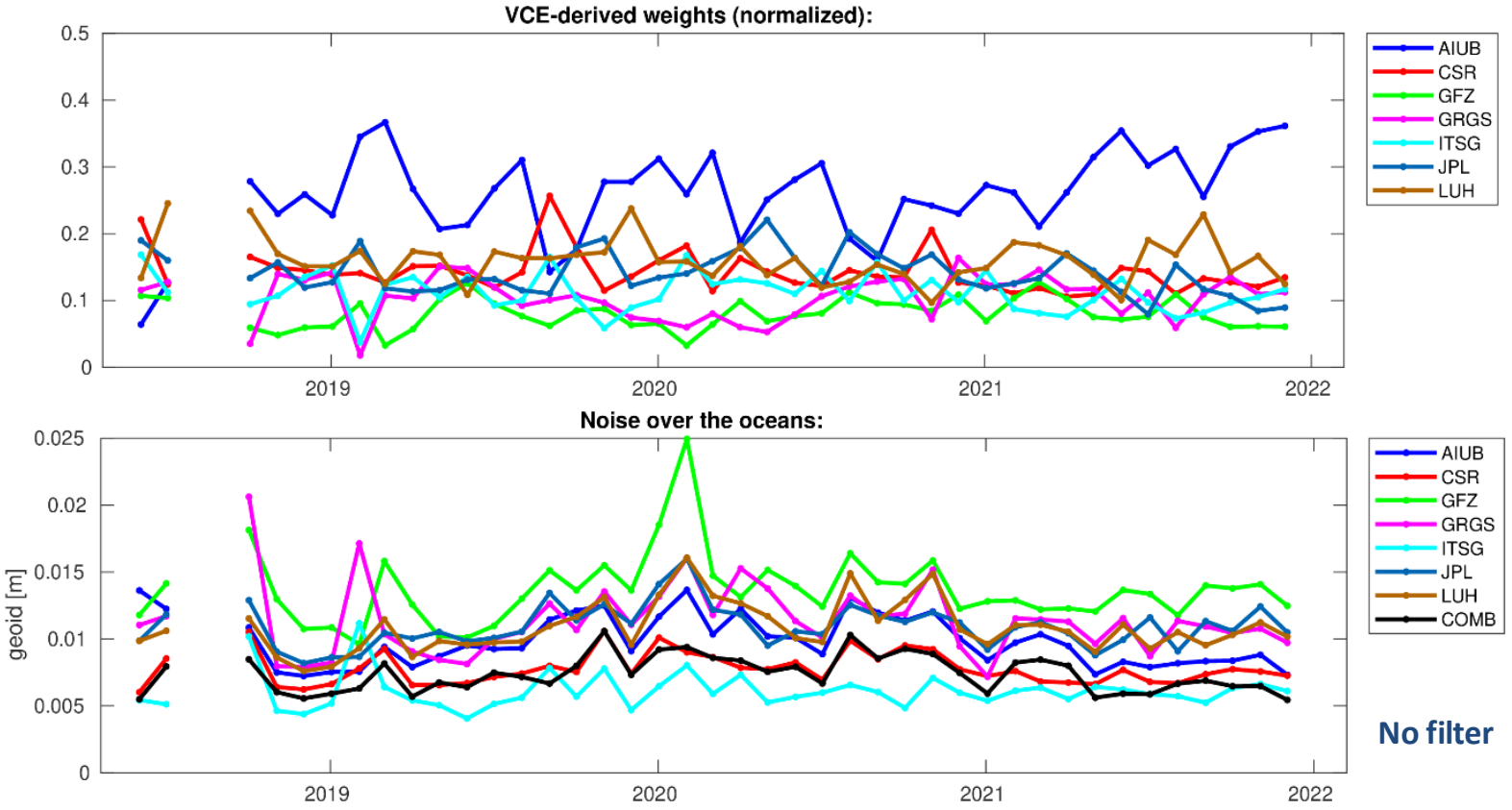
- **Only one product for the user**
- **Reduced noise**

COST-G within the G3P project



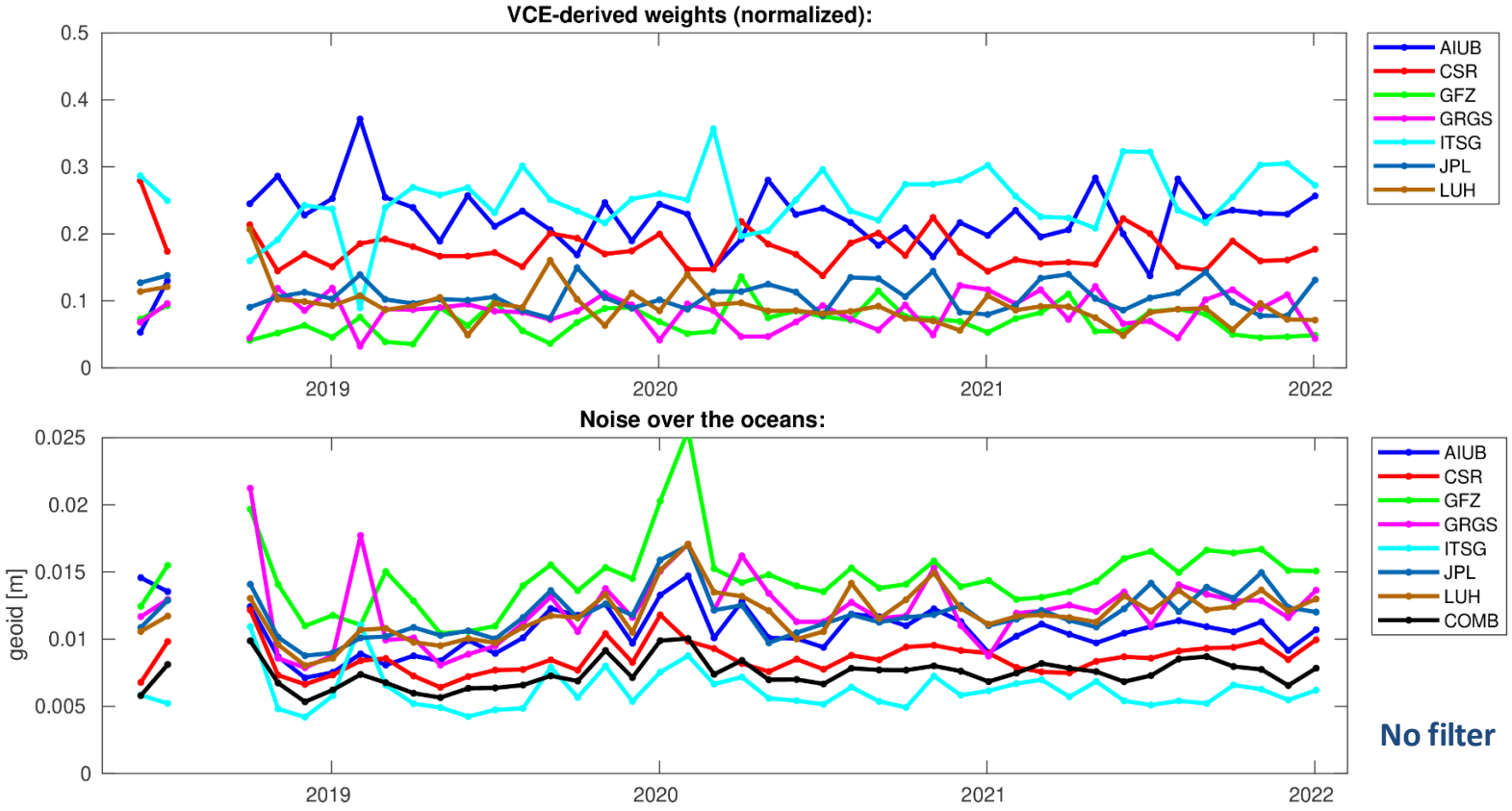
G3P received funding from the EU's Horizon 2020 research and innovation program under grant agreement No. 870353

GRACE-FO Operational Combination



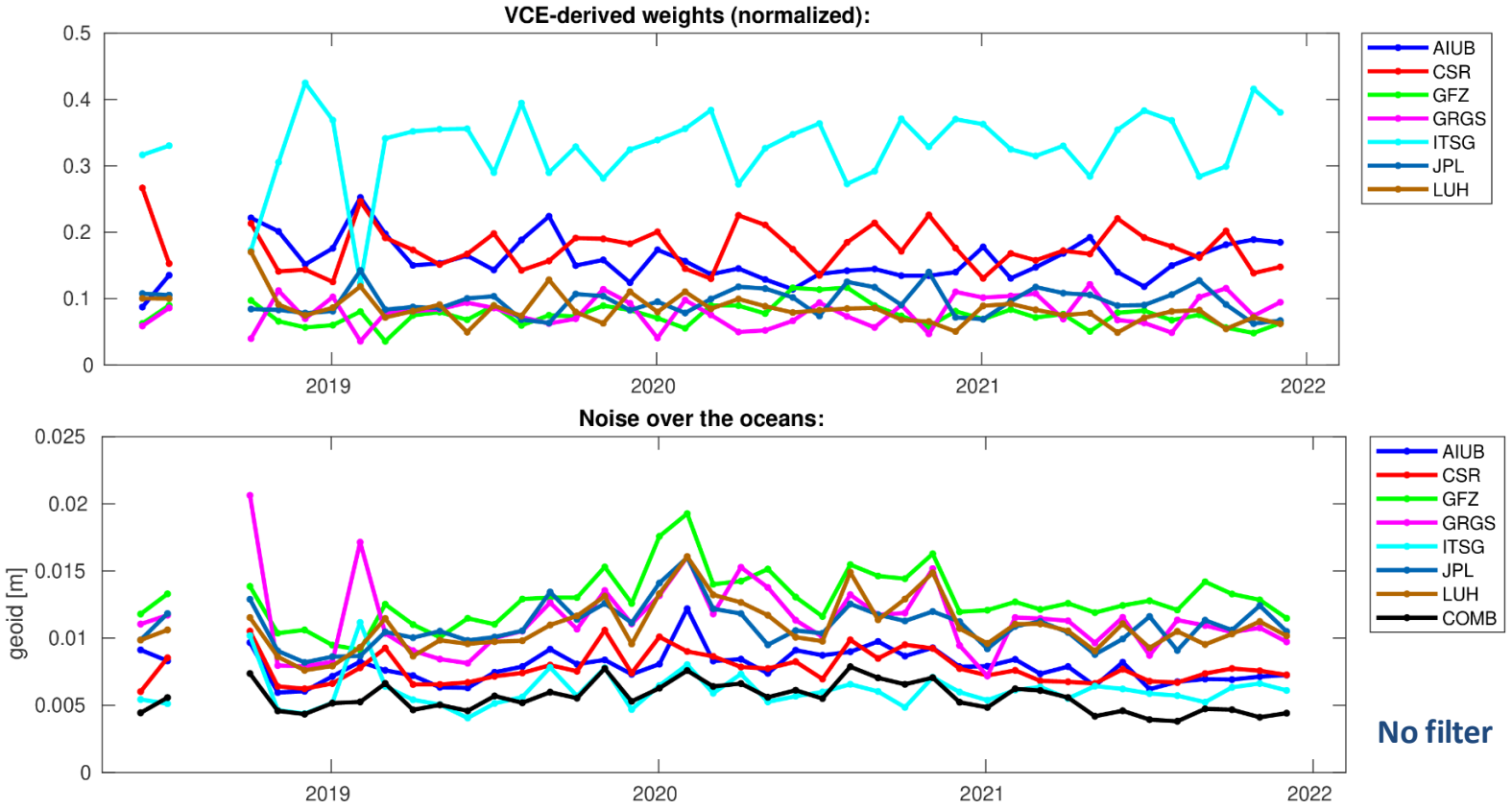
Weights do not reflect the noise over the oceans of AC solutions:
Highest weight: AIUB **Lowest noise: ITSG**

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

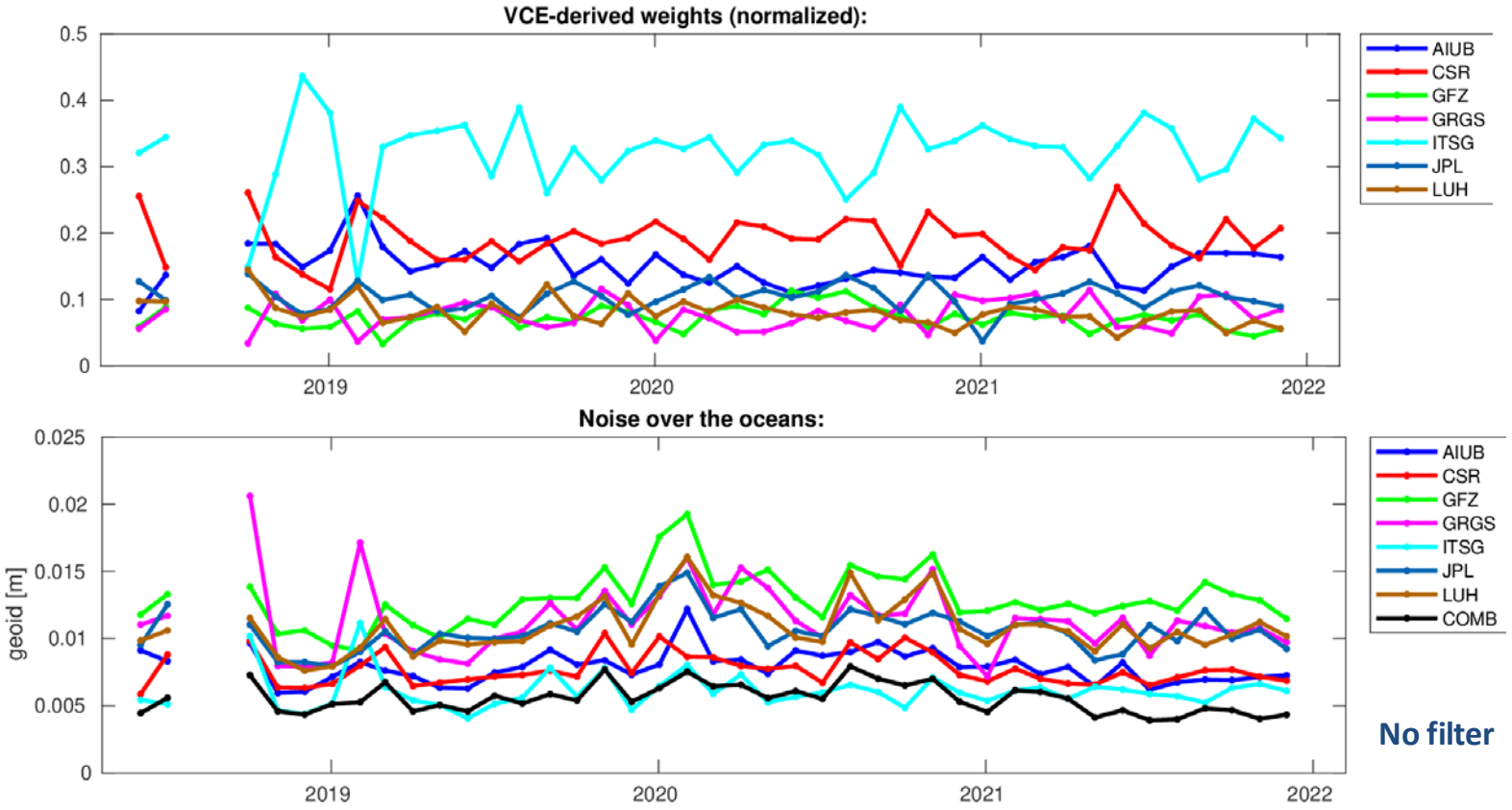


Empirical Noise Modeling of AIUB AC solution (Ph.D. work of M. Lasser)

GFZ time-series based on ACT product from G3P (as AIUB, GRGS, ITSG, LUH)

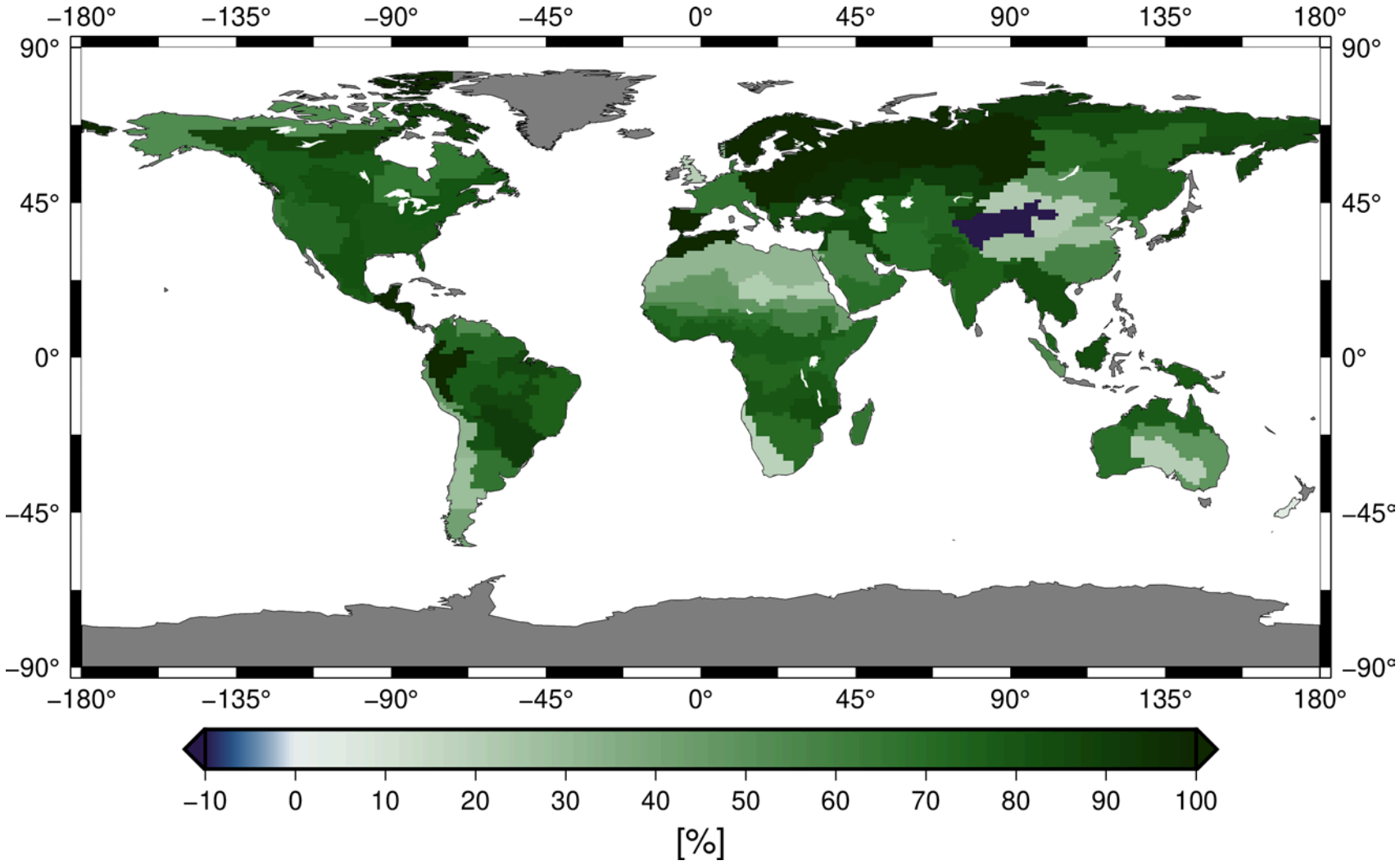
=> Combination outperforms all individual solutions in 2021

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



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)

icgem.gfz-potsdam.de/series

Search

ICGEM

GFZ Helmholtz Centre Potsdam

Gravity Field Solutions for dedicated Time Periods

ICGEM Home

Gravity Field Models
- Static Models
- Temporal Models
- Topographic Gravity Field Models

Calculation Service
- Regular grids
- User-defined points

3D Visualisation
- Static Models
- Temporal Models
- Trend & Amplitude
- Spherical Harmonics

Evaluation
- Spectral domain
- GNSS Leveling

Documentation
- FAQ
- Theory
- References

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
+ EGSIEM		European Gravity Service for Improved Emergency Project

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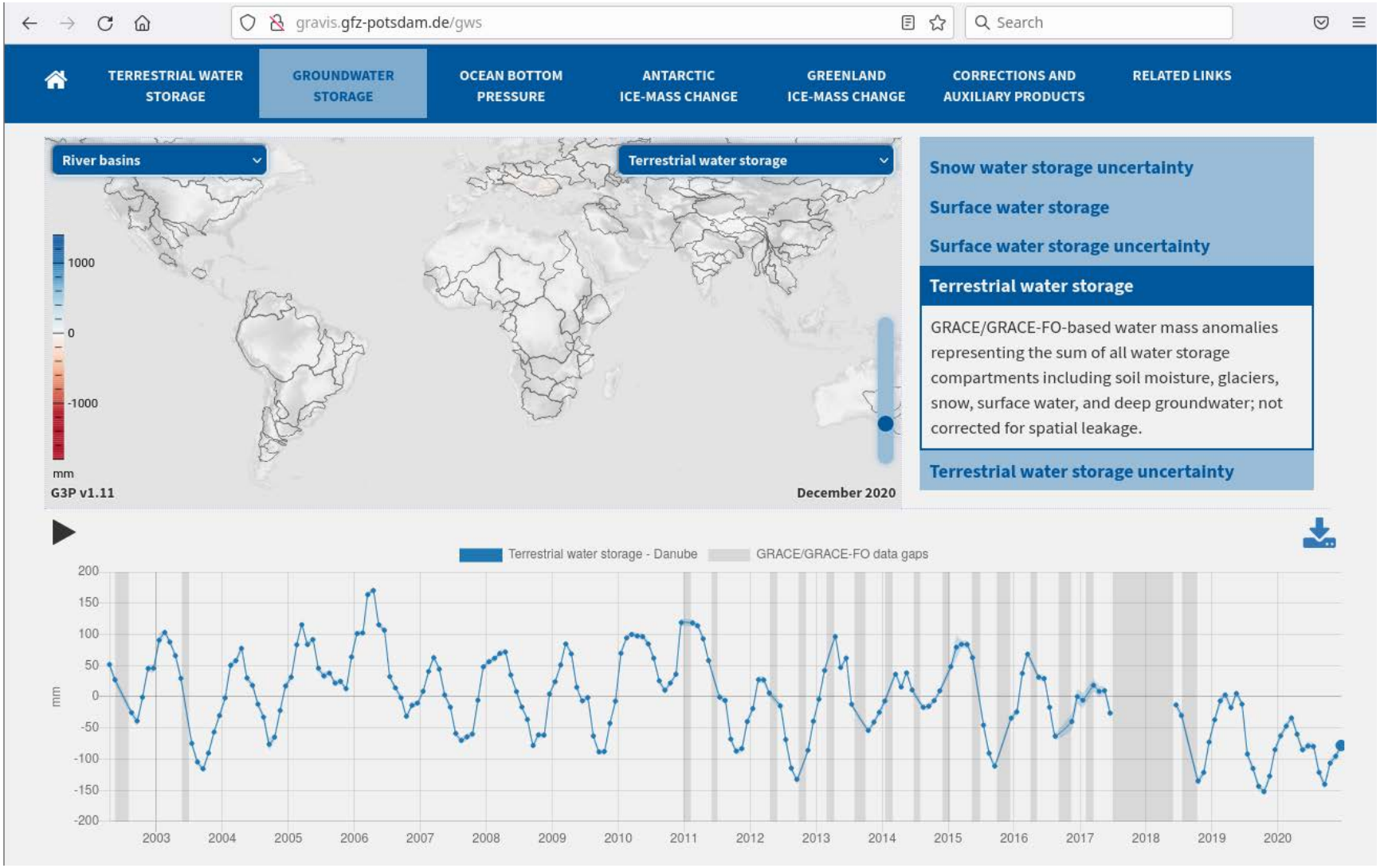
COST-G products: Level-3 (post-processed grids/time-series)



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.**