

The Combination Service for time-variable Gravity Fields

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Swiss Geoscience Meeting
Bern, 06/12/2025

Session 23: Geodesy

Contents

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

COST-G: product center of the IGFS

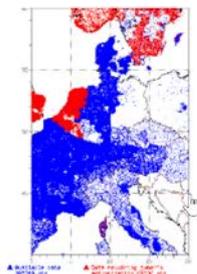
Gravity and geoid metadata

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



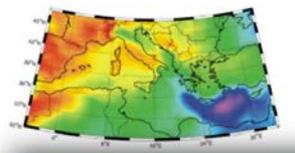
Gravity data

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

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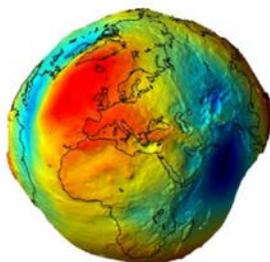
SG and Earth tide data

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

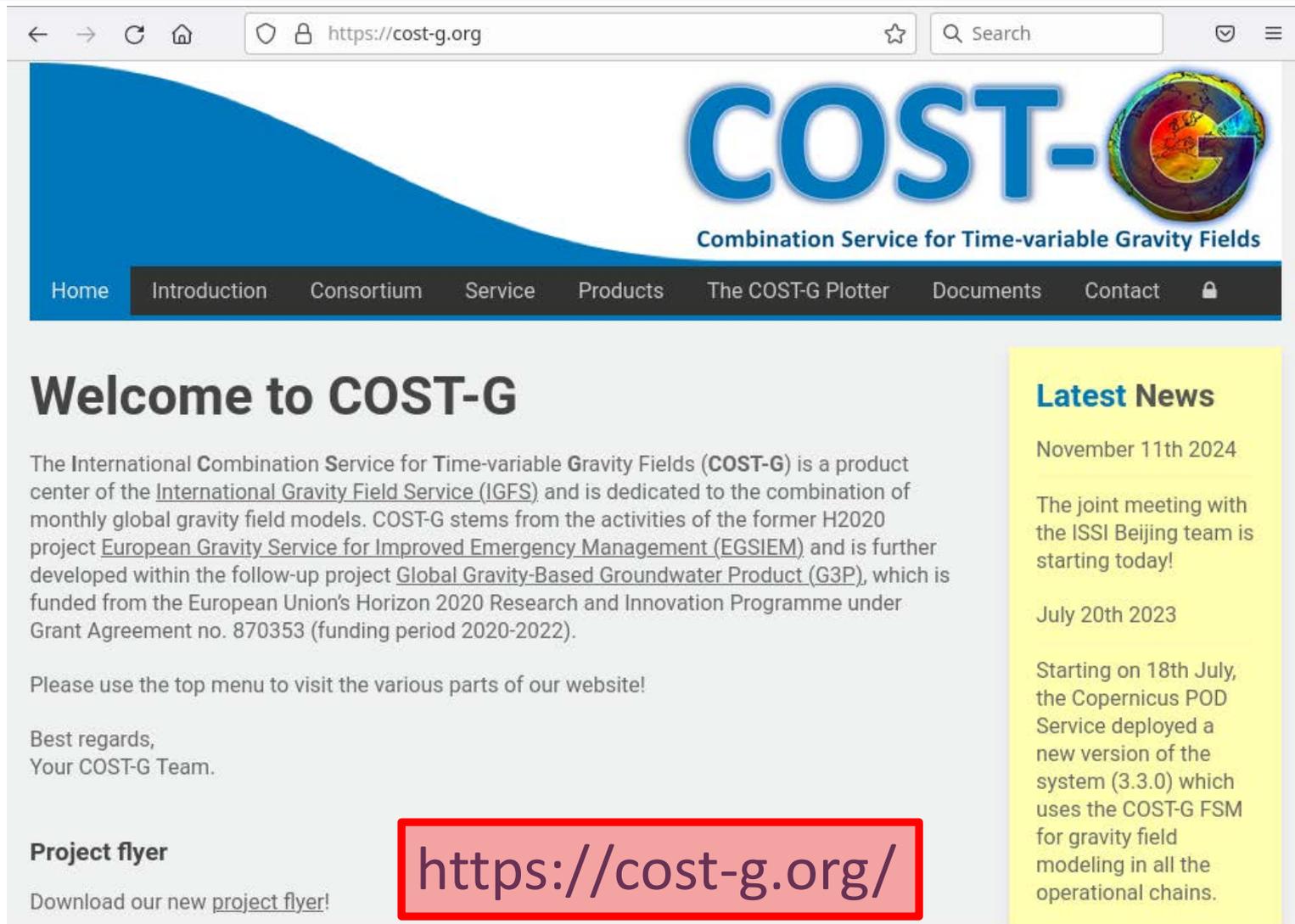


<http://igfs.topo.auth.gr/>



SGM 2025
Session 23: Geodesy

COST-G: Website



The screenshot shows the homepage of the COST-G website. At the top, there is a navigation bar with a search box and a menu icon. The main header features the COST-G logo, which includes a globe with a stylized 'G' and the text 'Combination Service for Time-variable Gravity Fields'. Below the header is a dark navigation menu with links for Home, Introduction, Consortium, Service, Products, The COST-G Plotter, Documents, and Contact. The main content area is divided into two columns. The left column has a large heading 'Welcome to COST-G' followed by a paragraph describing the service and its history. Below this is a message from the COST-G Team and a link to a project flyer. The right column has a yellow background and is titled 'Latest News', featuring two news items with dates and descriptions. A red box highlights the URL 'https://cost-g.org/' in the bottom right of the main content area.

← → ↻ 🏠 <https://cost-g.org> ☆ 🔍 Search 📧 ☰

COST-G

Combination Service for Time-variable Gravity Fields

Home Introduction Consortium Service Products The COST-G Plotter Documents Contact 🔒

Welcome to COST-G

The International **C**ombination **S**ervice for **T**ime-variable **G**ravity **F**ields (**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.

Project flyer

Download our new [project flyer!](#)

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

Latest News

November 11th 2024

The joint meeting with the ISSI Beijing team is starting today!

July 20th 2023

Starting on 18th July, the Copernicus POD Service deployed a new version of the system (3.3.0) which uses the COST-G FSM for gravity field modeling in all the operational chains.



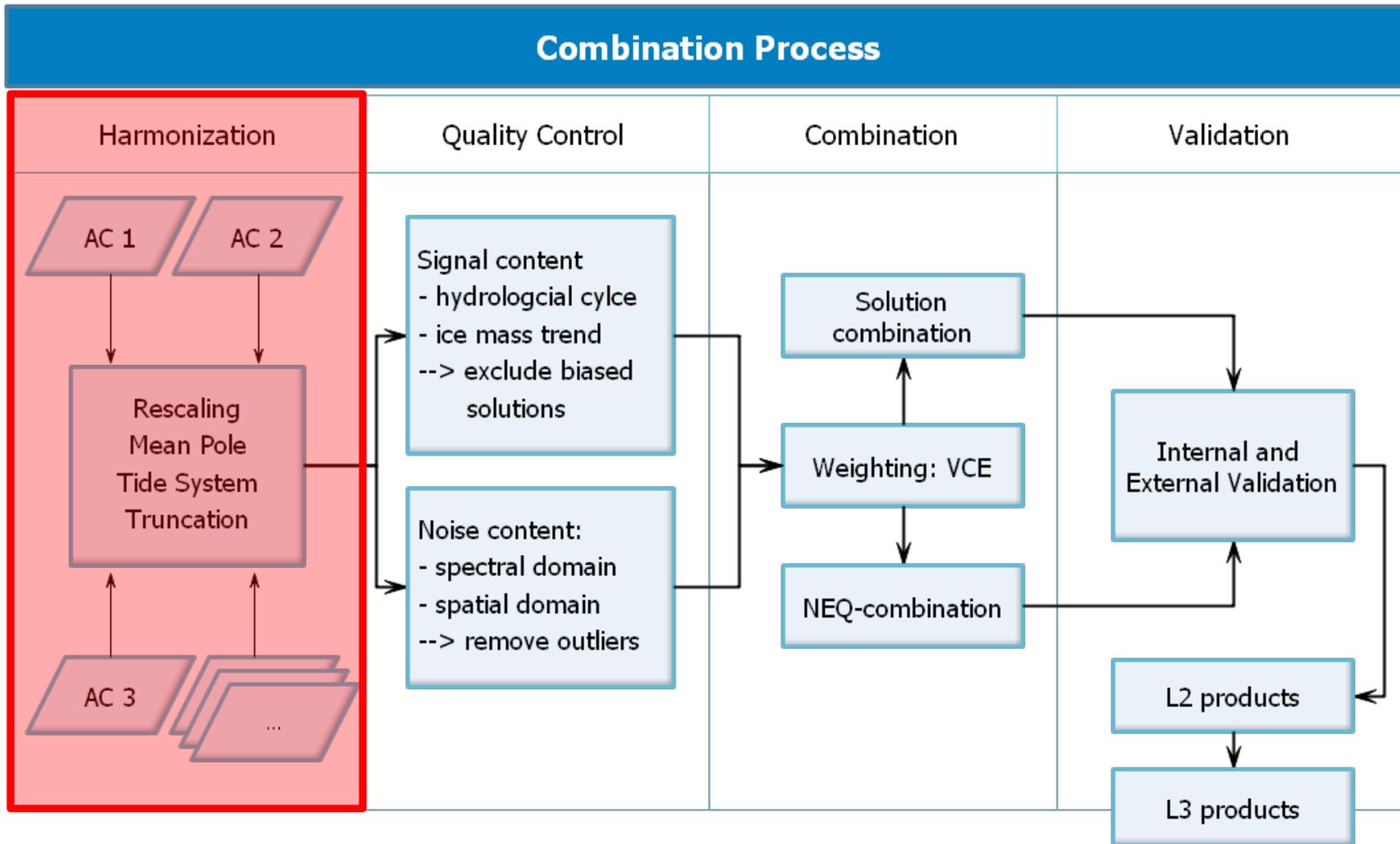
COST-G: Permanent Components

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

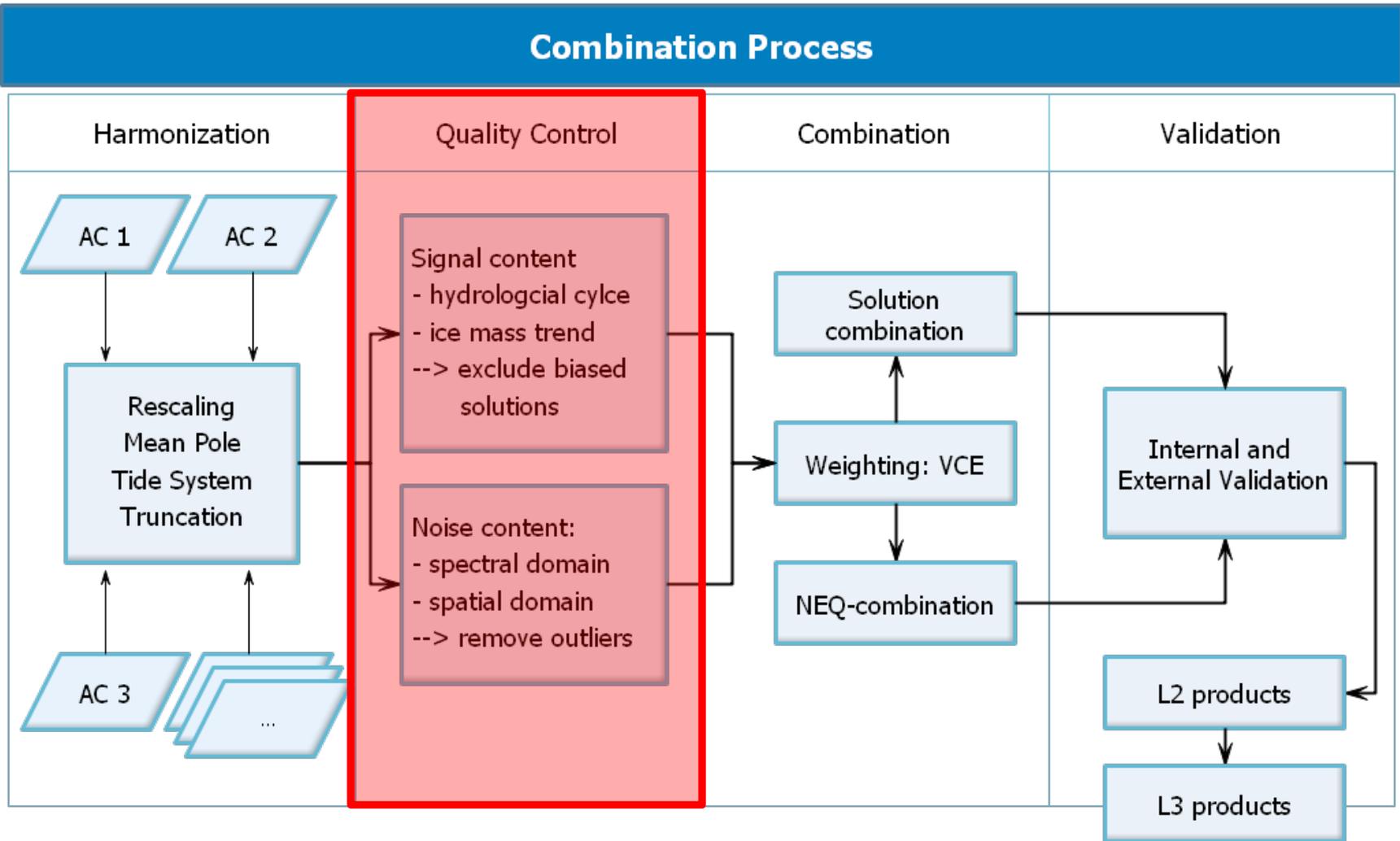
- **Central Bureau (CB) & Analysis Center Coordinator (ACC)**
 - AIUB
- **Analysis Centers (ACs)**
 - AIUB, GRGS, GFZ, HUST, LUH, Tongji, TUG
- **Level-3 Center (L3C)**
 - GFZ
- **Validation Centers (VCs)**
 - GRGS, GFZ
- **Product Evaluation Group (PEG)**
 - A. Eicker, M. Horwath, B. Meyssignac
- **Partner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



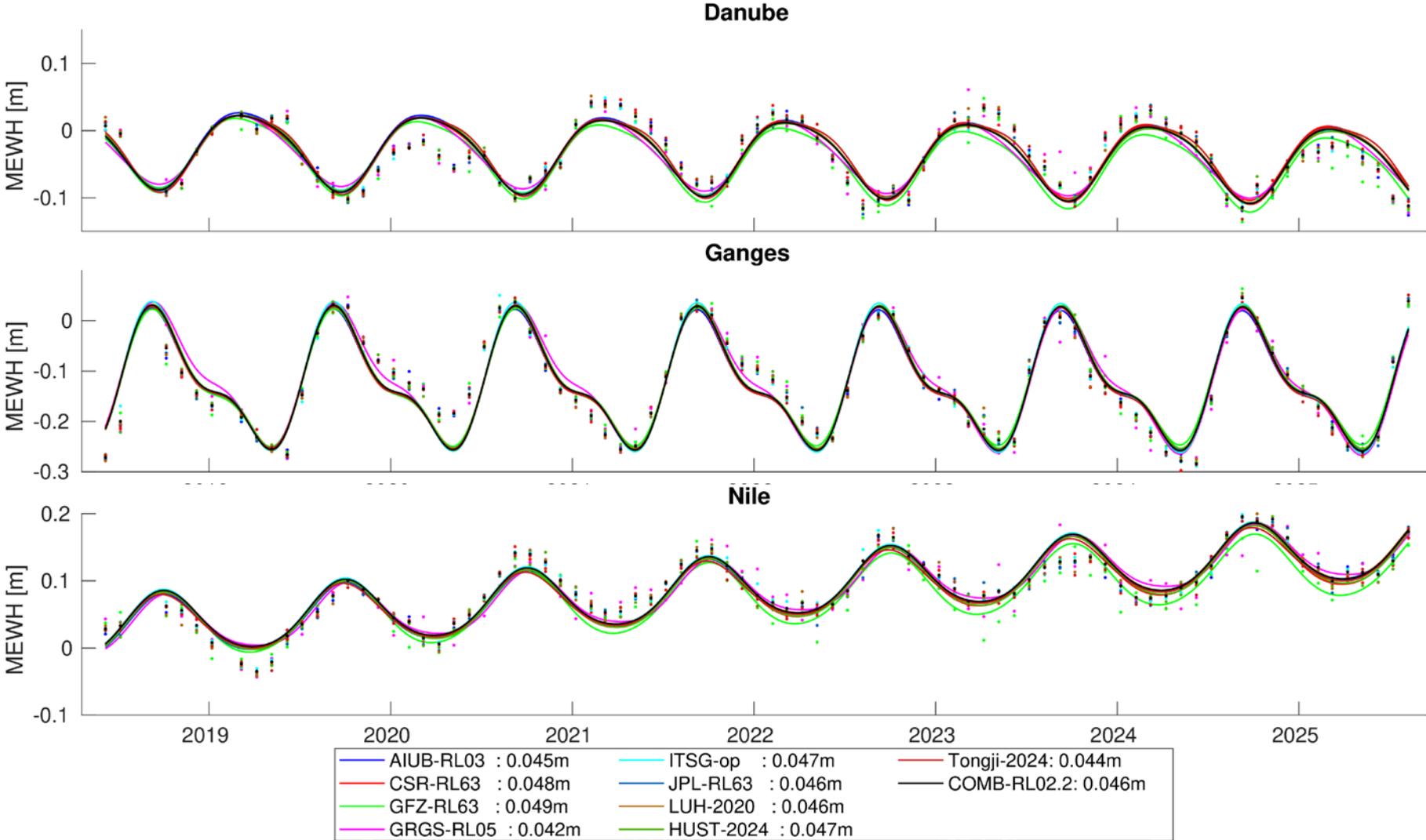
COST-G operations: Harmonization



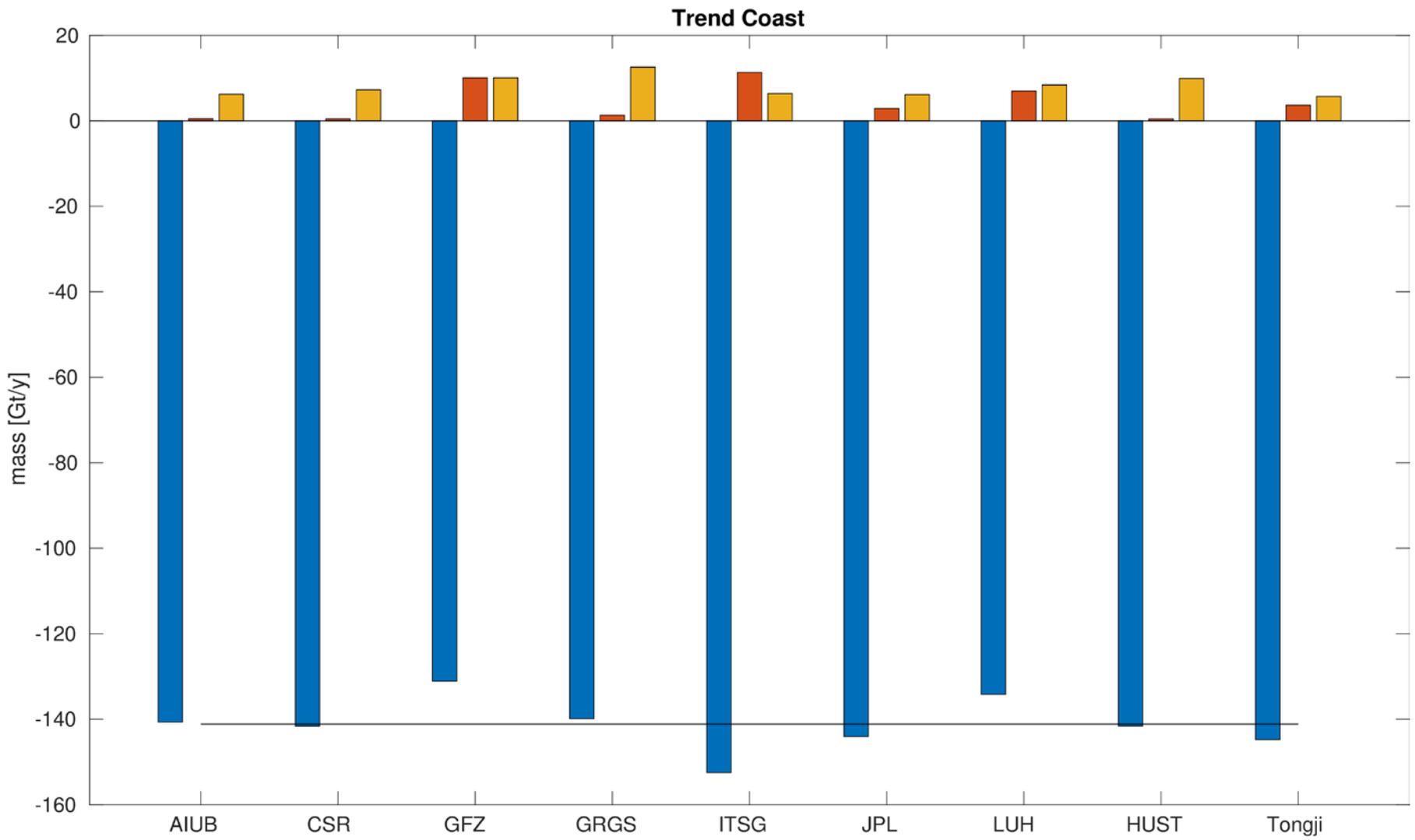
COST-G operations: Quality Control



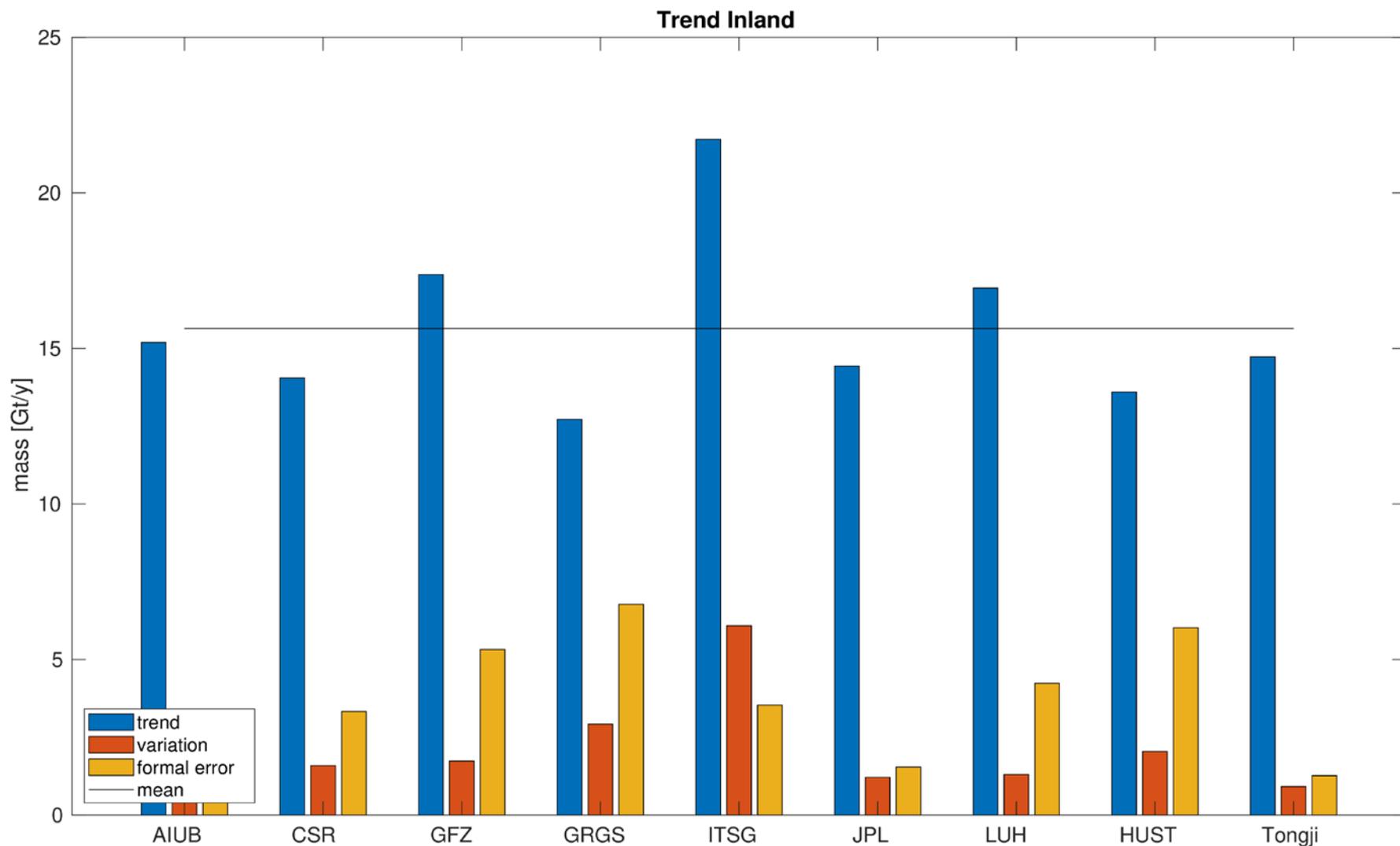
Quality control: Hydrological signal content (GRACE-FO)



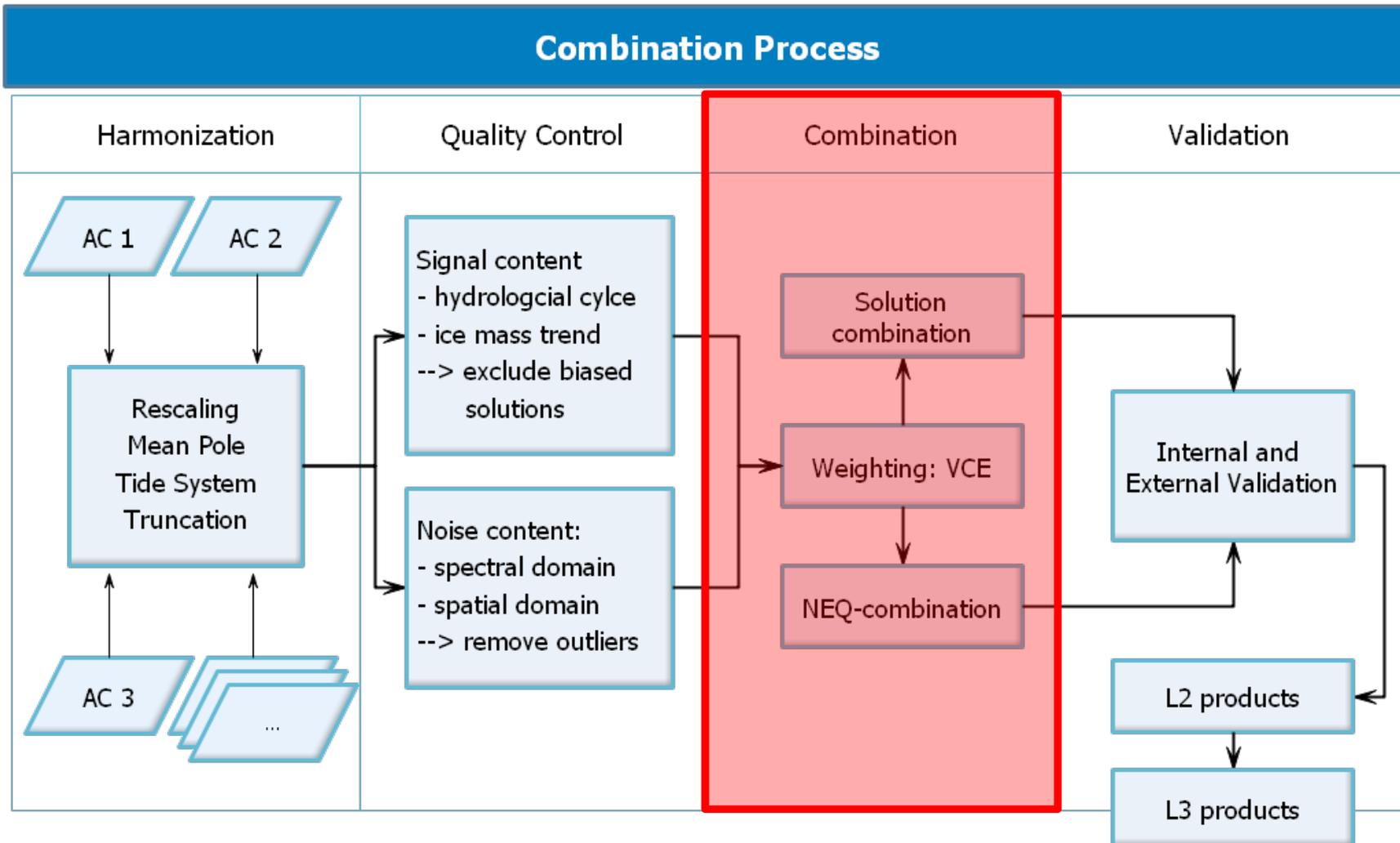
Quality control: Ice mass change in Greenland (GRACE-FO)



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

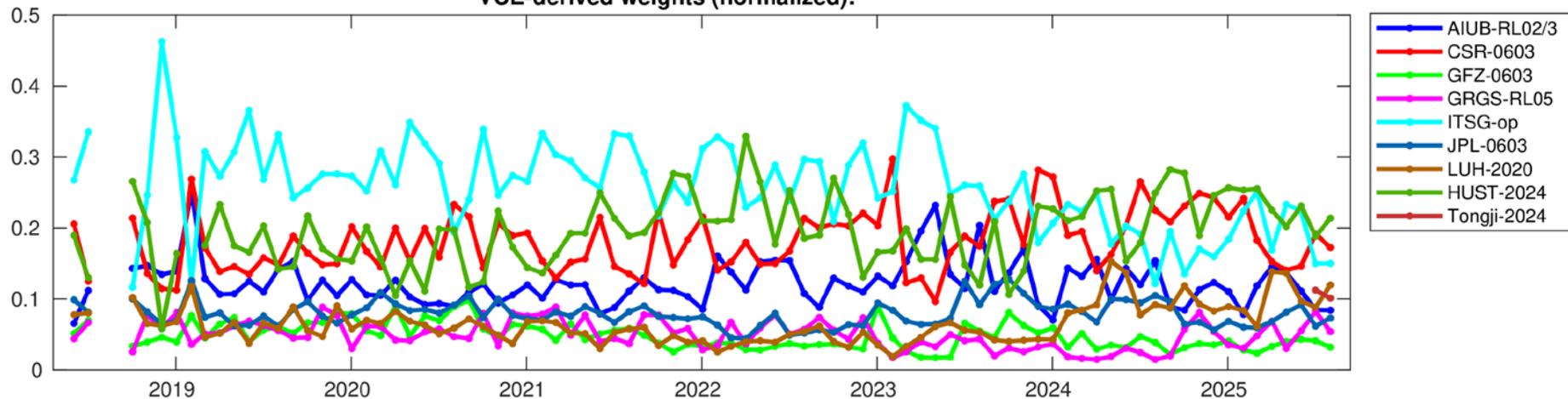


COST-G operations: Combination

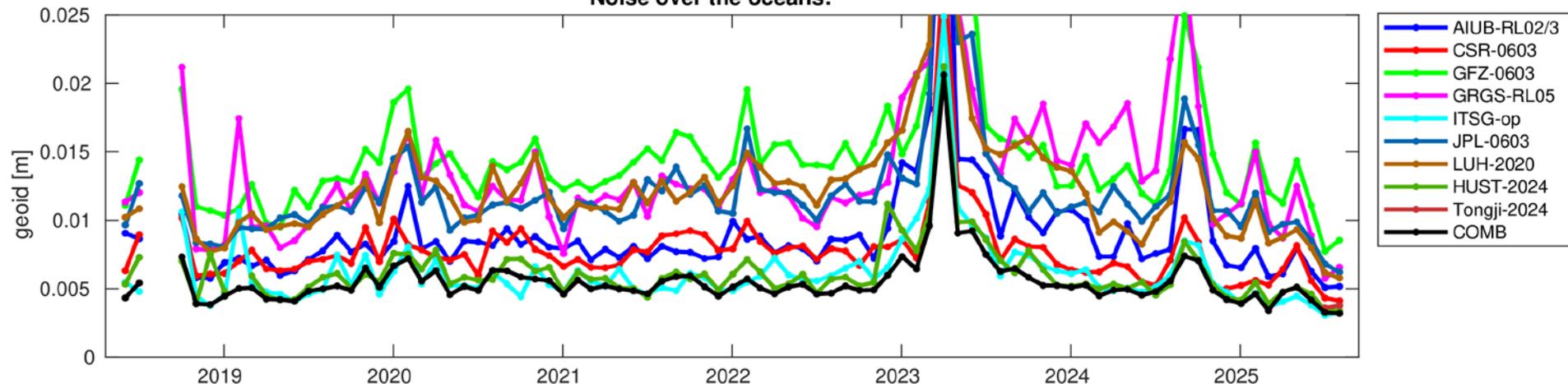


Relative weights by Variance Component Estimation

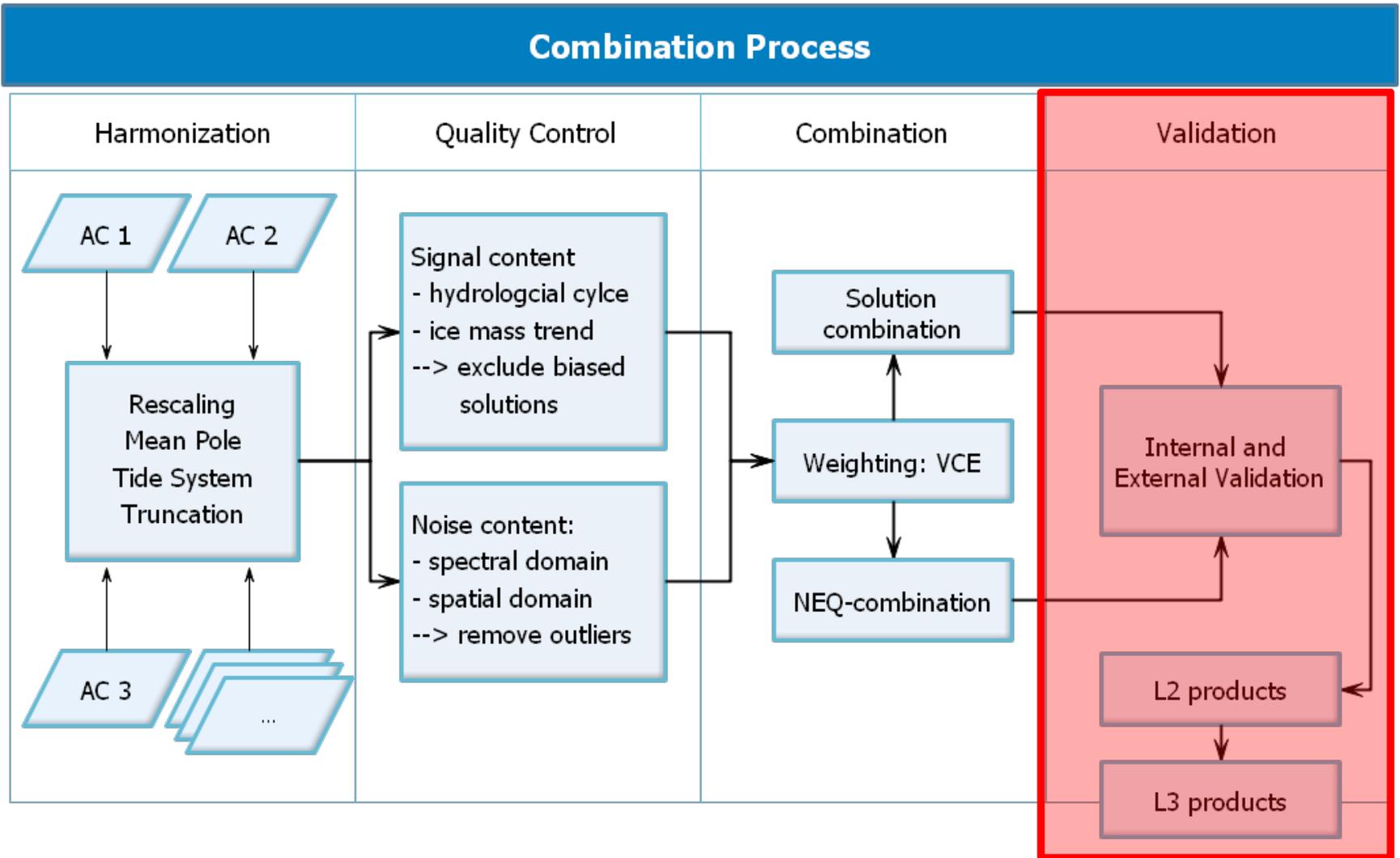
VCE-derived weights (normalized):



Noise over the oceans:

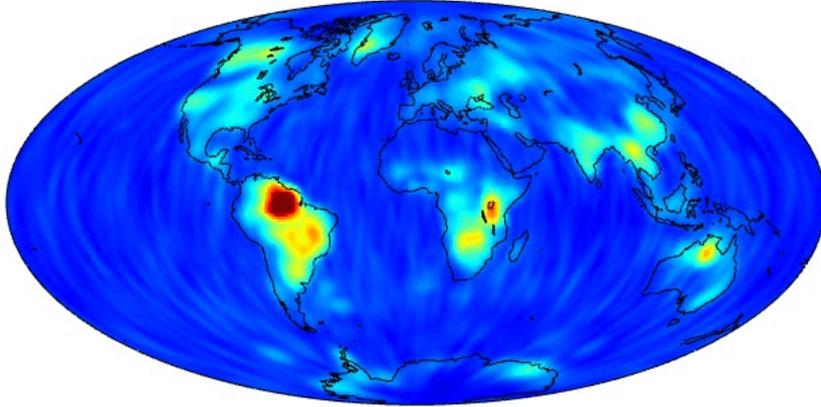


COST-G operations: Validation

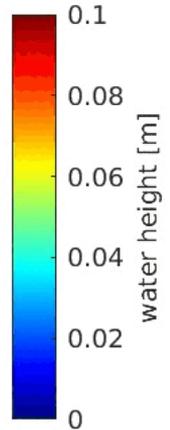
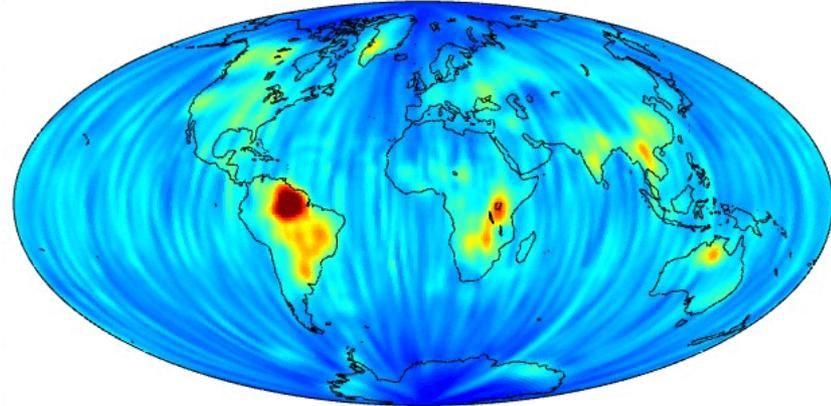


Validation: Noise Levels (spatial domain)

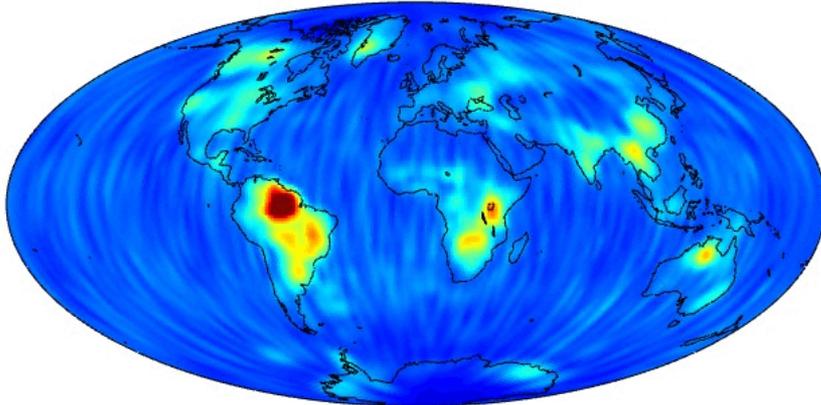
Residual variability of CSR-0603



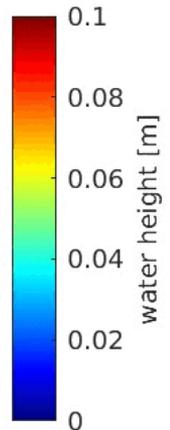
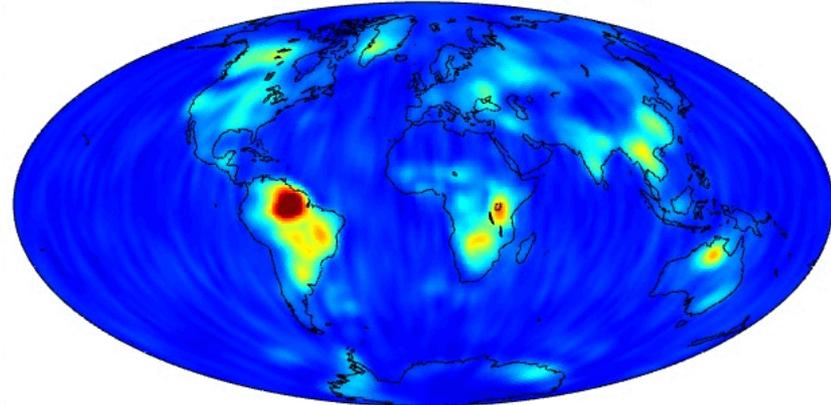
Residual variability of GFZ-0603



Residual variability of JPL-0603

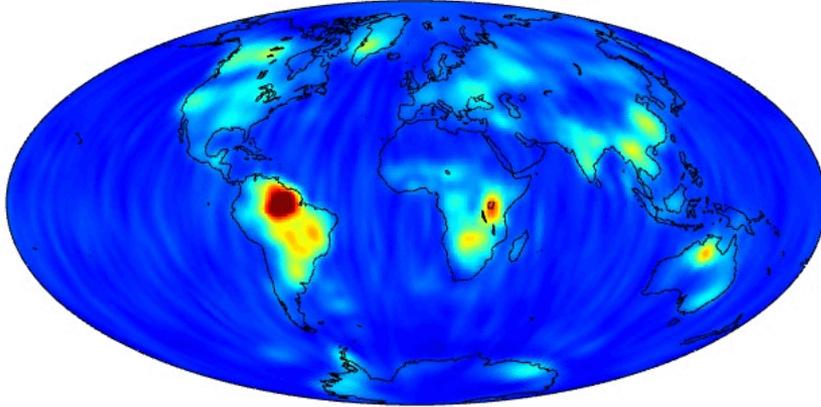


Residual variability of ITSG-op

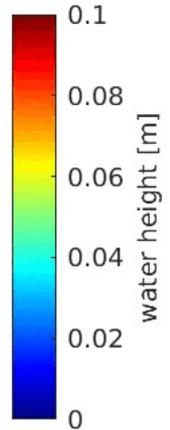
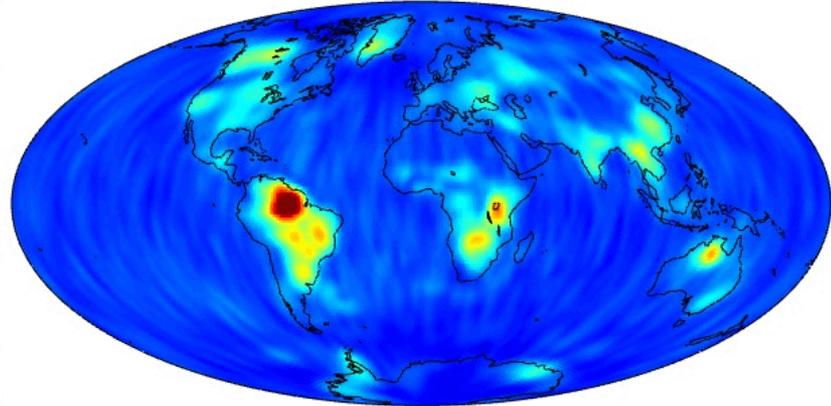


Validation: Noise Levels (spatial domain)

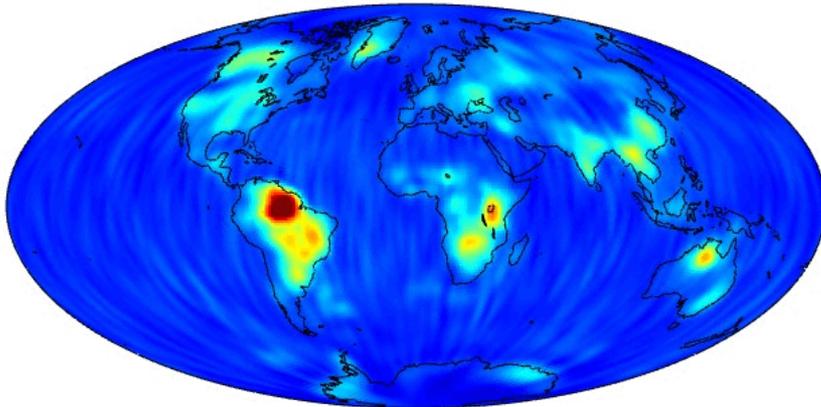
Residual variability of Tongji-2024



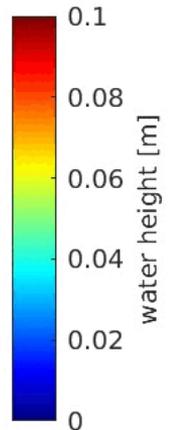
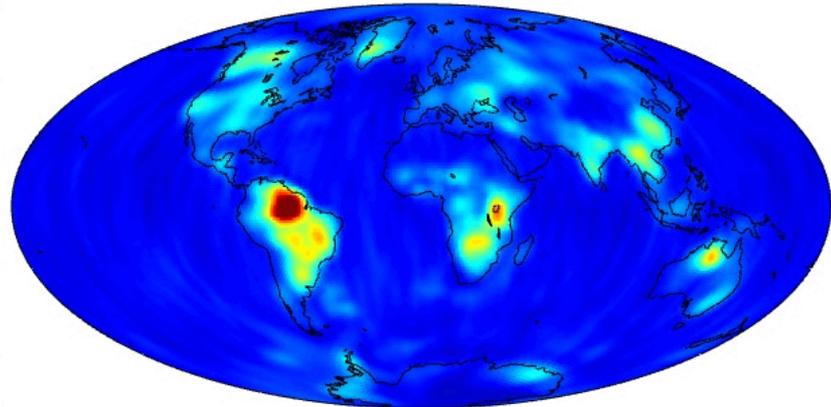
Residual variability of HUST-2024



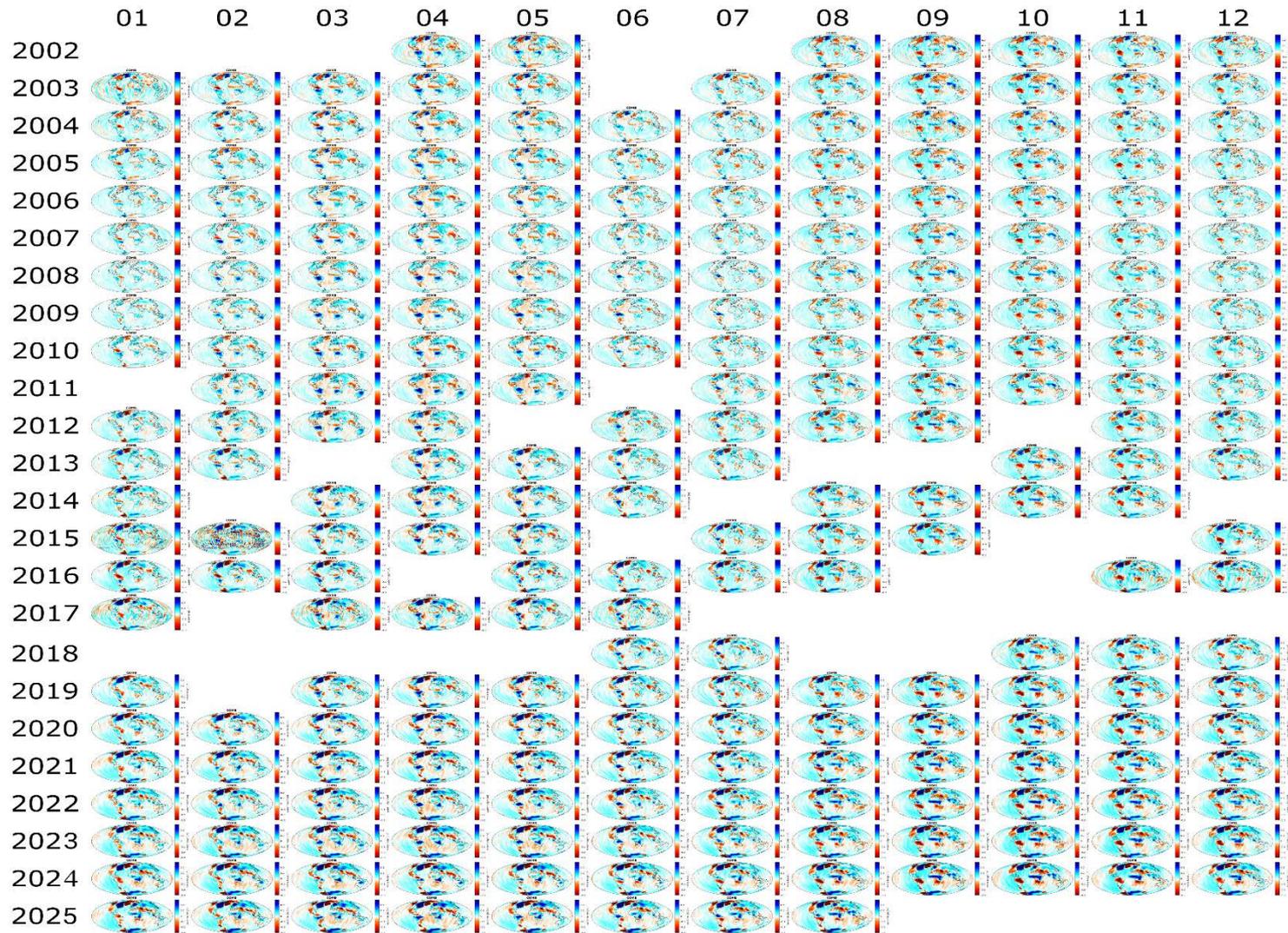
Residual variability of AIUB-RL03



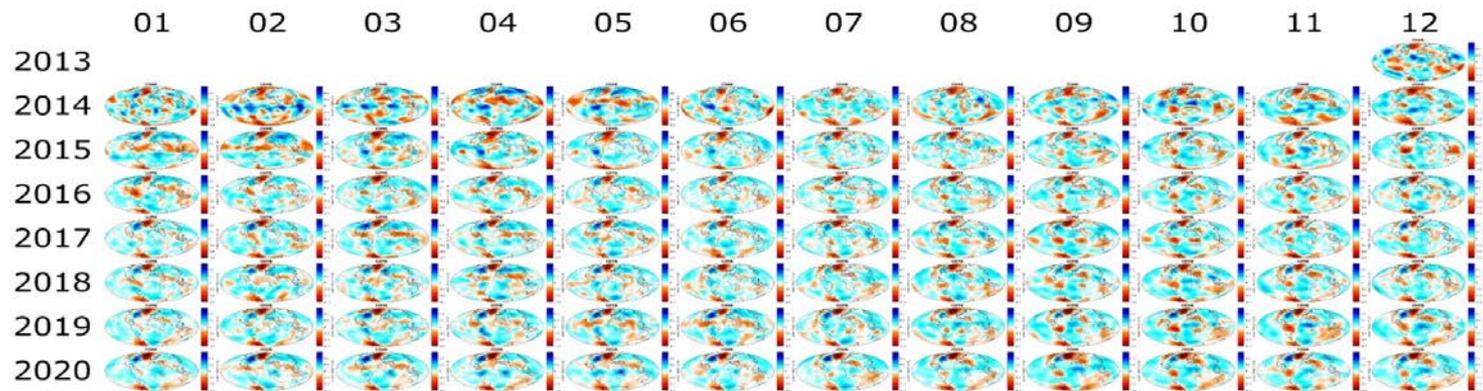
Residual variability of COSTG-RL02.2



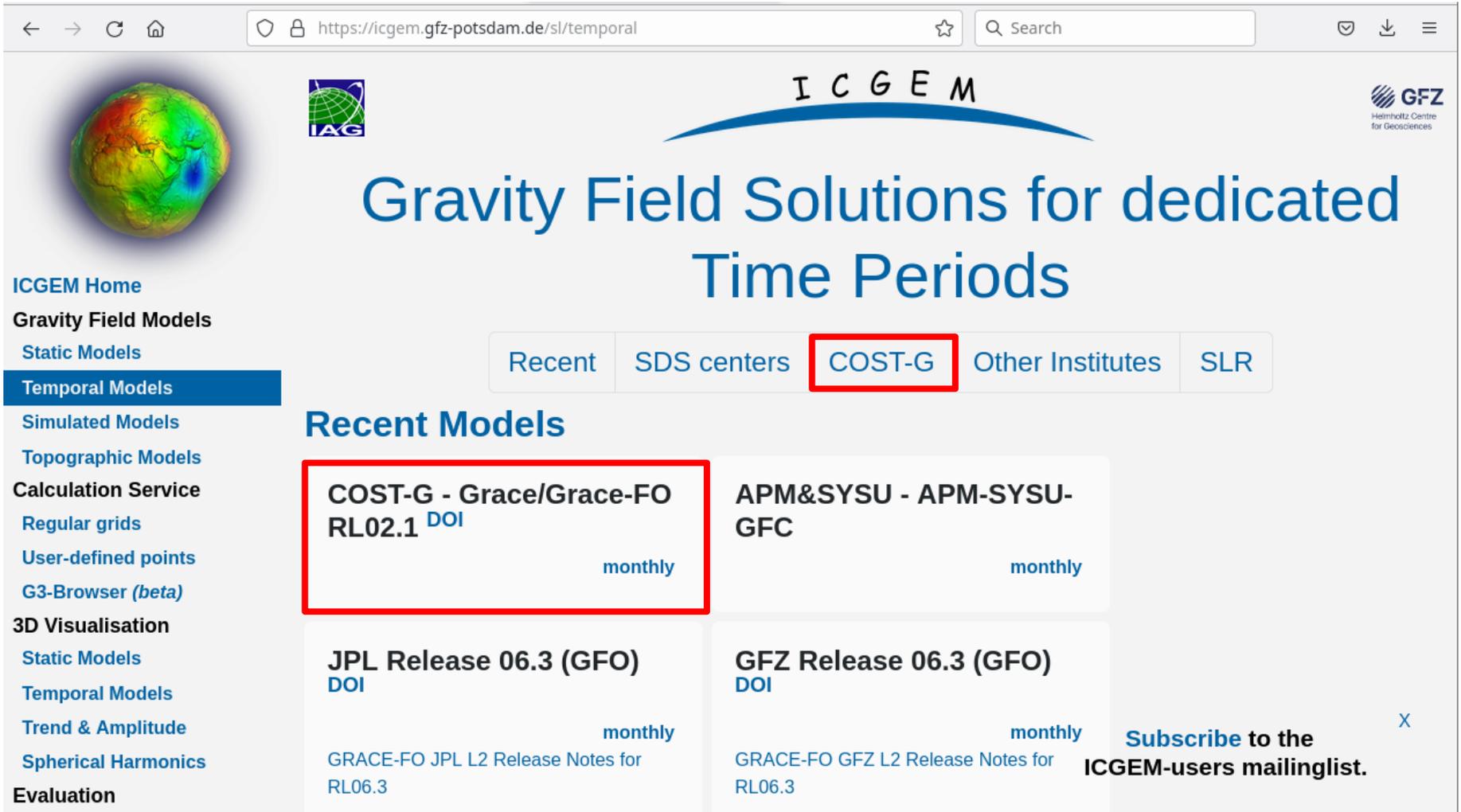
COST-G: products (GRACE/GRACE-FO)



COST-G: products (Swarm)



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



ICGEM

Gravity Field Solutions for dedicated Time Periods

Recent SDS centers **COST-G** Other Institutes SLR

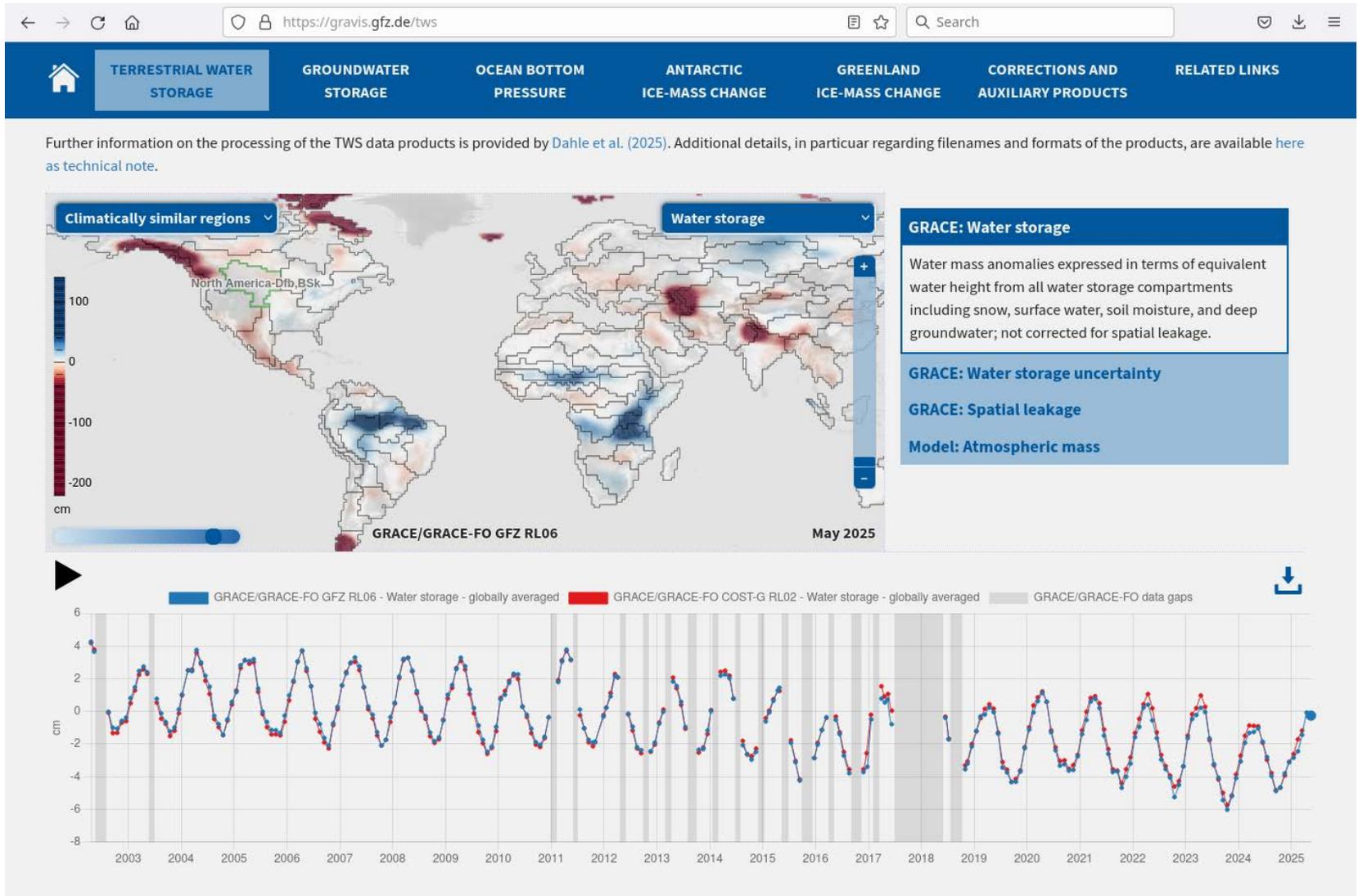
Recent Models

| | |
|--|--|
| COST-G - Grace/Grace-FO RL02.1 DOI monthly | APM&SYSU - APM-SYSU-GFC monthly |
| JPL Release 06.3 (GFO) DOI monthly GRACE-FO JPL L2 Release Notes for RL06.3 | GFZ Release 06.3 (GFO) DOI monthly GRACE-FO GFZ L2 Release Notes for RL06.3 |

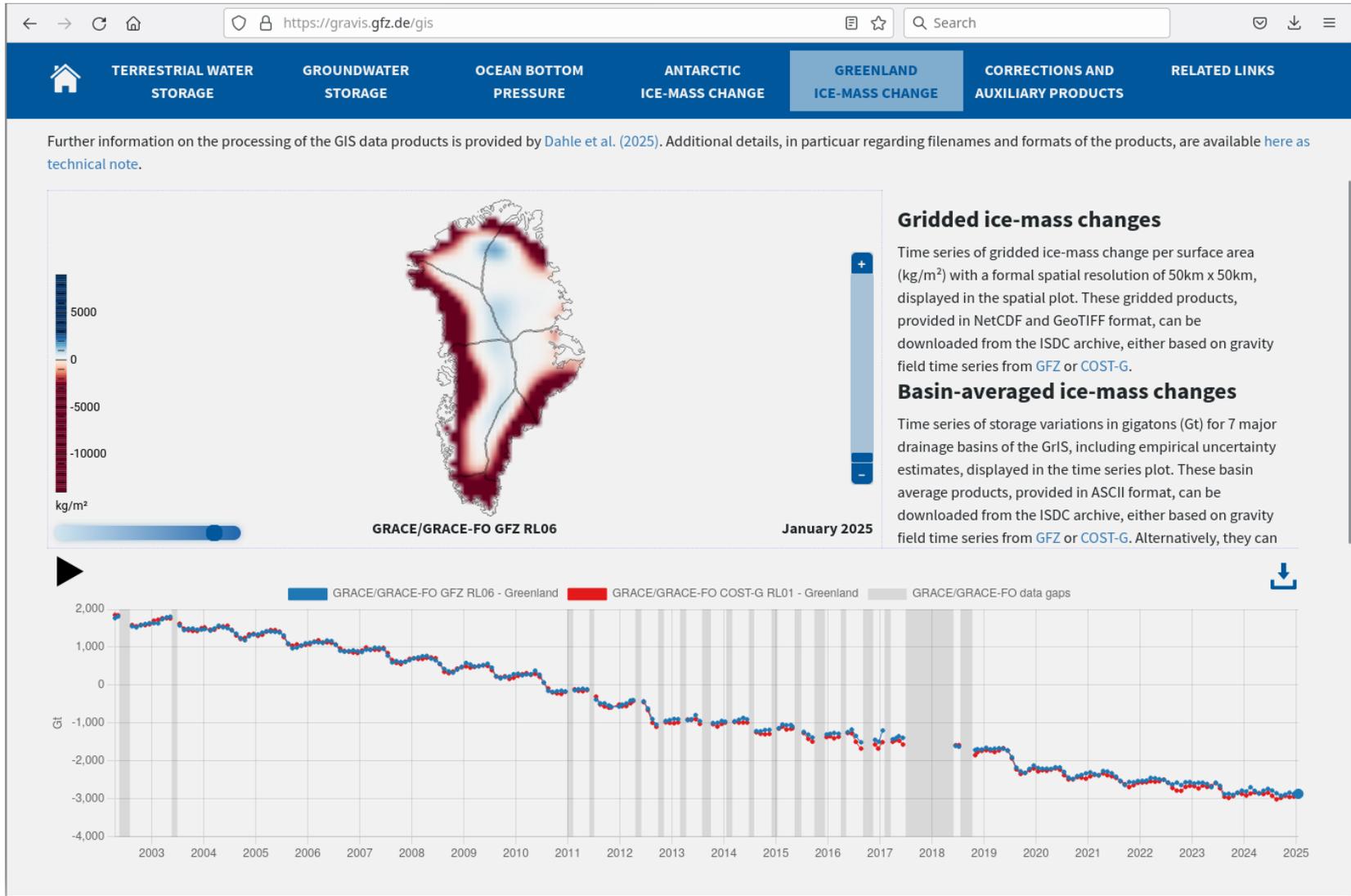
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COST-G products: Level-3 (post-processed grids/time-series)



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



Summary and Outlook

- **COST-G combined Level-2 products for GRACE (repro), Swarm (operational), and GRACE-FO (repro/operational) are available from ICGEM (<https://icgem.gfz-potsdam.de/sl/temporal>).**
- **COST-G Level-3 products for GRACE and GRACE-FO are available via GFZ's Gravis portal (<https://gravis.gfz.de/home>).**
- **When GRACE SDS RL07 time-series with realistic uncertainty information will become available, a re-combination either on solution, or on normal equation level is foreseen.**