

Combination Service for Time-variable Gravity Fields (COST-G): operations and new developments

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IAG 2021: 2b.1 - Analysis Techniques



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COST-G: Website



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Welcome to COST-G

The International **C**ombination **S**ervice for **T**ime-variable **G**ravity Fields (**COST-G**) is a product center of the International Gravity Field Service (IGFS) and is dedicated to the combination of monthly global gravity field models. COST-G stems from the activities of the former H2020 project European Gravity Service for Improved Emergency Management (EGSIEM) and is further developed within the follow-up project Global Gravity-Based Groundwater Product (G3P), which is funded from the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement no. 870353 (funding period 2020-2022).

Please use the top menu to visit the various parts of our website!

Best regards,
Your COST-G Team.

<https://cost-g.org/>

Latest News

January 11th 2021

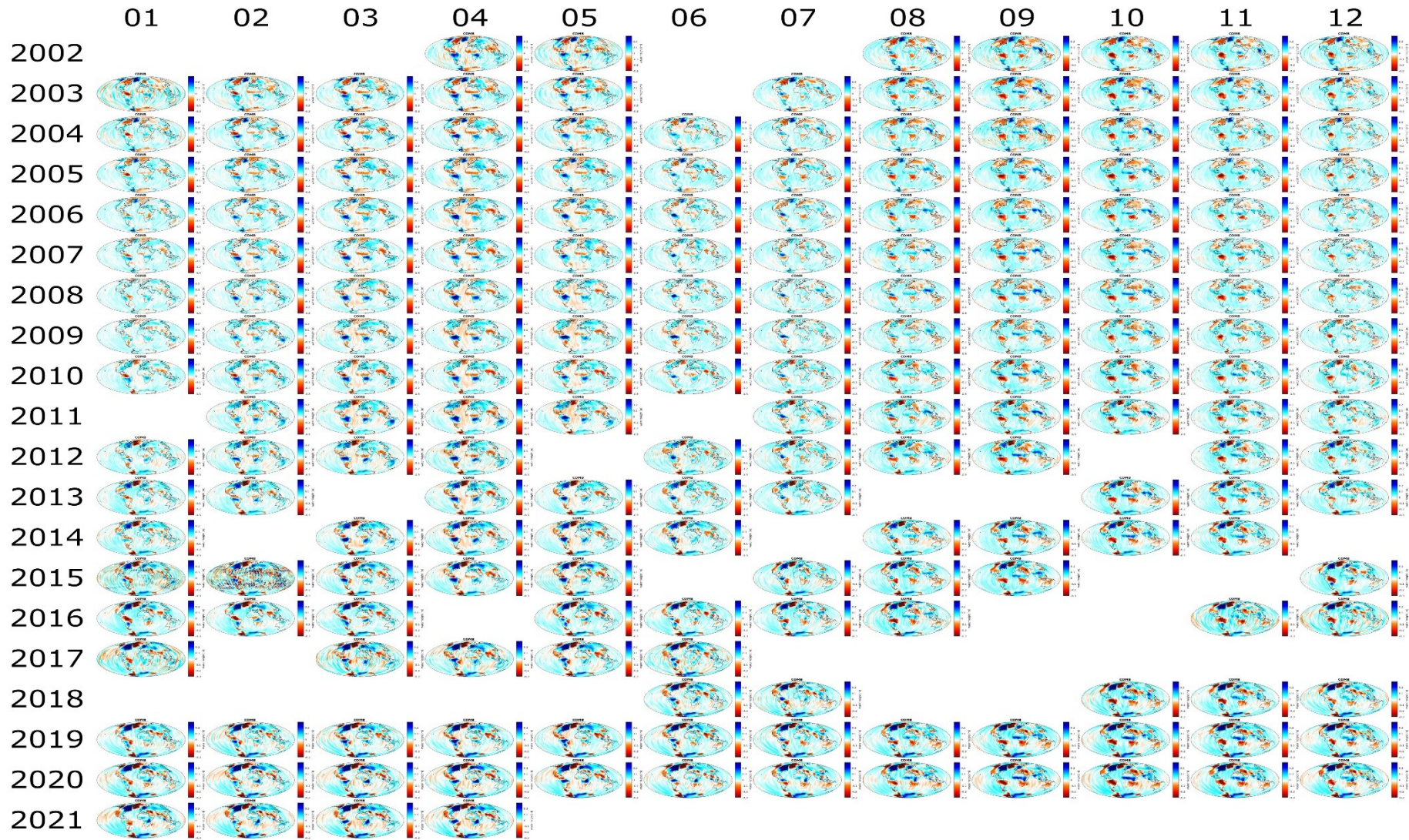
COST-G is having its annual start of the year meeting from 11th to 15th of January!

November 23rd 2020

COST-G GRACE-FO monthly models are now available!



COST-G: Products (GRACE/GRACE-FO)



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

ICGEM

GFZ
Helmholtz Centre
POTSDAM

Gravity Field Solutions for dedicated Time Periods

The following gravity field time series are presently available:

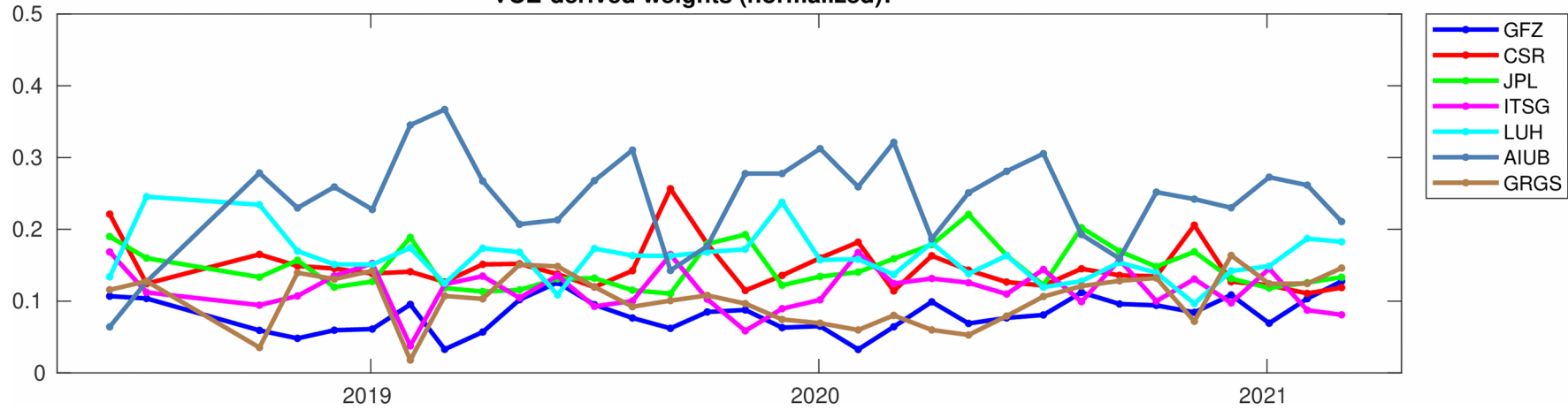
GRACE and Grace-FO solutions from the Science Data System centers CSR, GFZ and JPL				collapse all
- CSR			Center for Space Research at University of Texas, Austin	
- GFZ			Helmholtz Centre Potsdam German Research Centre for Geosciences	
GFZ Release 05	monthly	weekly	GFZ GRACE Level-2 Processing, Revised 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	

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](#)

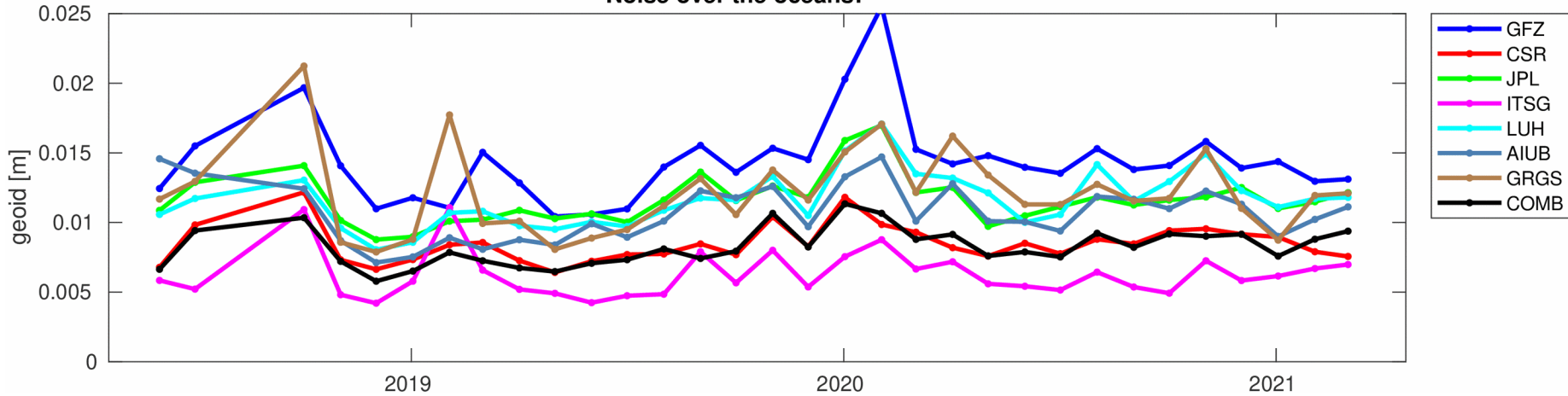
COST-G (International Combination Service for Time-variable Gravity Field)				collapse all
Grace	DOI	monthly		
Grace-FO	DOI	monthly		
Swarm	DOI	monthly		

GRACE-FO weighting scheme: geoid height, unfiltered

VCE-derived weights (normalized):

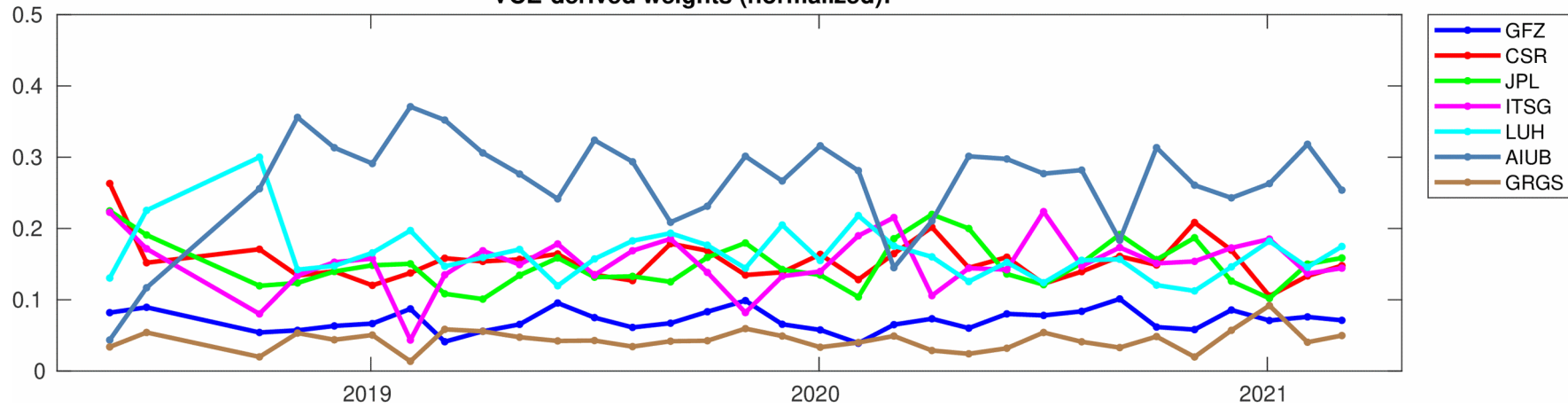


Noise over the oceans:

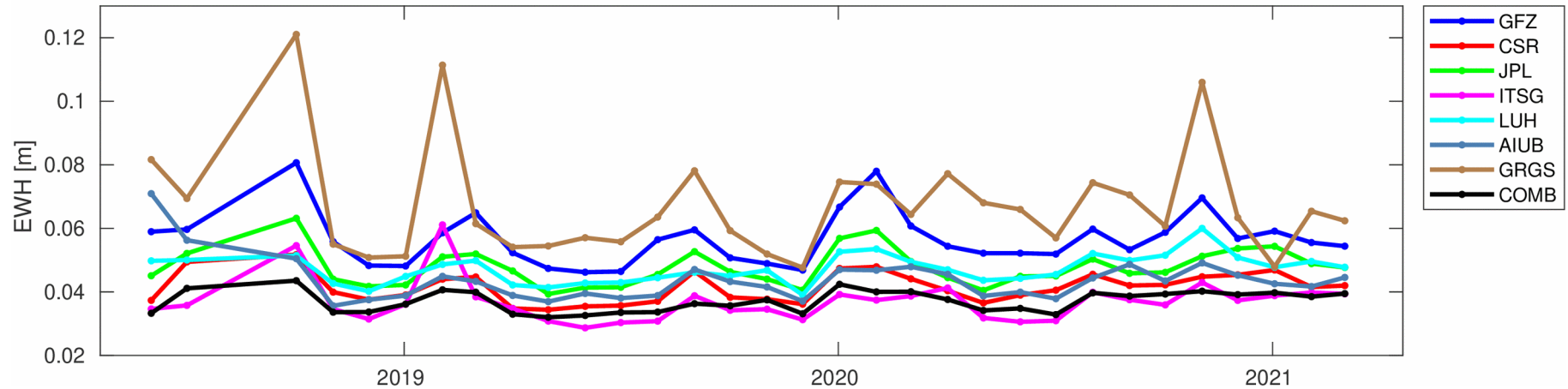


GRACE-FO weighting scheme: EWH, 300 km Gauss filtered

VCE-derived weights (normalized):



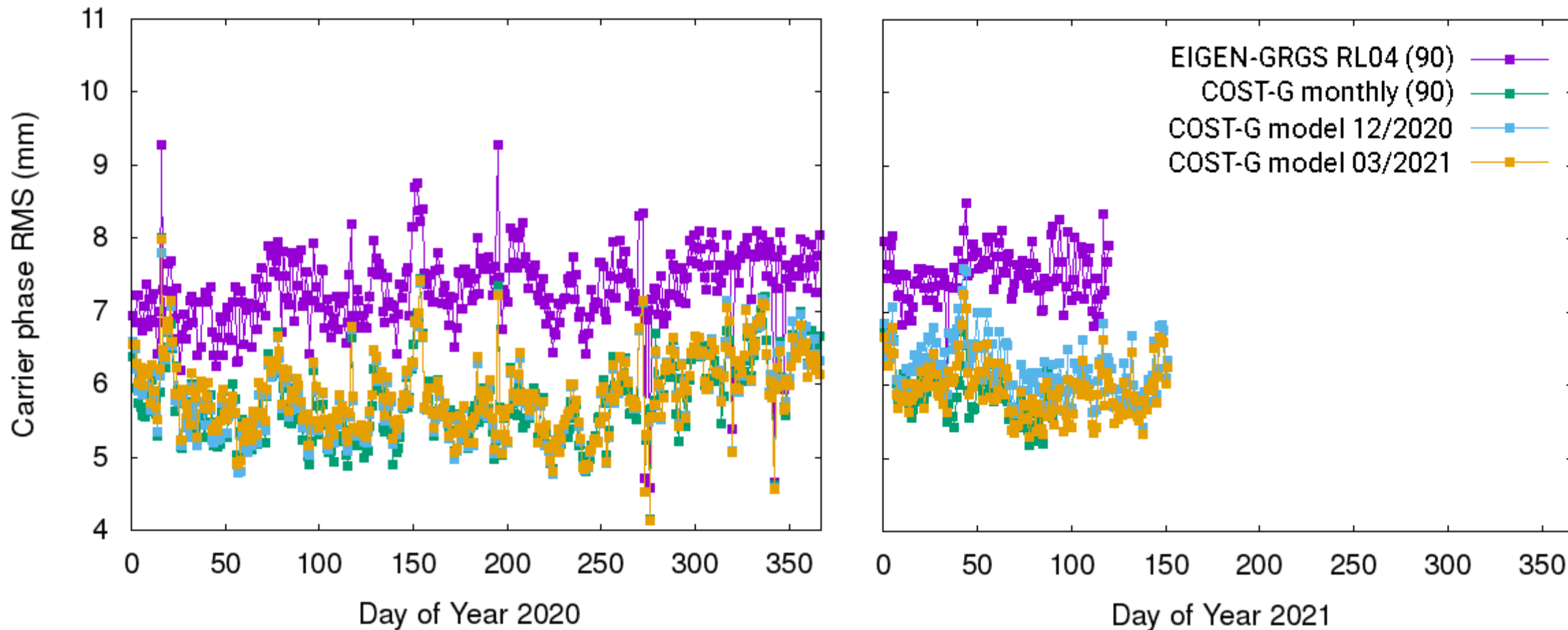
Noise over the oceans:



Relative weights are more consistent with noise assessment when based on 300 km Gauss filtered EWH.

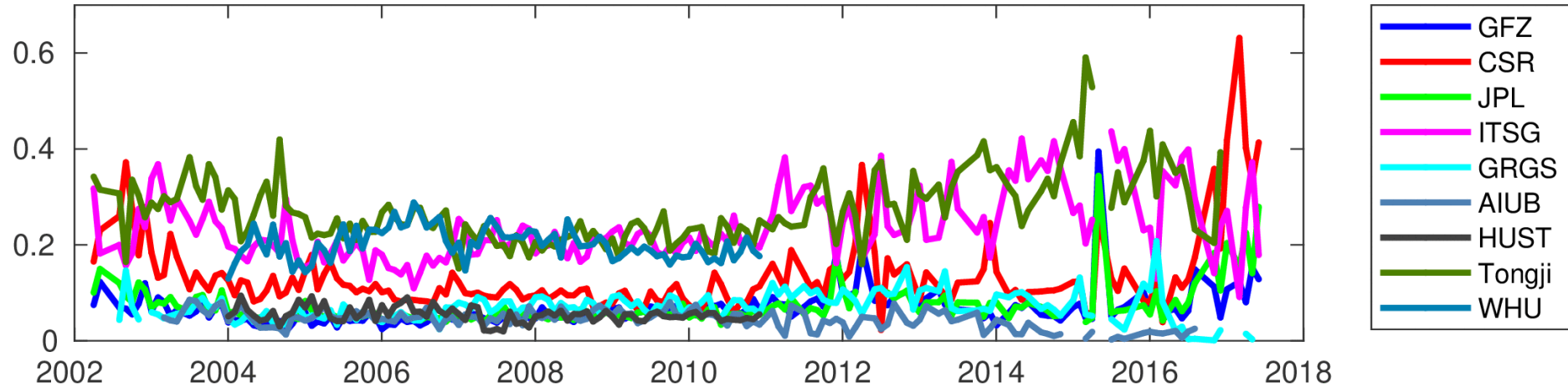
Predictions for Altimetry Precise Orbit Determination

- COST-G monthly fields and deterministic models outperform standard EIGEN-GRGS RL04
- COST-G predictions based on deterministic models allow for high-quality altimeter POD

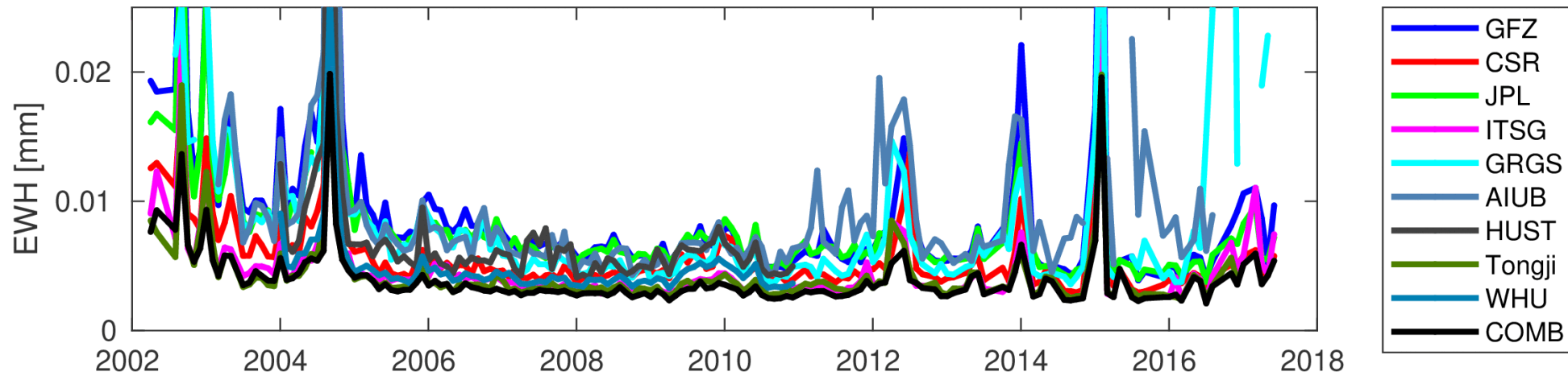


Extension to Chinese Analysis Centers (GRACE)

VCE-derived weights (normalized): degree 90



Noise over the oceans: degree 90 (Gauss 400km)



Validation: GOCE orbit fit

- GRACE solutions up to d/o 90 filled up with GOCE-DIR-6 up to d/o 240:
- The table shows RMS of orbit fits (cm) for the different test cases (3D residuals. mean values from the 30 individual arcs in question)

Gravity model	Month			
	2009/11	2009/12	2010/10	2010/11
GFZ_RL06	7.41	6.86	6.21	6.16
AIUB_RL02	8.71	8.56	7.39	7.21
CSR_RL06	6.89	9.10	6.65	6.20
GRGS_RL04	5.89	7.30	5.48	5.83
ITSG_2018_tide_free	5.53	5.13	4.19	4.54
HUST-Grace2019	7.93	7.92	6.98	7.59
Tongji-Grace2018	5.15	5.51	4.33	4.37
WHU_RL02	6.90	7.58	4.81	5.03
COSTG_RL01	5.03	5.54	4.52	4.72
COSTG incl. Chinese	5.08	5.33	4.37	4.55

Best cases are high-lighted

Combined gravity fields benefit from inclusion of Chinese analysis centers in 3 of 4 cases!