

## Consolidated and validated monthly gravity field combinations of the GRACE, Swarm and GRACE-FO satellite missions

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### ICCC WS21

#### Session 01 – Hydrology and data processing



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- Introduction to COST-G
- COST-G operations (example GRACE-FO):
  - Quality control
  - Combination
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- COST-G products

# COST-G: product center of the IGFS

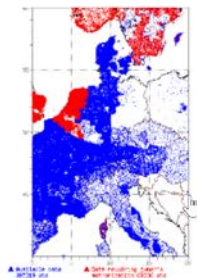
## Gravity and geoid metadata

Online applications for the creation of metadata for gravity and geoid data. Service for searching the metadata database.



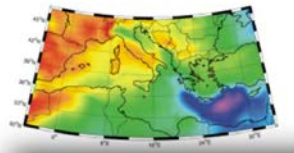
## Gravity data

Land, marine, airborne gravity data as point and gridded values. Absolute and relative gravity data, WGM



## Geoid

Geoid models and geoid determination software, geoid modeling processing methodologies



## IGFS Mailing Lists

Subscribe to our mailing lists to informed on IGFS Products & Stan

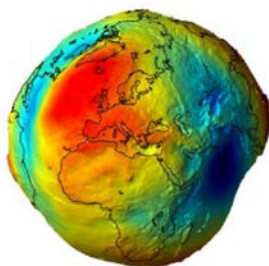
## SG and Earth tide data

Temporal variations of the Earth gravity field through long-term records from ground gravimeters, SG data, Earth tide data.



## Global Earth Models

Collection and archive of all existing global gravity field models, web interface for access to GEMs, model visualization and service.



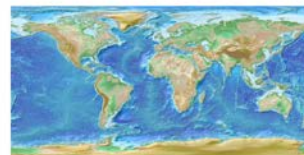
## Time-variable GEMs

Combined gravity field solutions in SH coefficients and spatial grids for hydrological, oceanic and polar ice sheets applications.



## DEM data

Digital Elevation Models, relevant software for DEM creation, assessment, manipulation and display, global relief and crustal models and spherical harmonic data sets.



COST-G is a product center of the



<http://igfs.topo.auth.gr/>



# COST-G: Website



## 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).

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

The service started its work in 2019 and the website is still under construction. More features will be available soon! We apologize for any inconvenience. For any questions, please [contact us](#).

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!



**ICCC WS21**  
S01 – Hydrology and data processing

# COST-G: Permanent Components

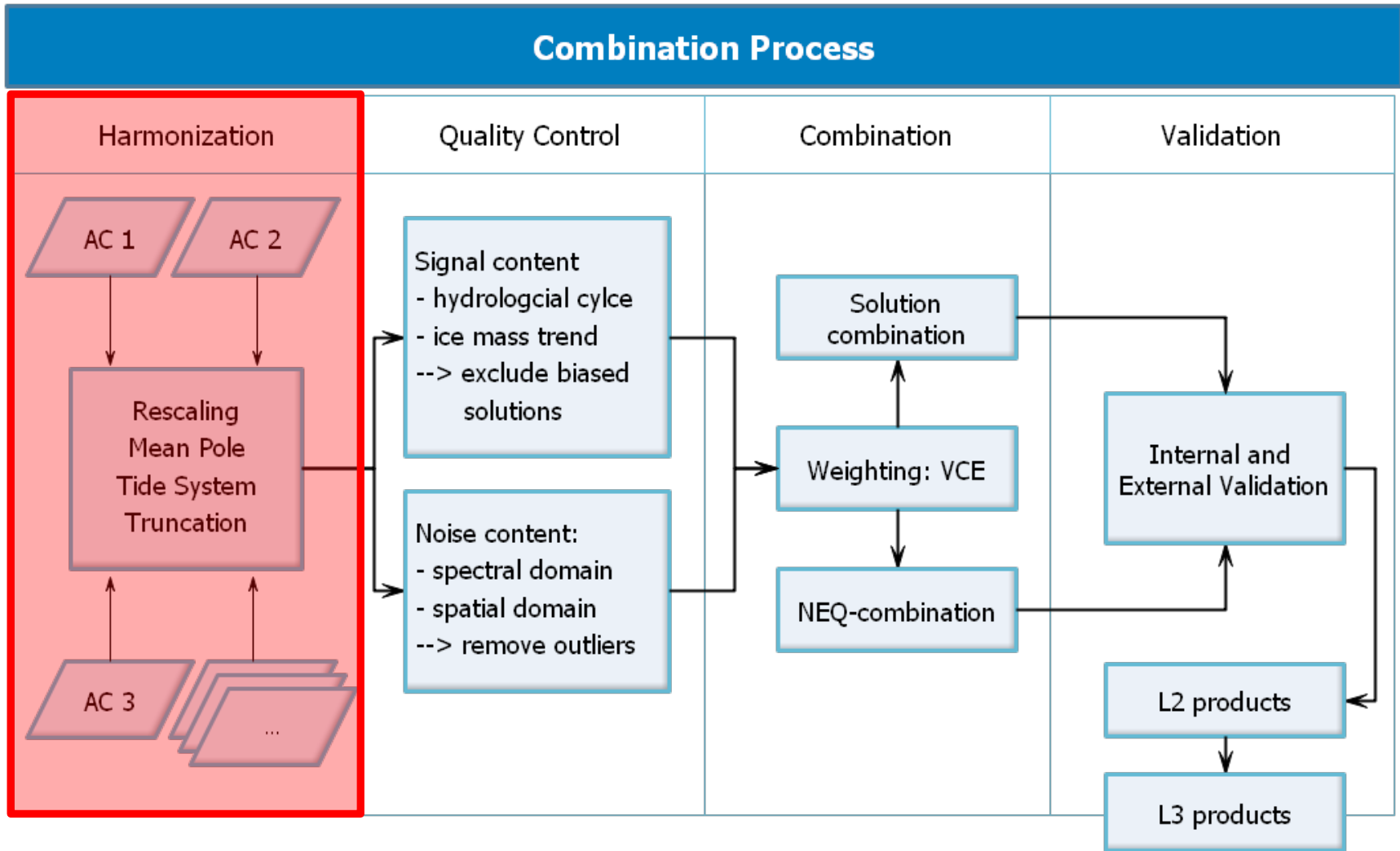
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COST-G accomplishes its objectives through the following permanent components and roles:

- **Central Bureau (CB) & Analysis Center Coordinator (ACC)**
  - AIUB
- **Analysis Centers (ACs)**
  - AIUB, CNES, GFZ, LUH, TUG
- **Partner ACs:** CSR, JPL
- **Candidate ACs:** Chinese ACs
- **Level-3 Center (L3C)**
  - GFZ
- **Validation Centers (VCs)**
  - GRGS, GFZ
- **Product Evaluation Group (PEG)**
  - A. Eicker, A. Groh, B. Meyssignac

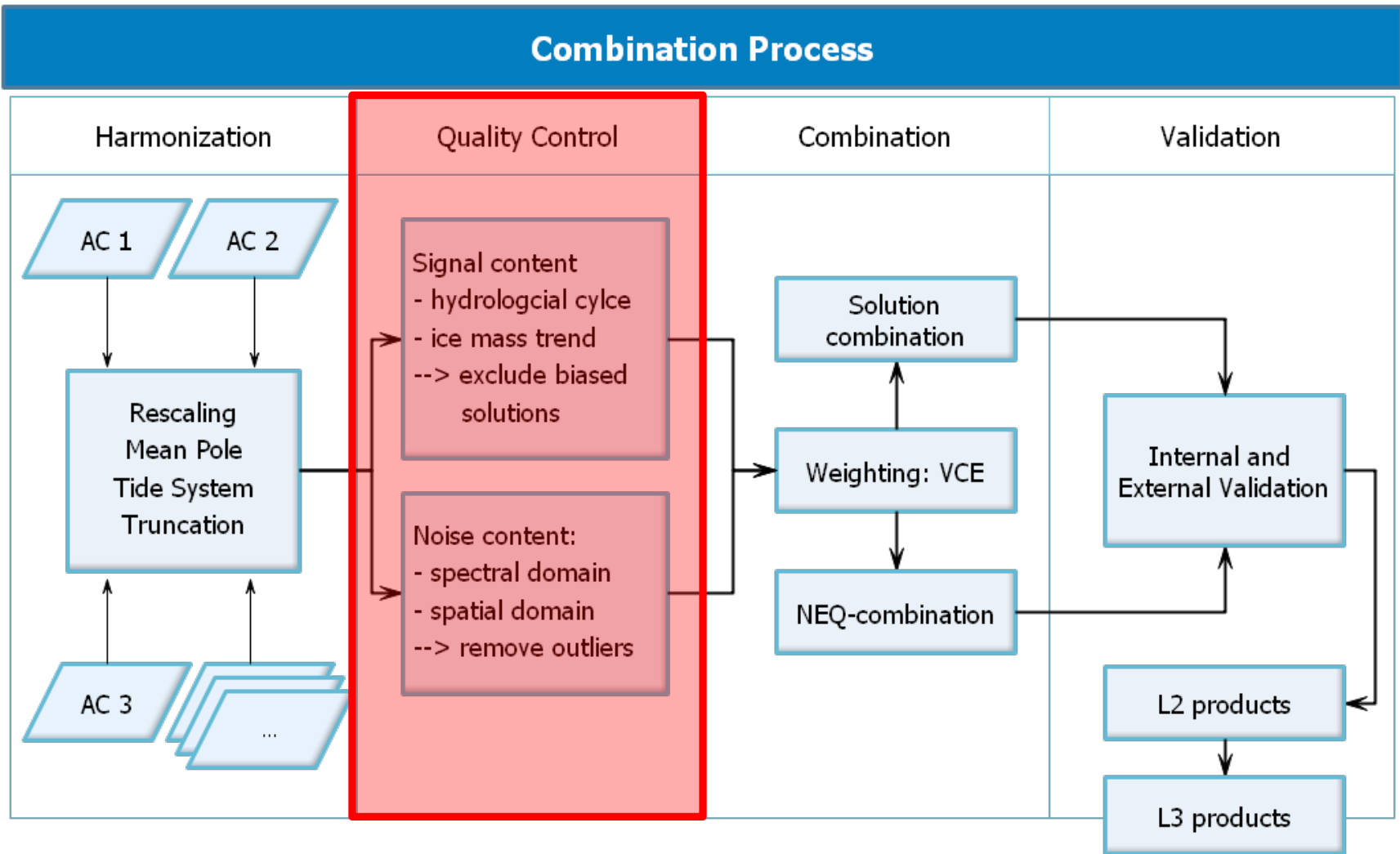


# COST-G operations: Harmonization

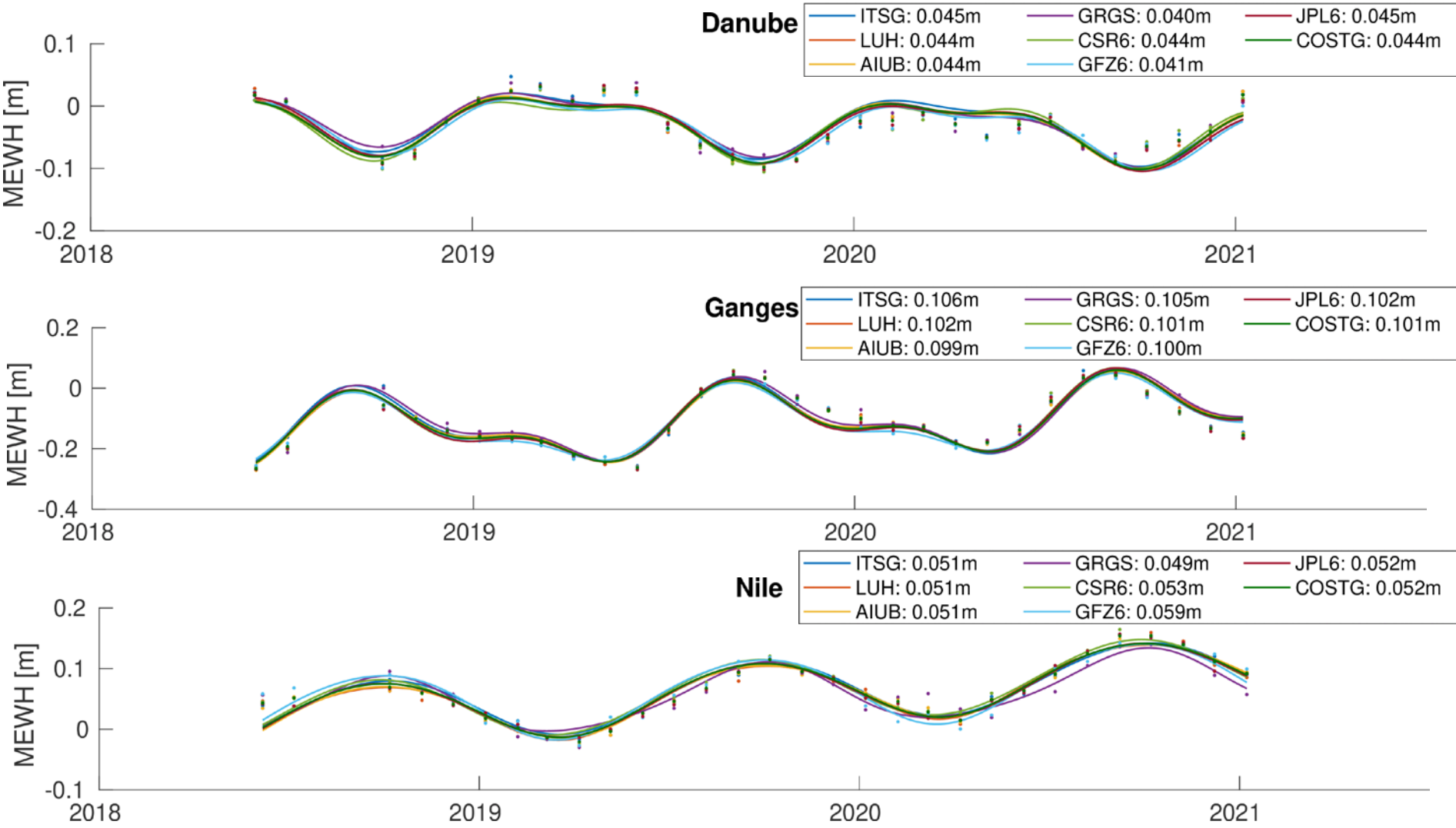




# COST-G operations: Quality Control

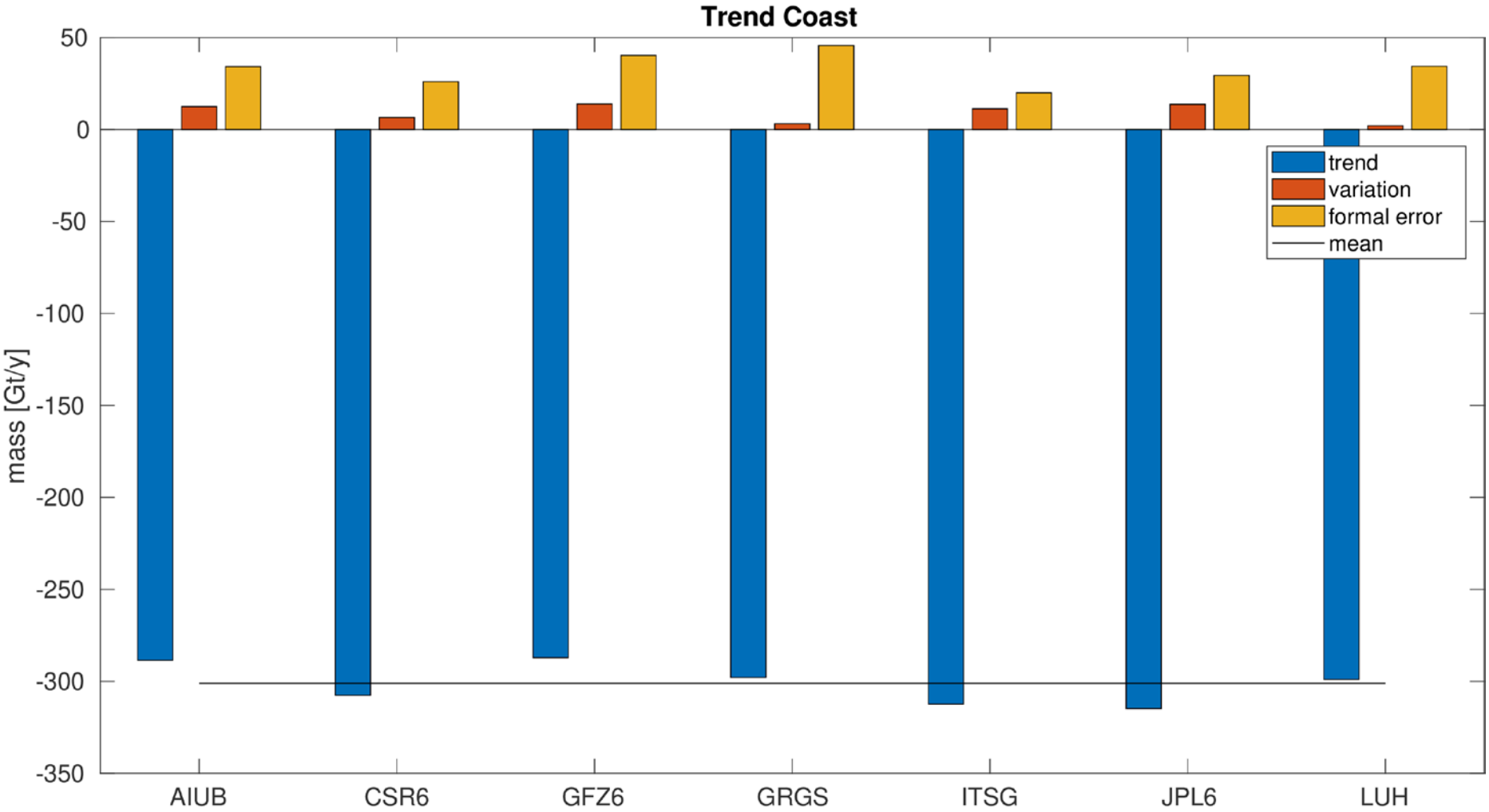


# Quality control: Hydrological signal content (GRACE-FO)

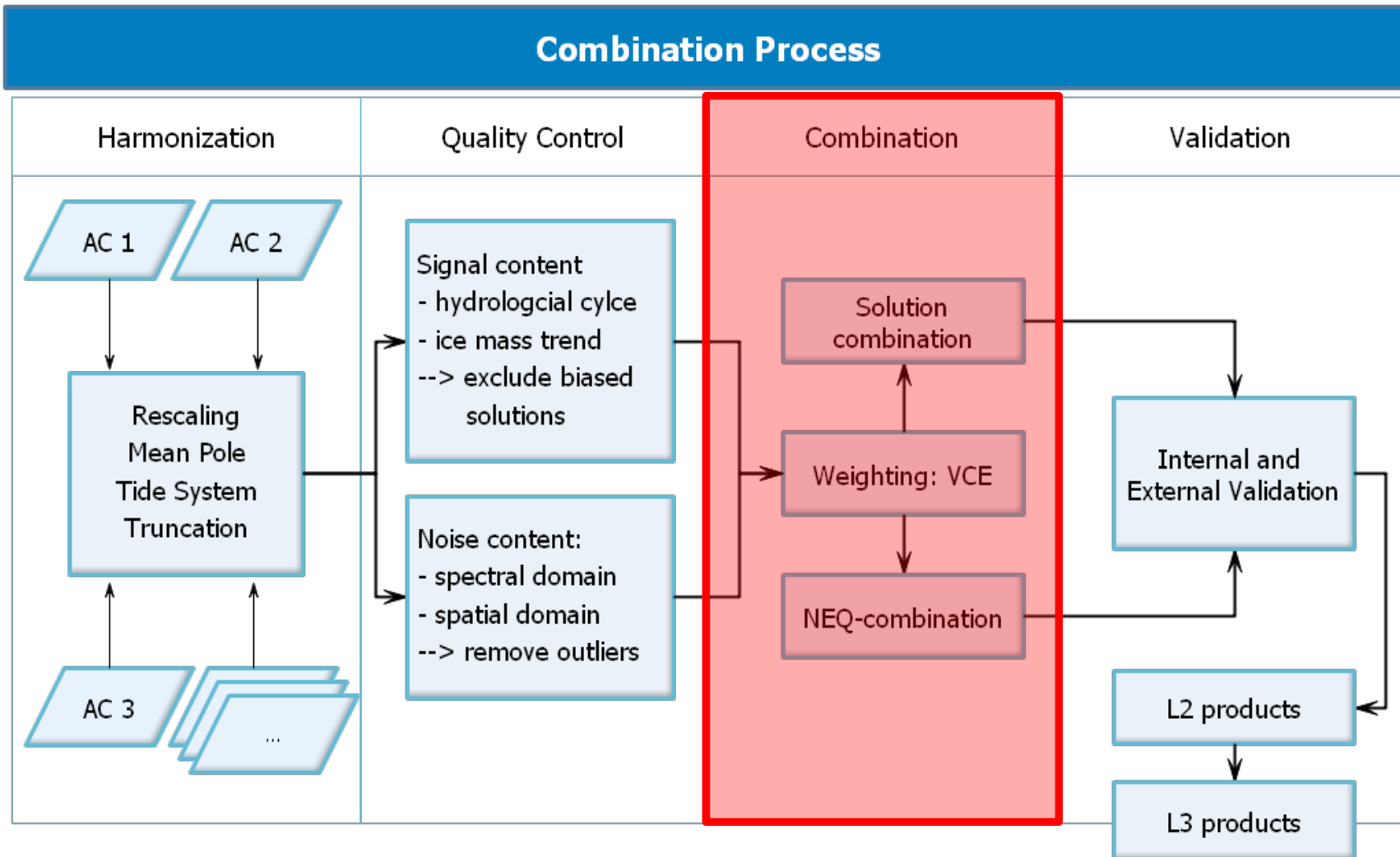




# Quality control: Ice mass change in Greenland (GRACE-FO)

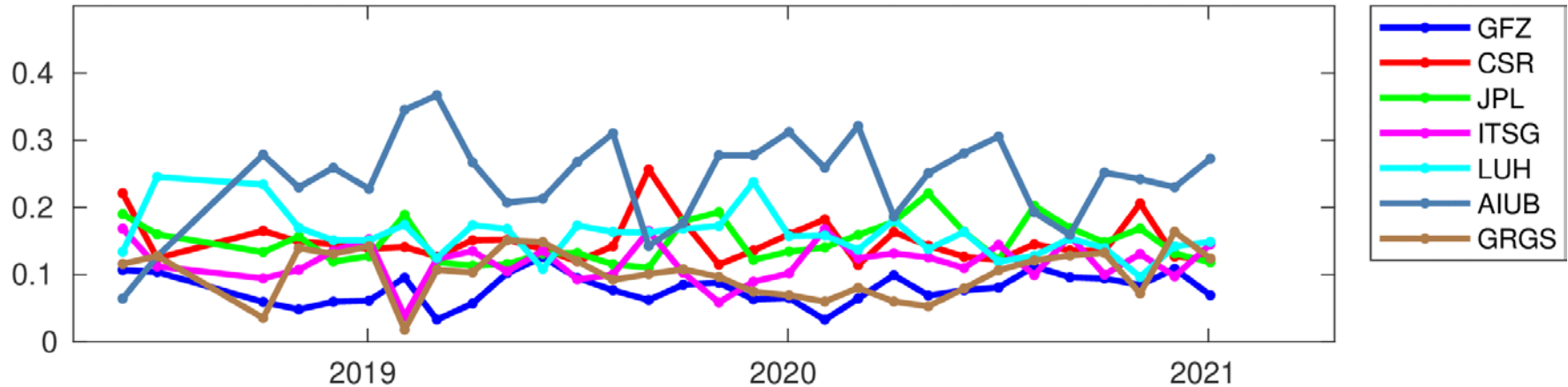


# COST-G operations: Combination

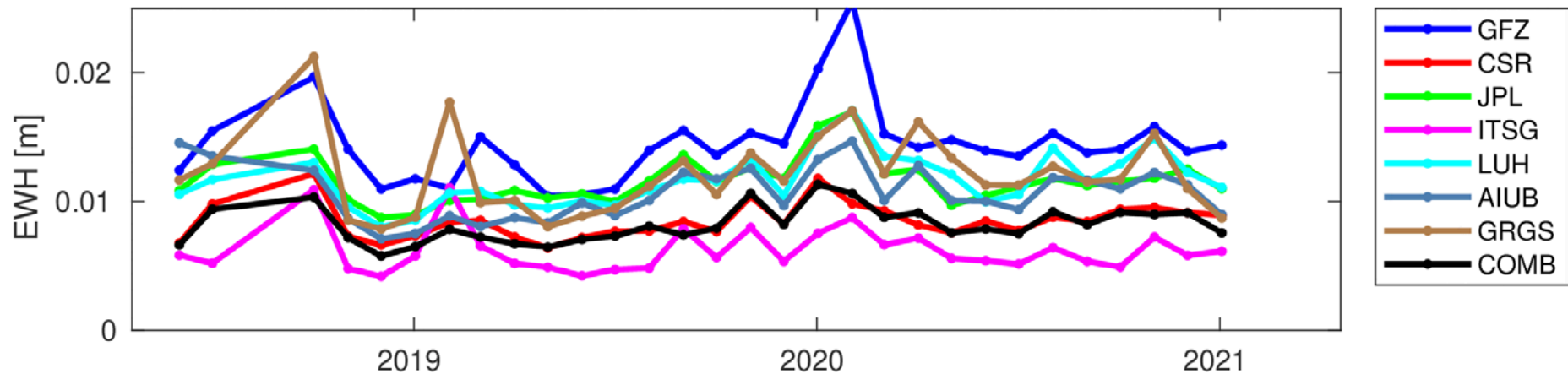


# Relative weights by Variance Component Estimation

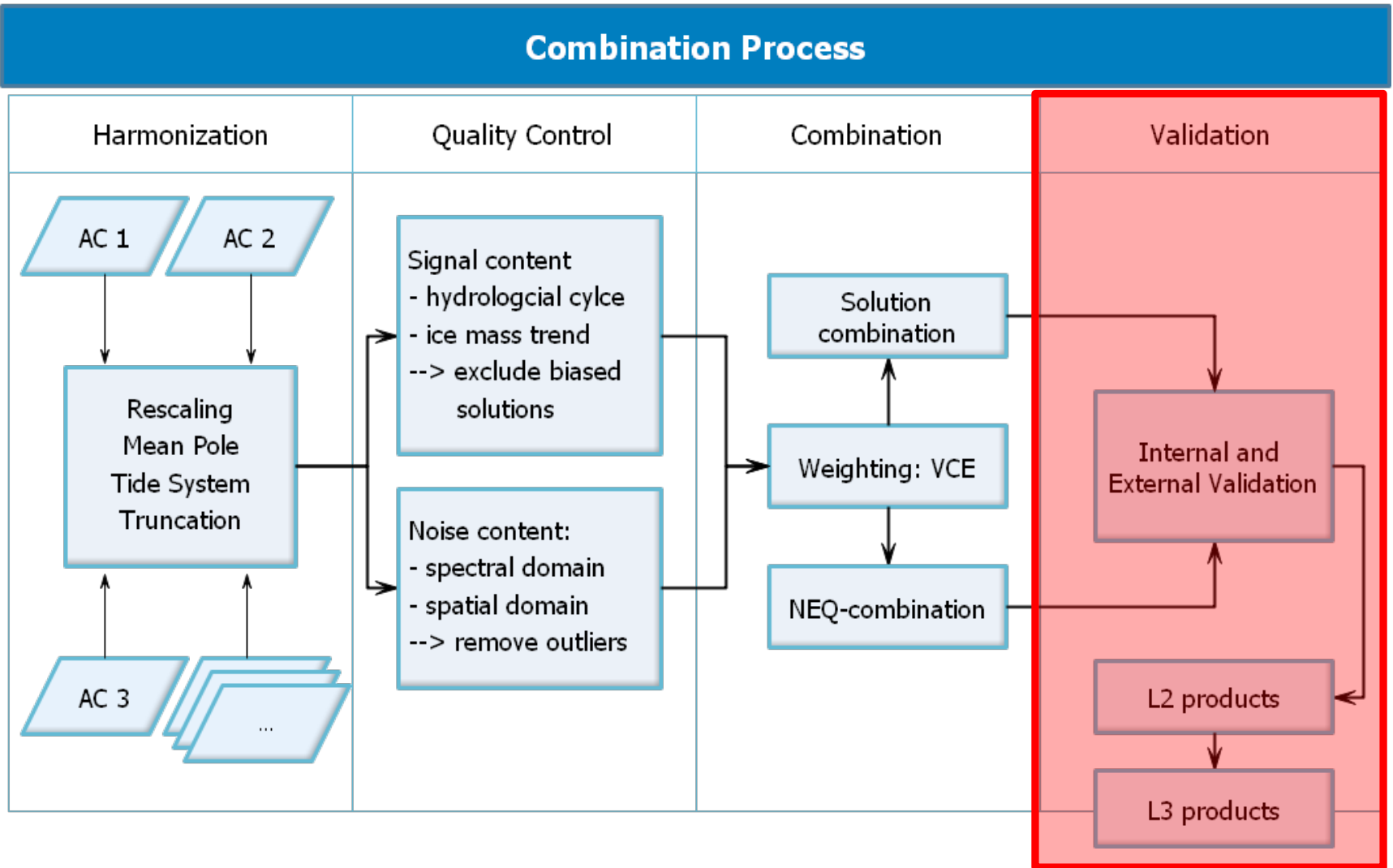
VCE-derived weights (normalized):



Noise over the oceans:

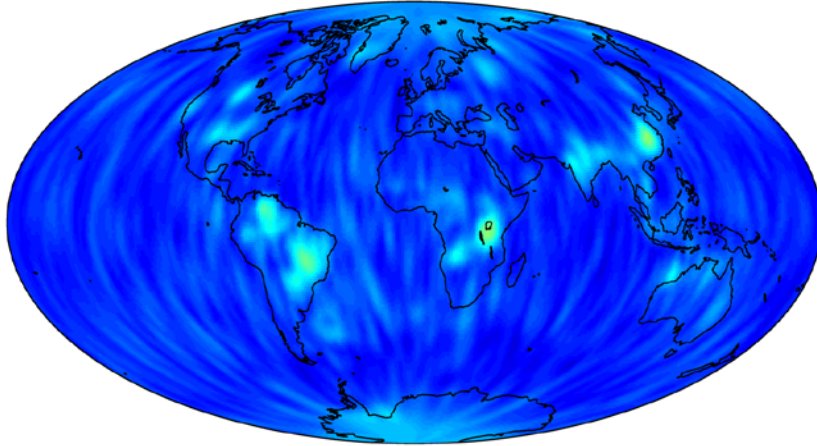


# COST-G operations: Validation

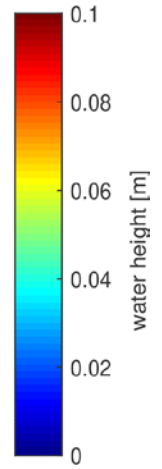
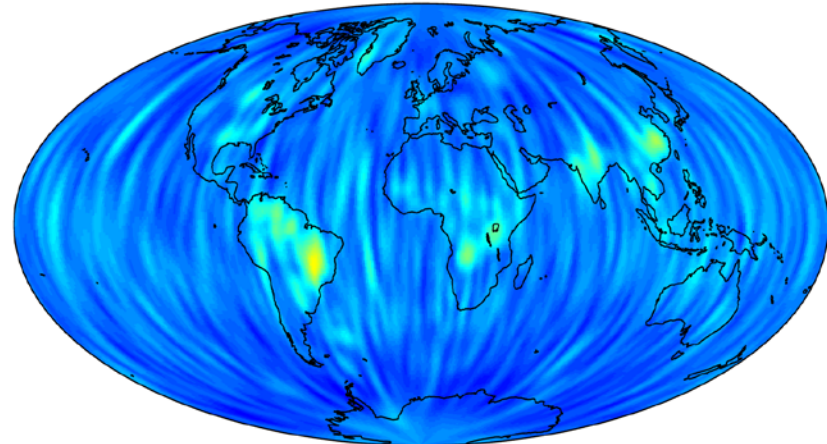


# Validation: Noise Levels (spatial domain)

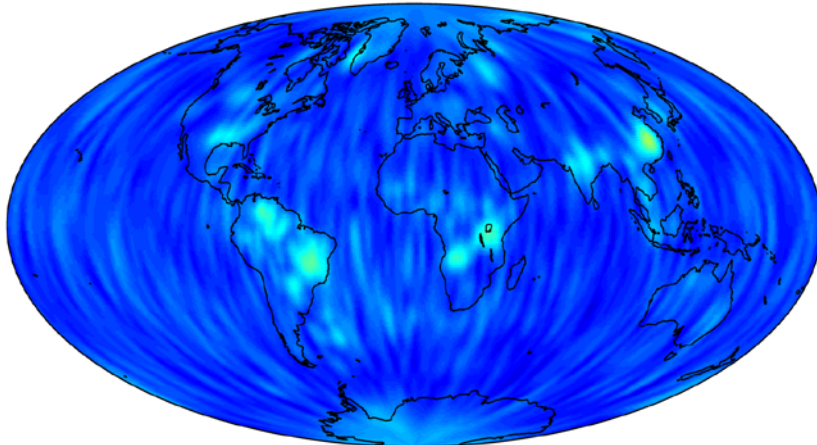
RMS of anomalies of CSR6, expressed in EWH



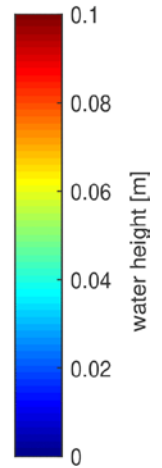
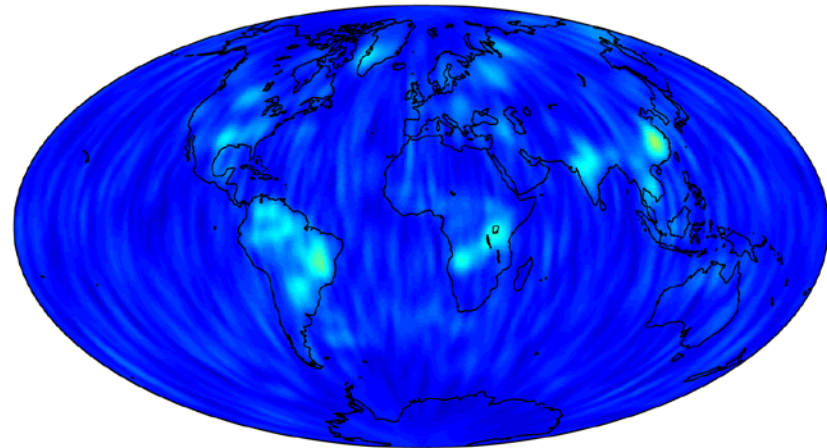
RMS of anomalies of GFZ6, expressed in EWH



RMS of anomalies of JPL6, expressed in EWH



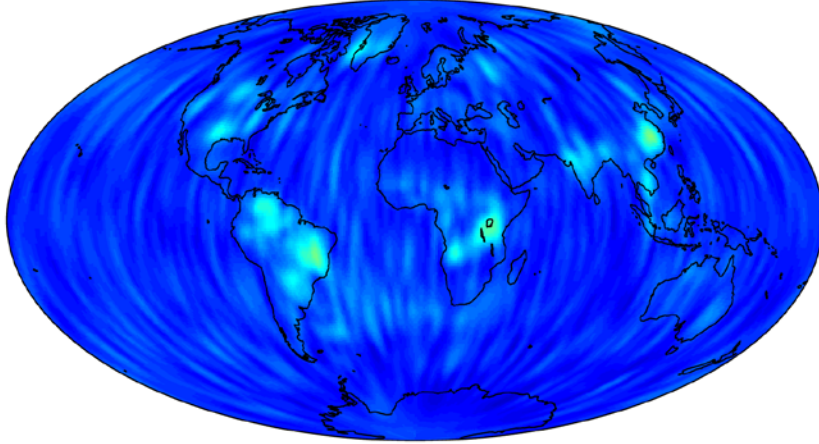
RMS of anomalies of ITSG, expressed in EWH



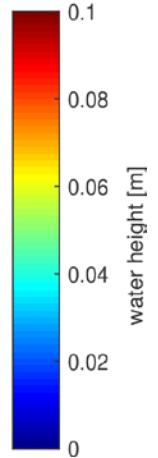
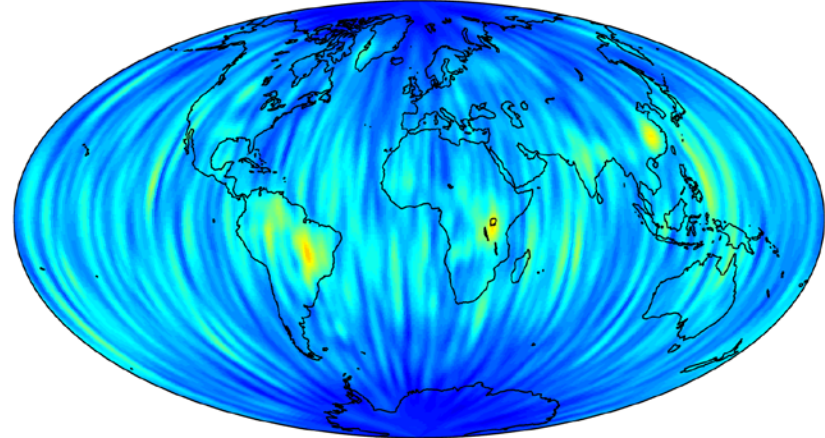


# Validation: Noise Levels (spatial domain)

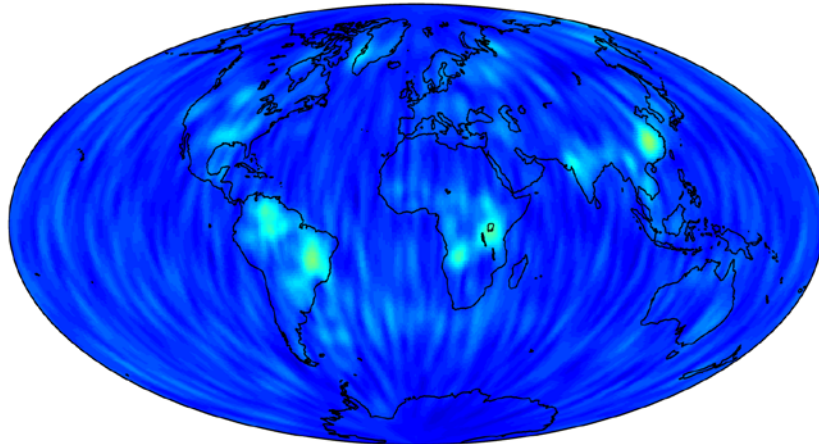
RMS of anomalies of AIUB, expressed in EWH



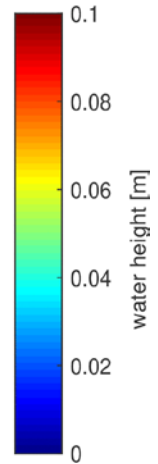
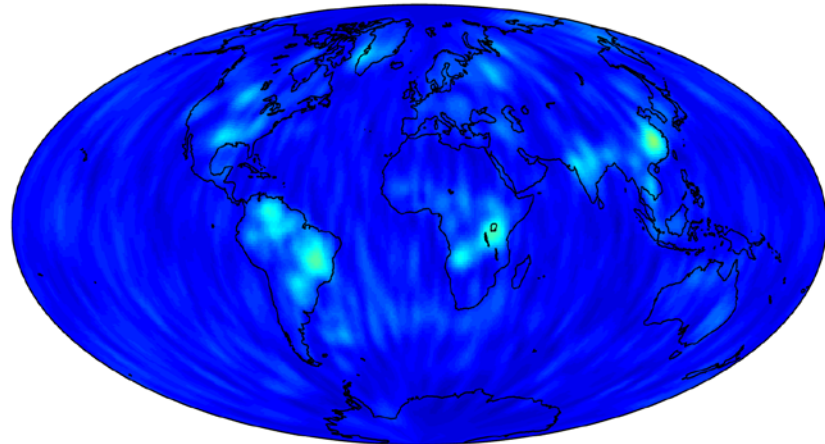
RMS of anomalies of GRGS, expressed in EWH



RMS of anomalies of LUH, expressed in EWH

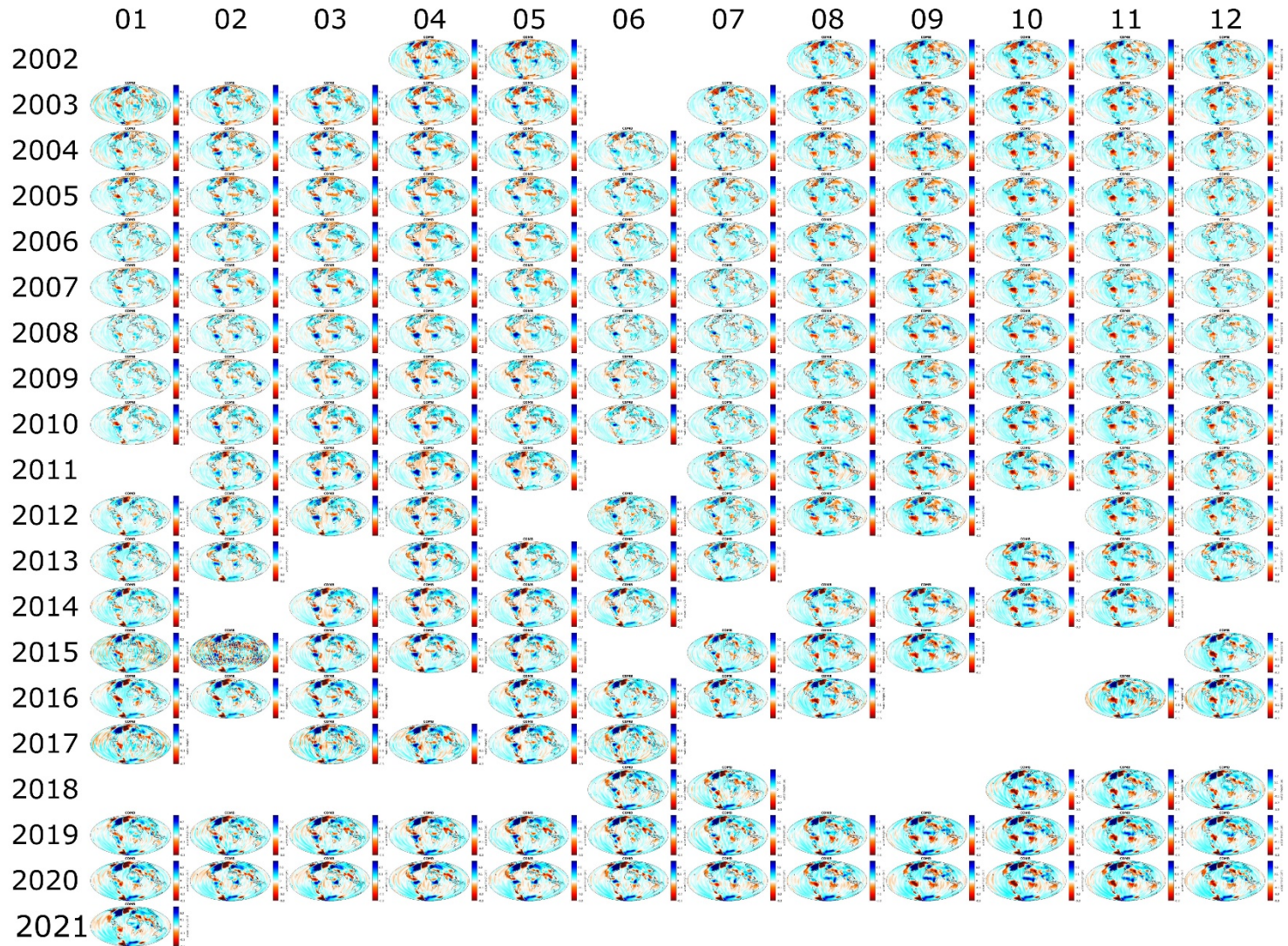


RMS of anomalies of COSTG, expressed in EWH

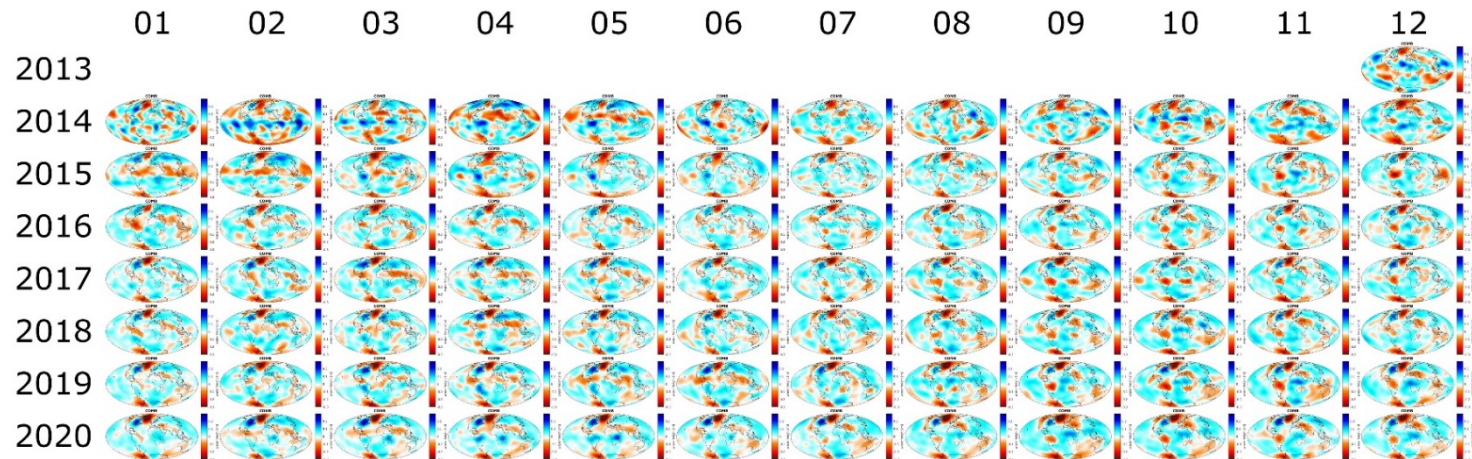




# COST-G: products (GRACE/GRACE-FO)



# COST-G: products (Swarm)





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

**ICGEM**

**GFZ**  
Helmholtz Centre  
POTSDAM

## Gravity Field Solutions for dedicated Time Periods

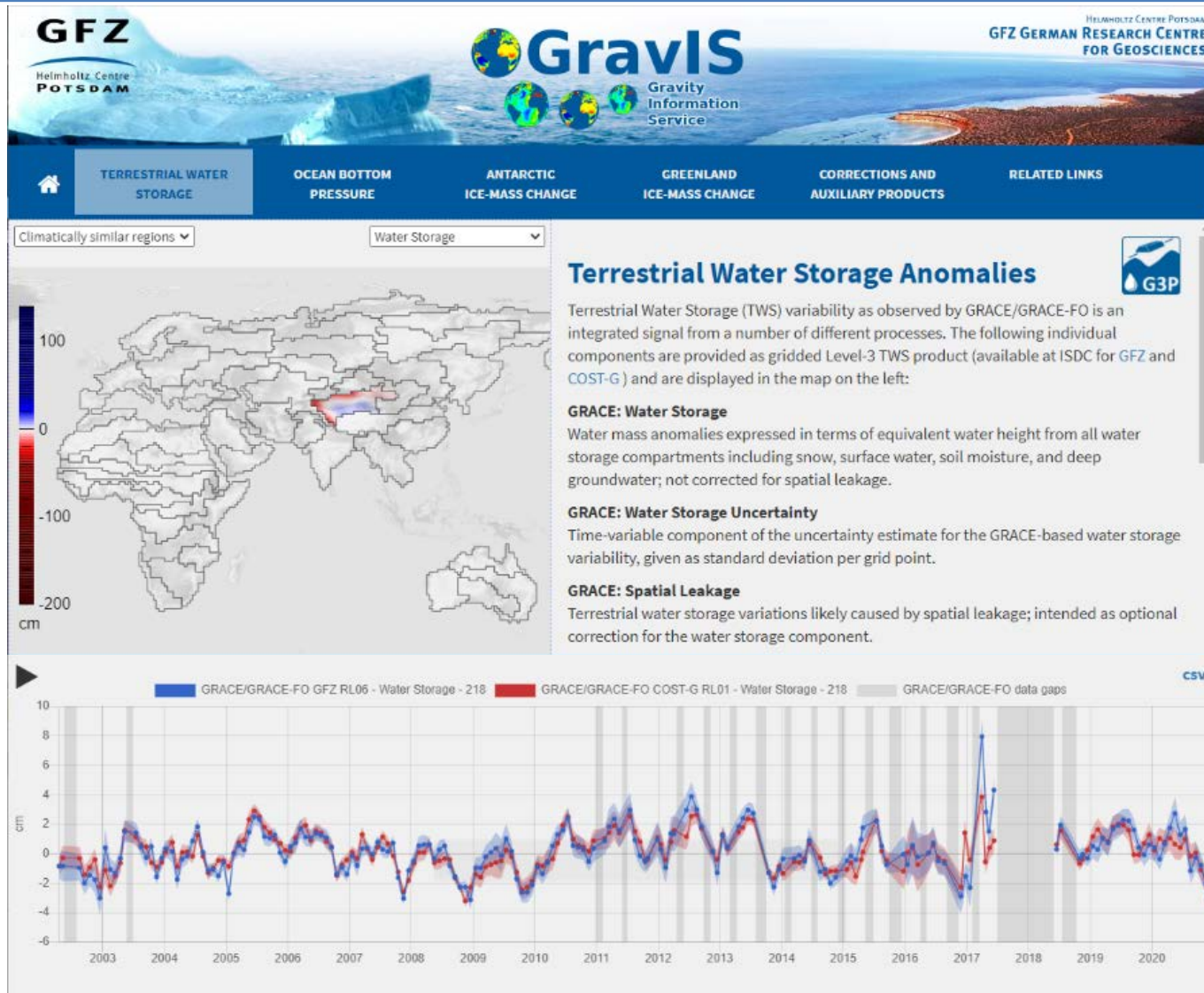
The following gravity field time series are presently available:

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		

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



# Summary and Outlook

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- **COST-G combined Level-2 products for GRACE (repro), Swarm (operational), and GRACE-FO are available from ICGEM (<http://icgem.gfz-potsdam.de/series>).**
- **COST-G Level-3 products for GRACE and GRACE-FO are available via GFZ's GravIS portal (<http://gravis.gfz-potsdam.de>).**
- **Inclusion of further candidate Analysis Centers (Chinese ACs) is planned for 2021 (benchmark testing and quality control are being performed).**