EGSIEM

European Gravity Service for Improved Emergency Management

EGSIEM combination service: combination on normal equation level

Uli Meyer

EGSIEM Final Review Meeting

Bern

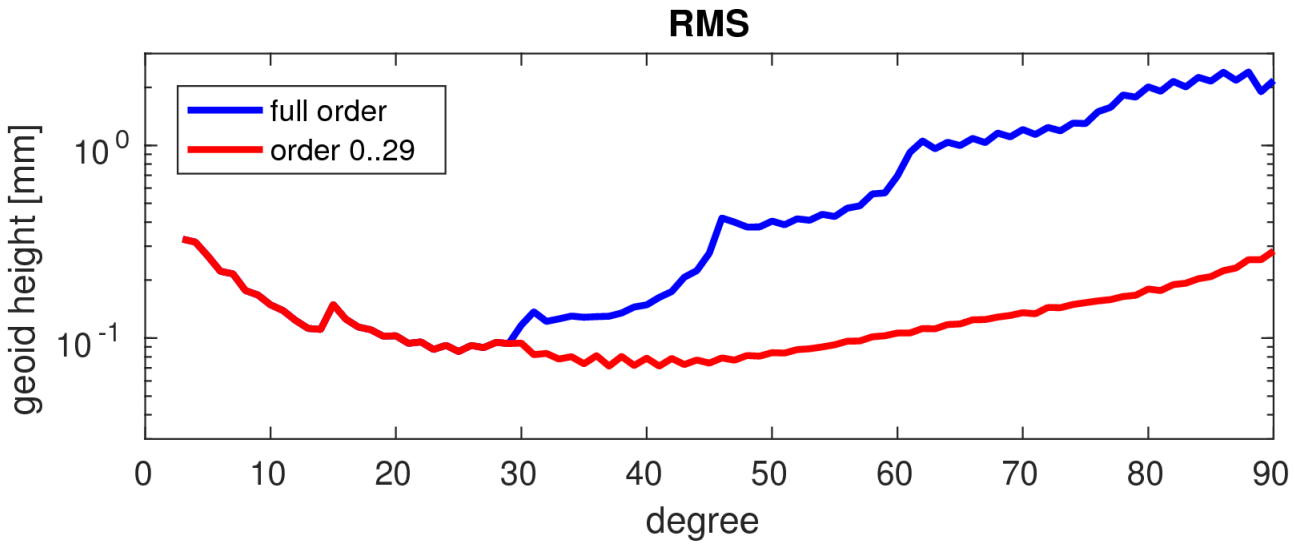
February 8 / 9th, 2018

Horizon2020

Contents

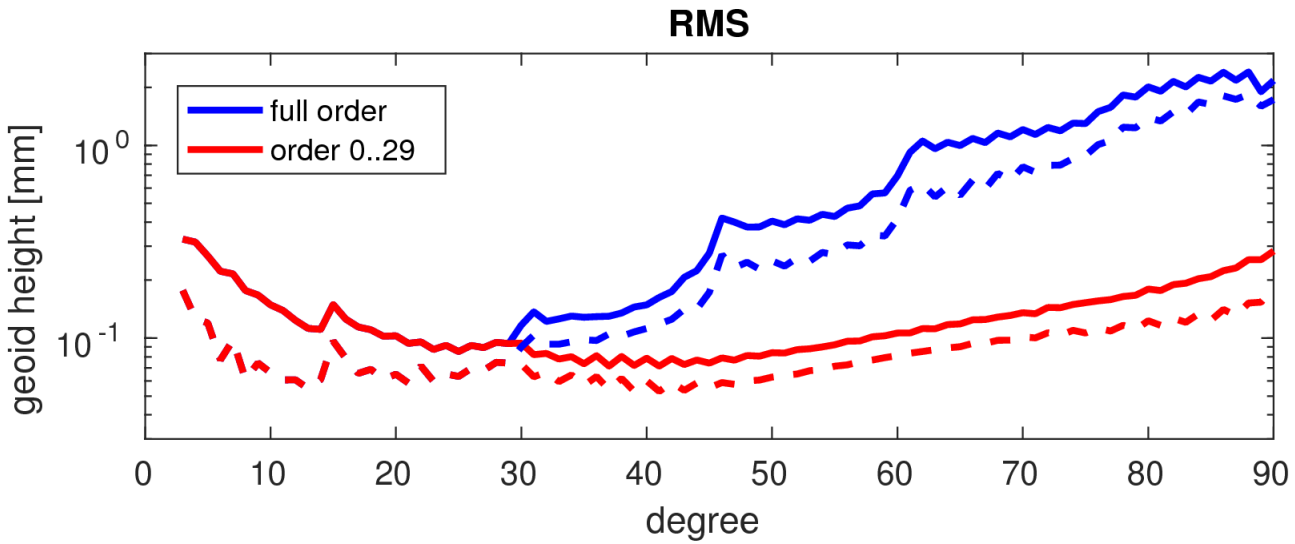
- Noise Assessment
- Combination of gravity fields
  - weights by VCE on solution level
  - empirical rescaling of NEQs
  - Final combination on NEQ-level
- Combination of de-aliasing products

Noise Assessment



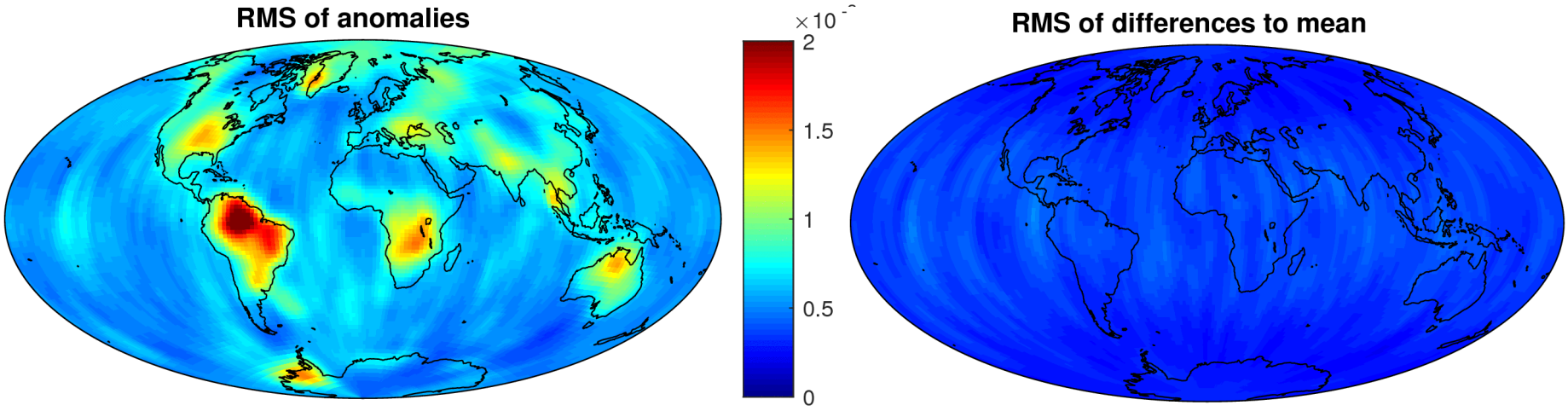
Anomalies:
differences to model

Noise Assessment

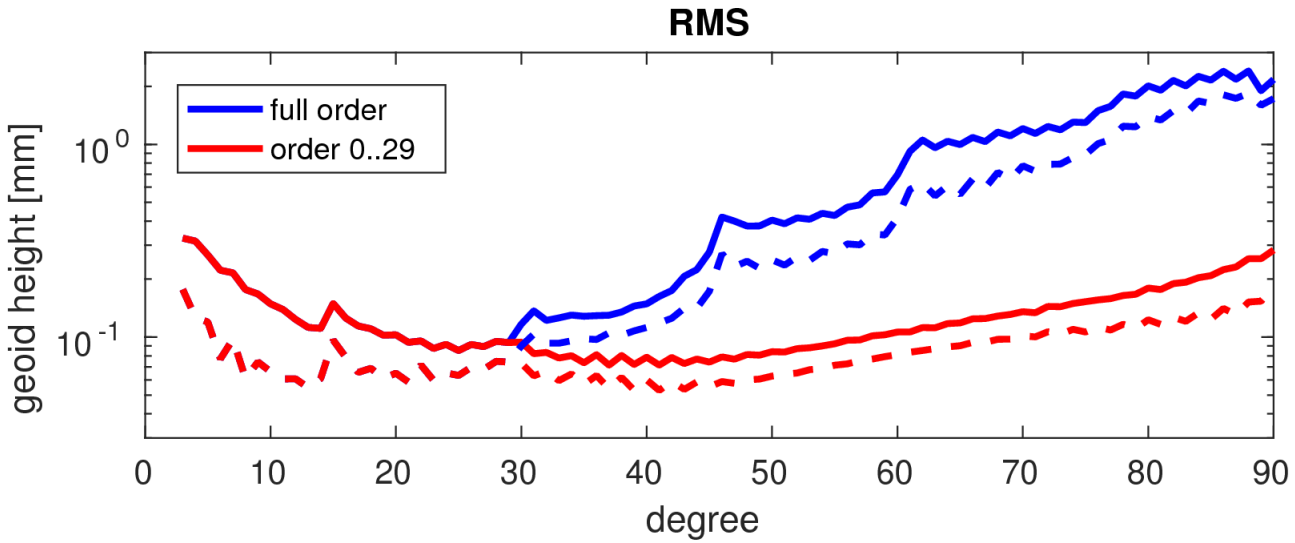


Anomalies: differences to model

Differences: differences to mean

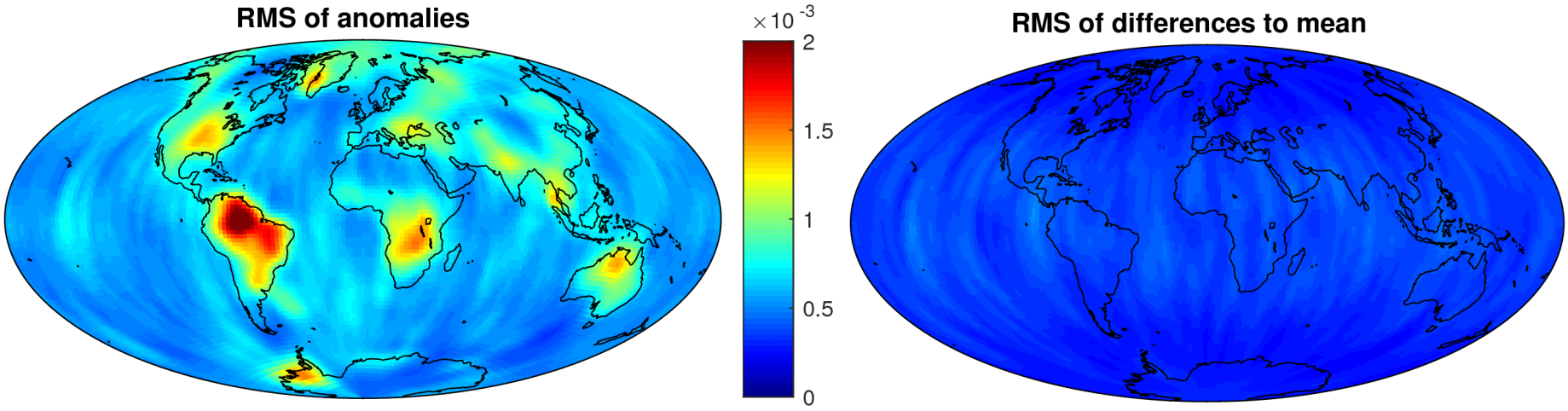


Noise Assessment

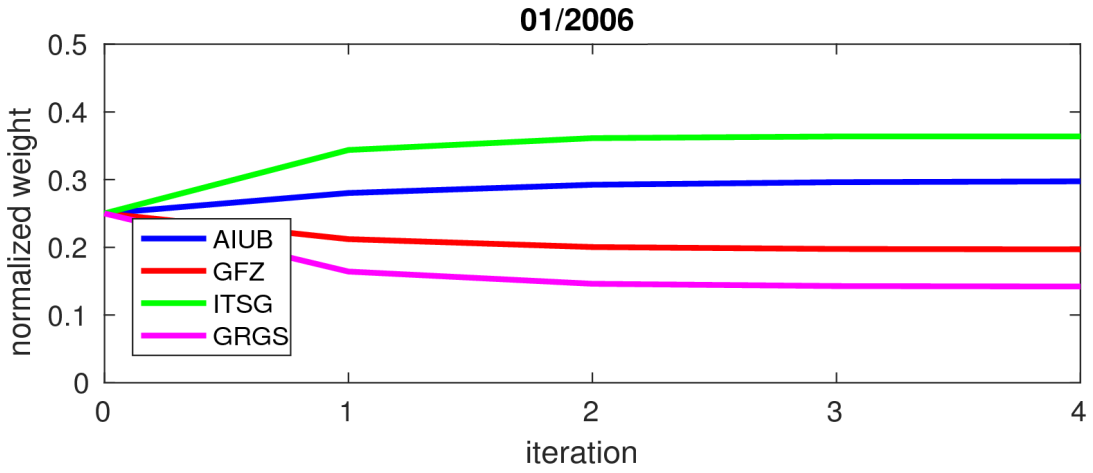


Differences to mean to derive relative weights.

Anomalies over quite regions to indepently assess quality.

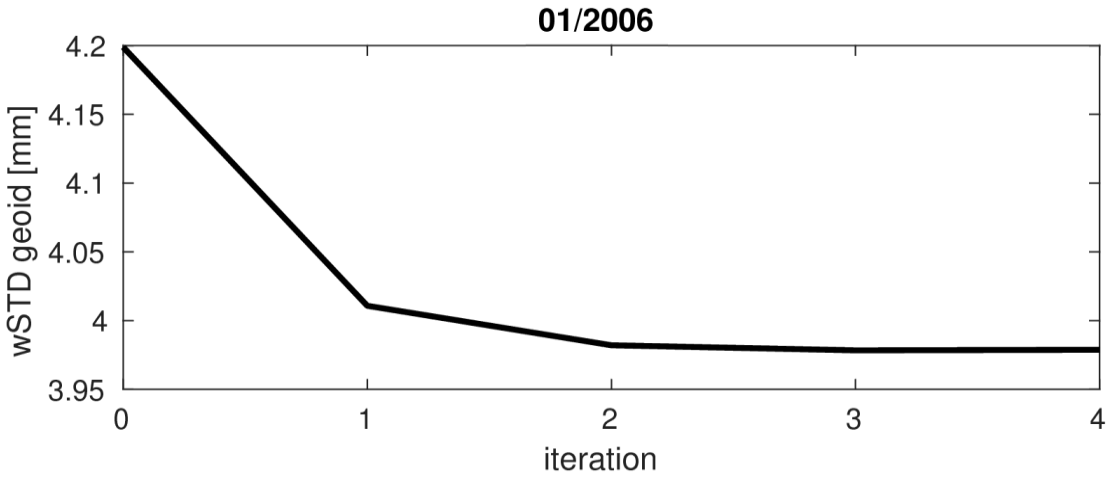


Variance component estimation on solution level



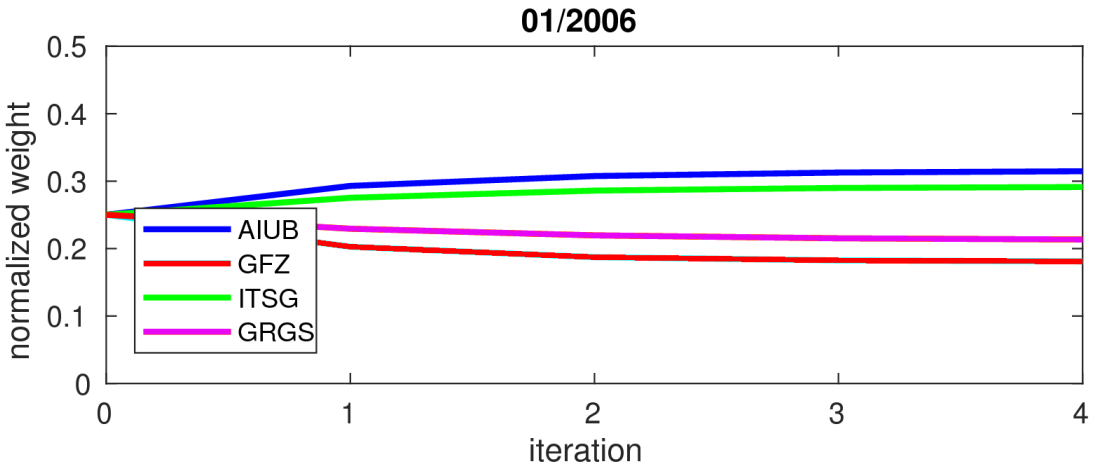
Variance
estimati
level tak
all SH co
degree a
equal w

Solution:	weight
GRGS	0.14
GFZ	0.19
AIUB	0.29
ITSG	0.38

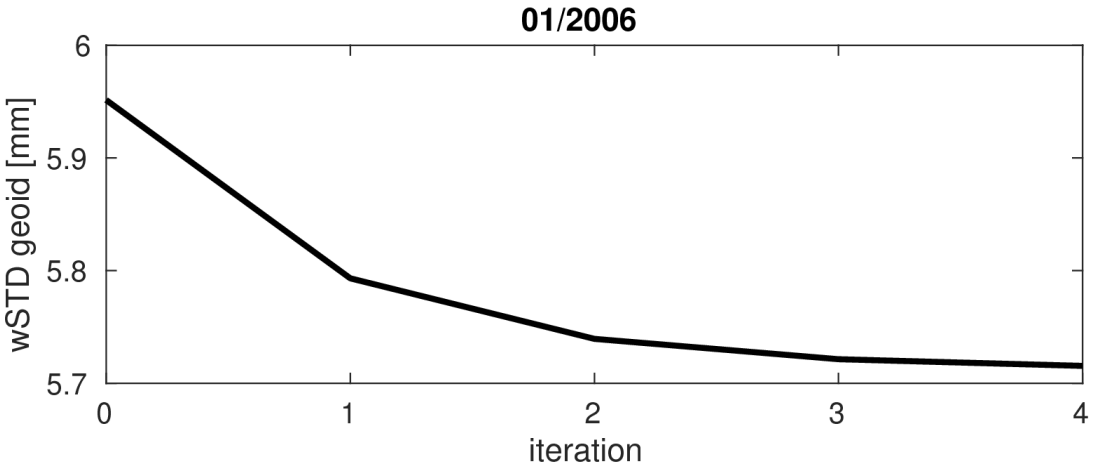


RMS of anomalies restricted to ocean areas as quality criterion.

Variance component estimation on solution level

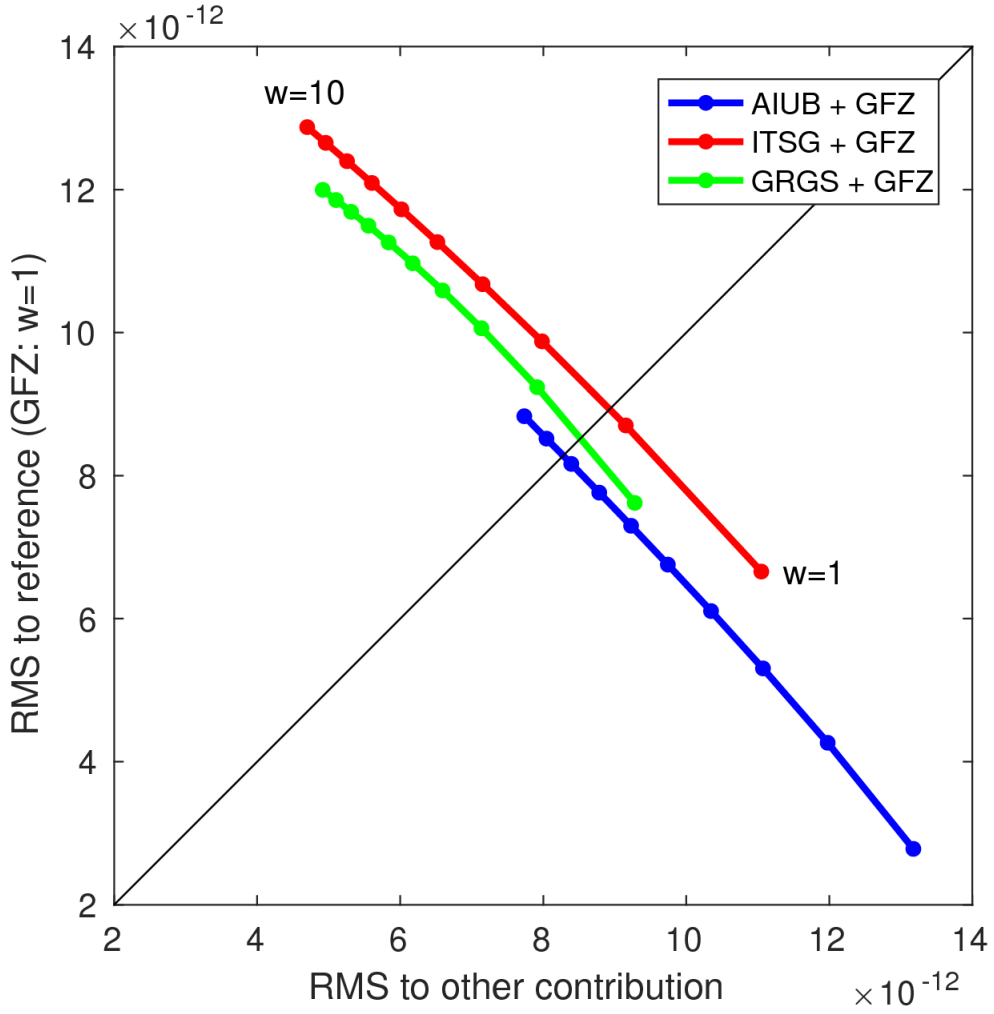


Solution:	weight
GRGS	0.21
GFZ	0.18
AIUB	0.31
ITSG	0.29



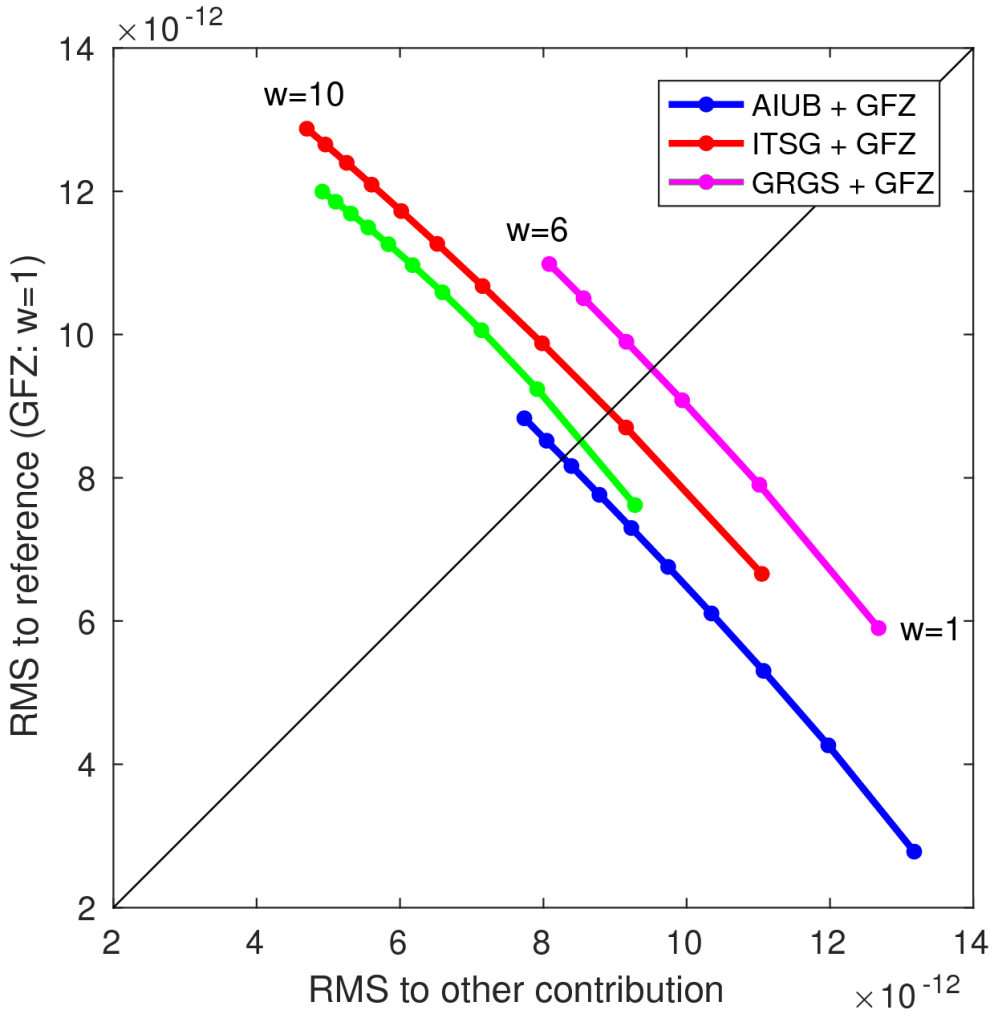
RMS of anomalies restricted to ocean areas as quality criterion.

Combination on Normal Equation Level



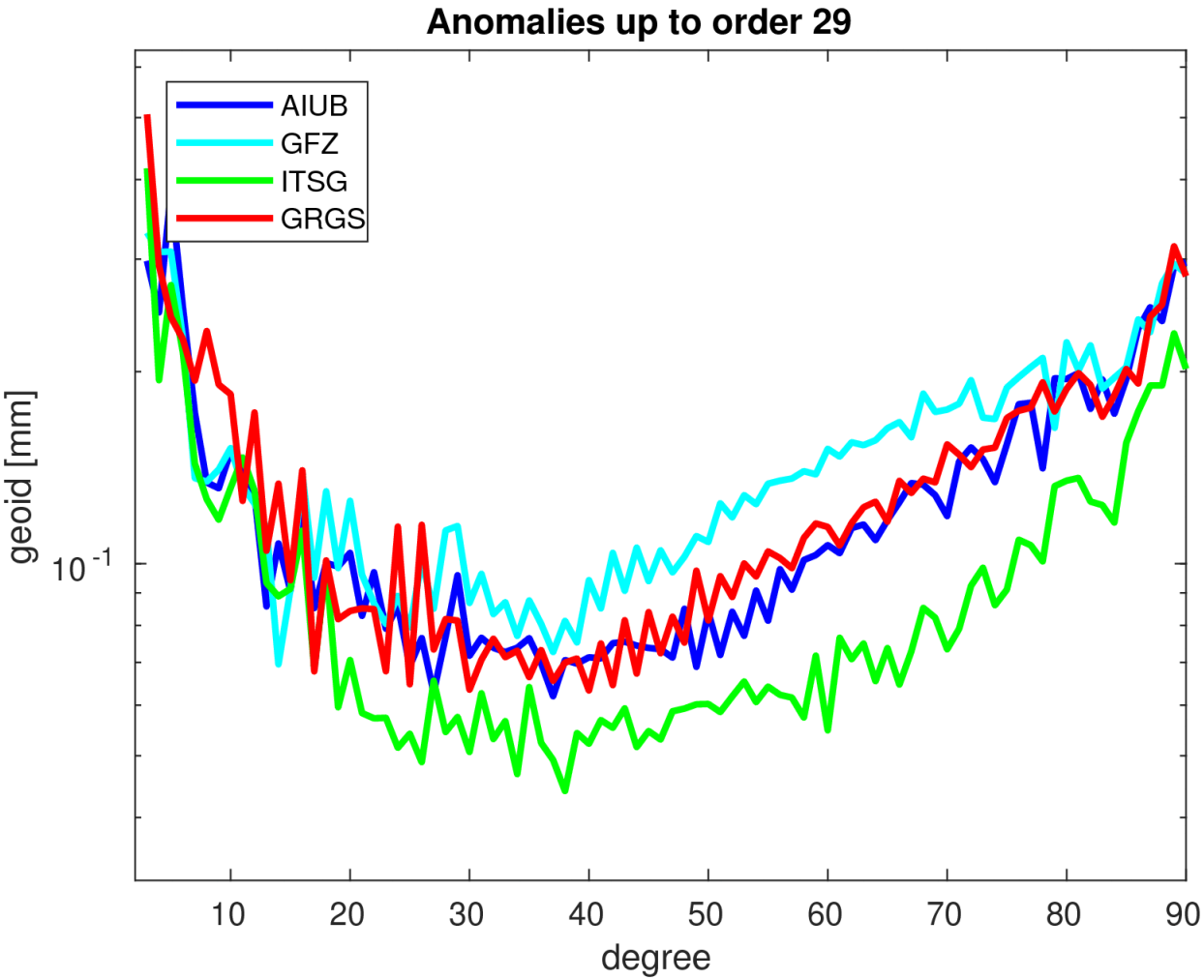
equalizing weight	
GRGS	1.60
GFZ	1.00
AIUB	8.34
ITSG	2.21

Combination on Normal Equation Level

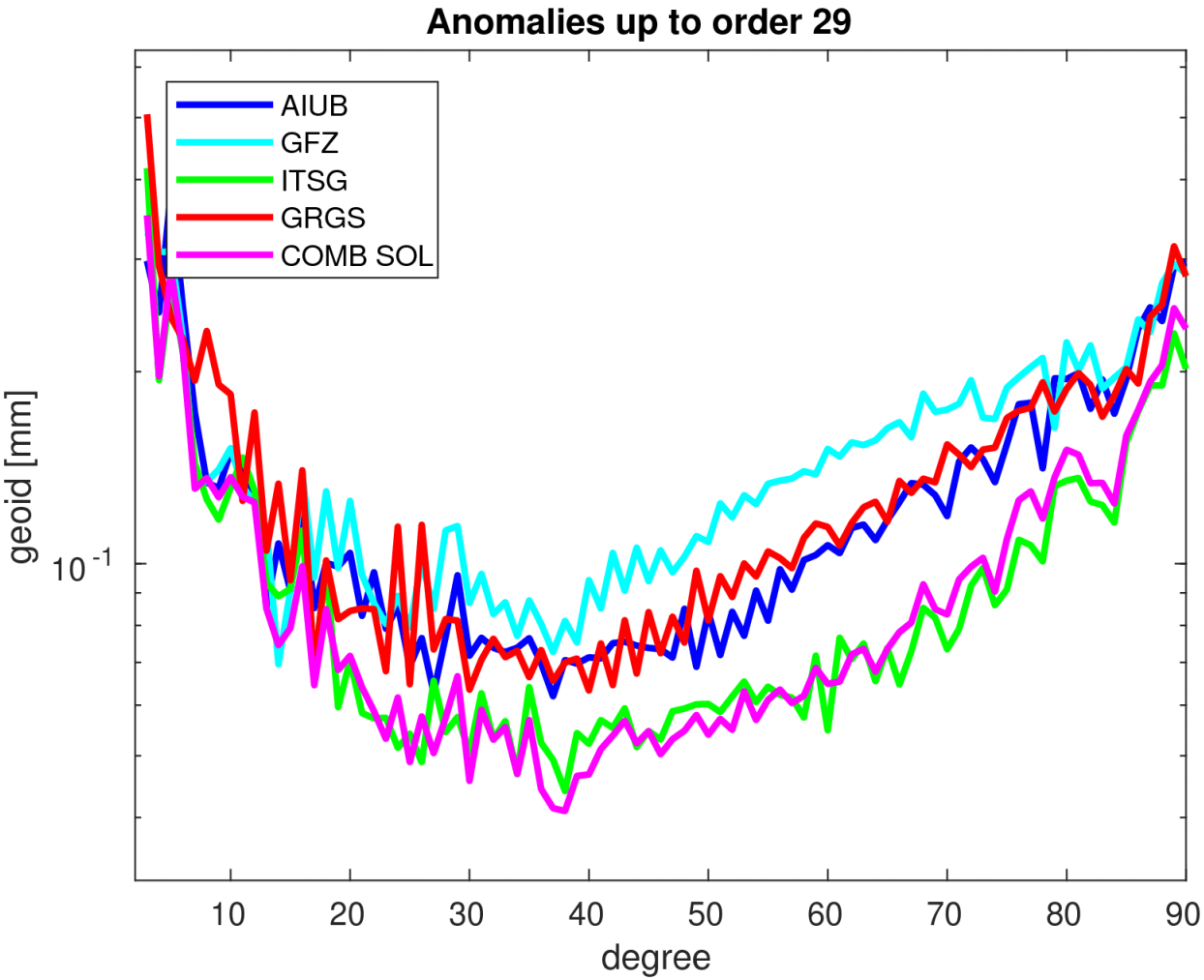


equalizing weight	
GRGS	3.56
GFZ	1.00
AIUB	8.34
ITSG	2.21

Combination: 2006/01

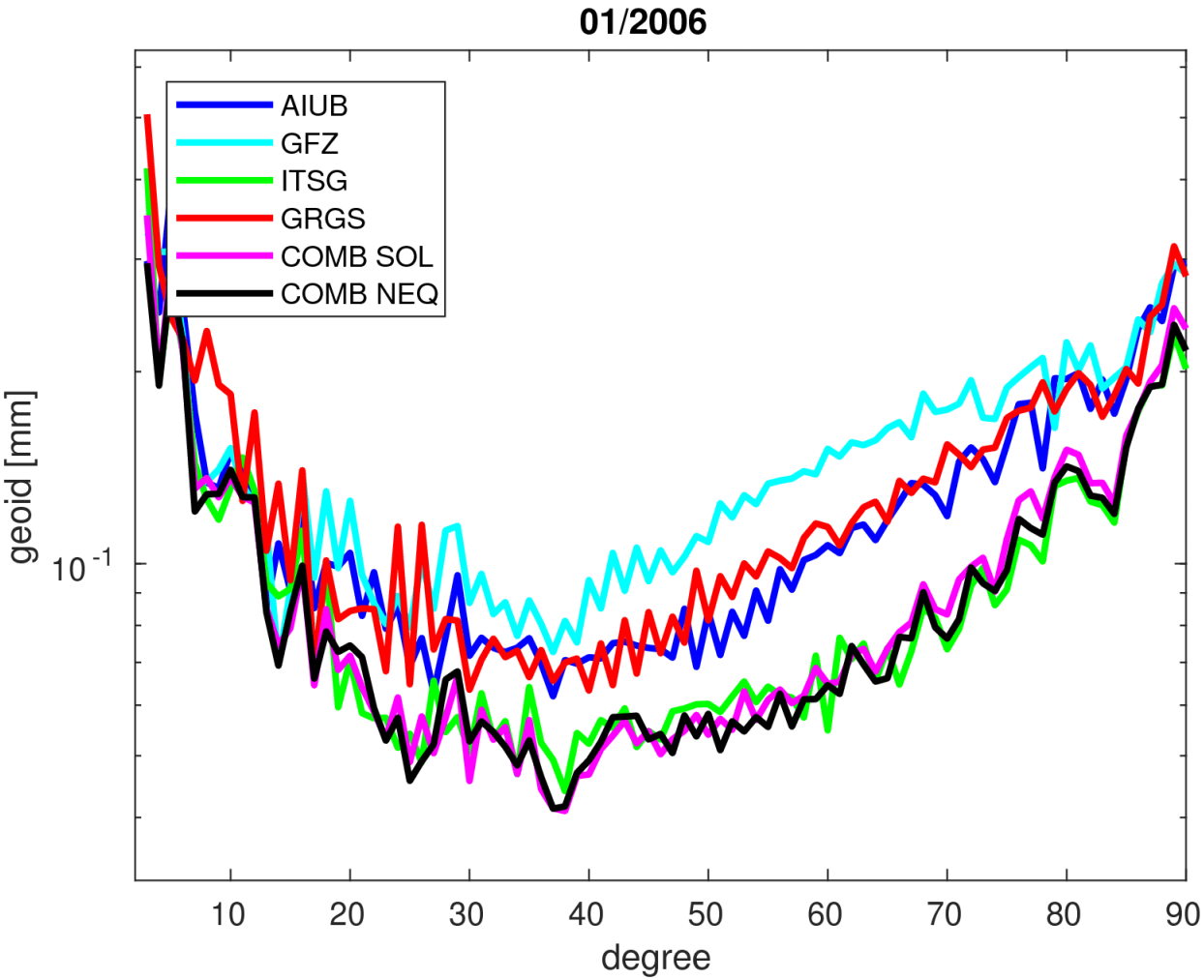


Combination: 2006/01



Solution:	weight
GRGS	0.14
GFZ	0.19
AIUB	0.29
ITSG	0.38

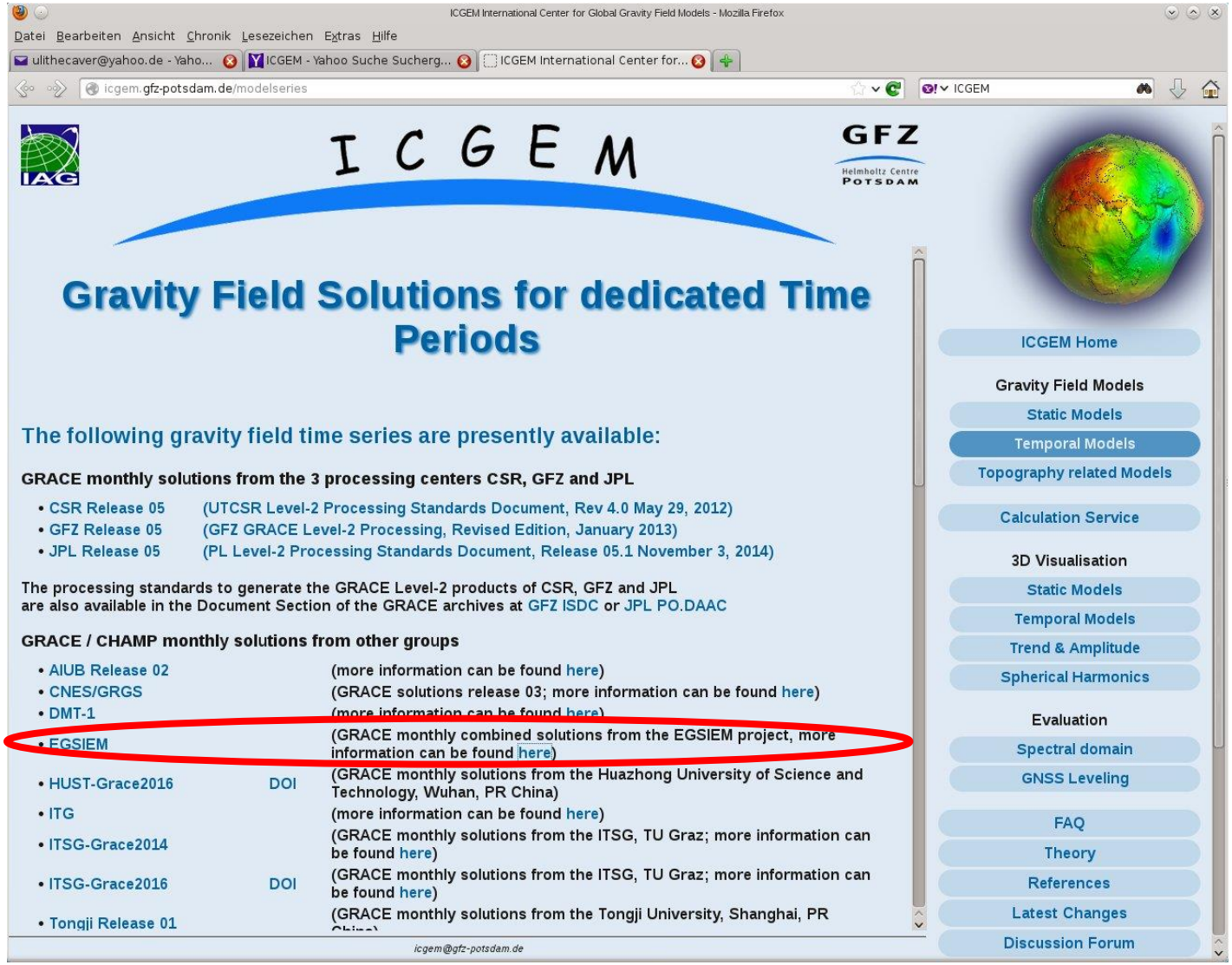
Combination: 2006/01



Solution:	weight
GRGS	0.14
GFZ	0.19
AIUB	0.29
ITSG	0.38

final weight	
GRGS	4.20
GFZ	1.00
AIUB	14.50
ITSG	3.56

Dissemination



Auxiliary products: dealiasing (GAA, B, C, D)

GA-products are monthly means of AOD-components:

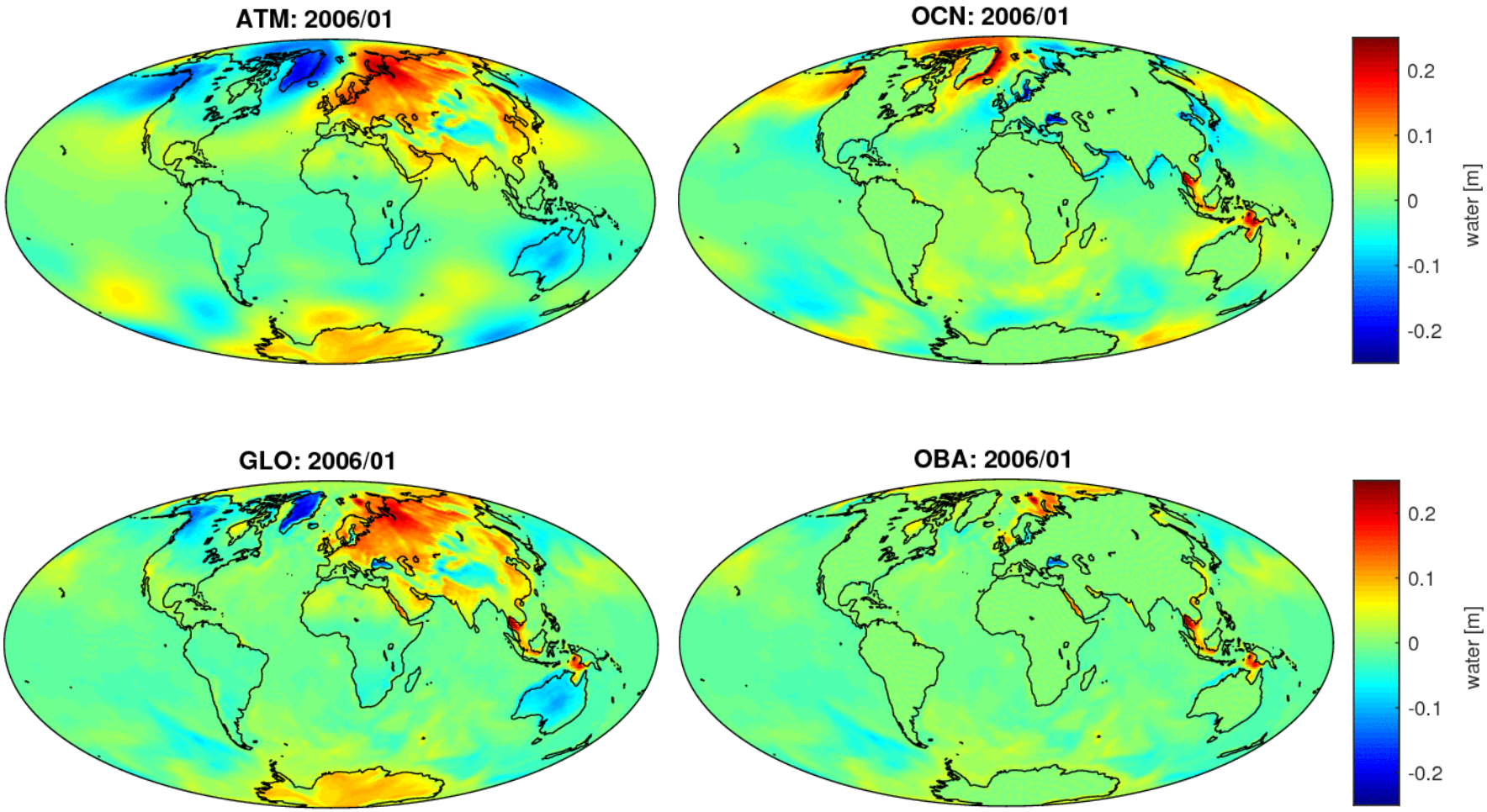
- A: atmosphere (integrated)
- B: ocean
- C: ocean + atmosphere (= A+B)
- D: ocean + surface pressure (oceans only)

Hydrology: restore A

Oceanography: restore B

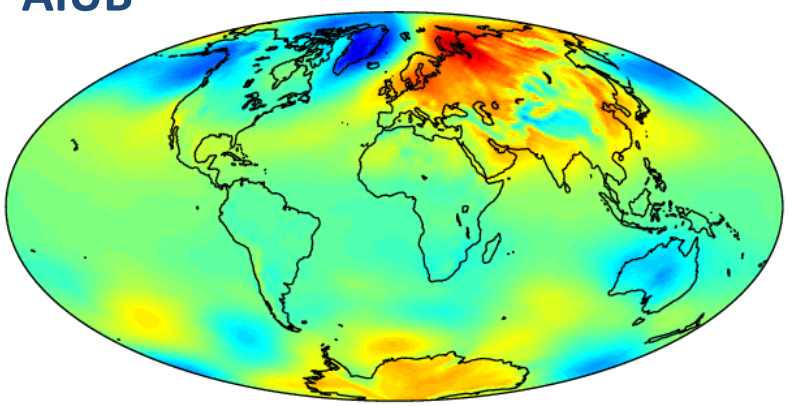
Ocean Bottom Pressure: restore D

Monthly mean of Dealiasing Products: AIUB

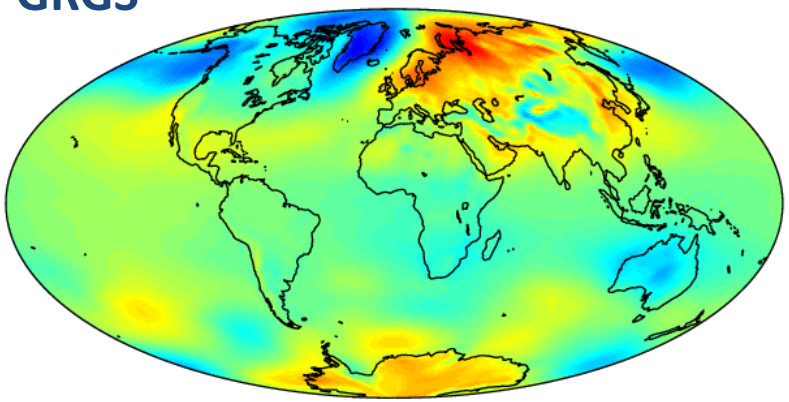


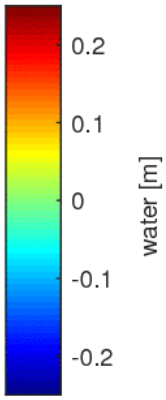
Monthly mean of Dealiasing Products: ATM

AIUB

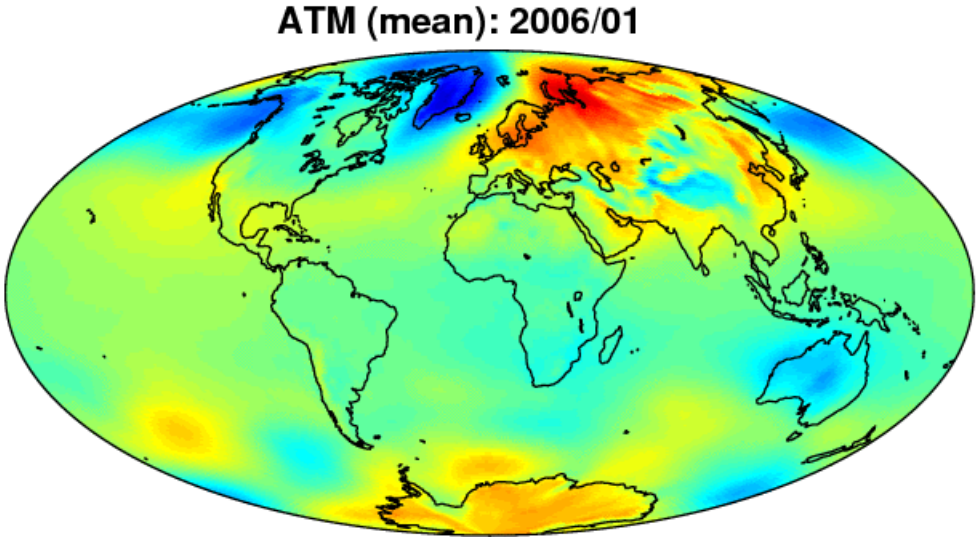


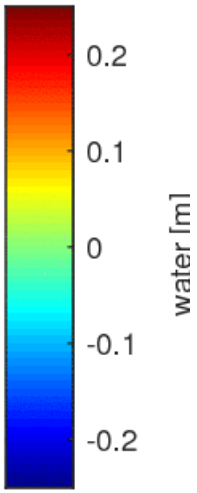
GRGS





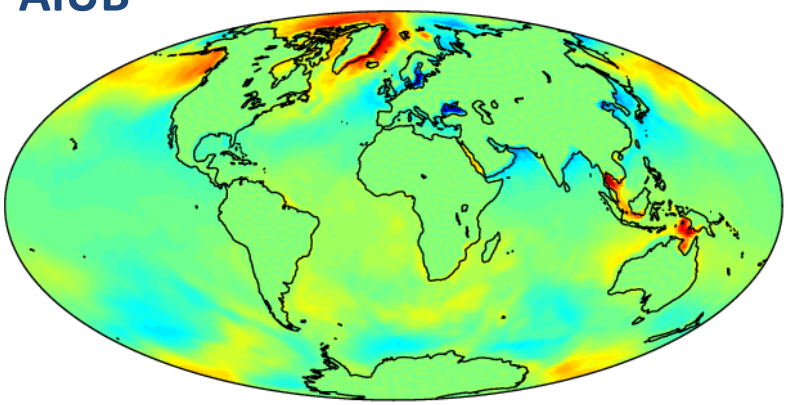
Mean:
w1 * AIUB +
w2 * ITSG +
w3 * GFZ +
w4 * GRGS



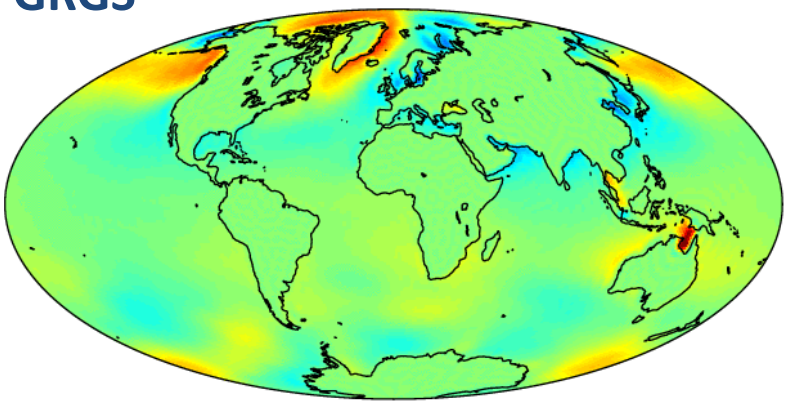


Monthly mean of Dealiasing Products: OCN

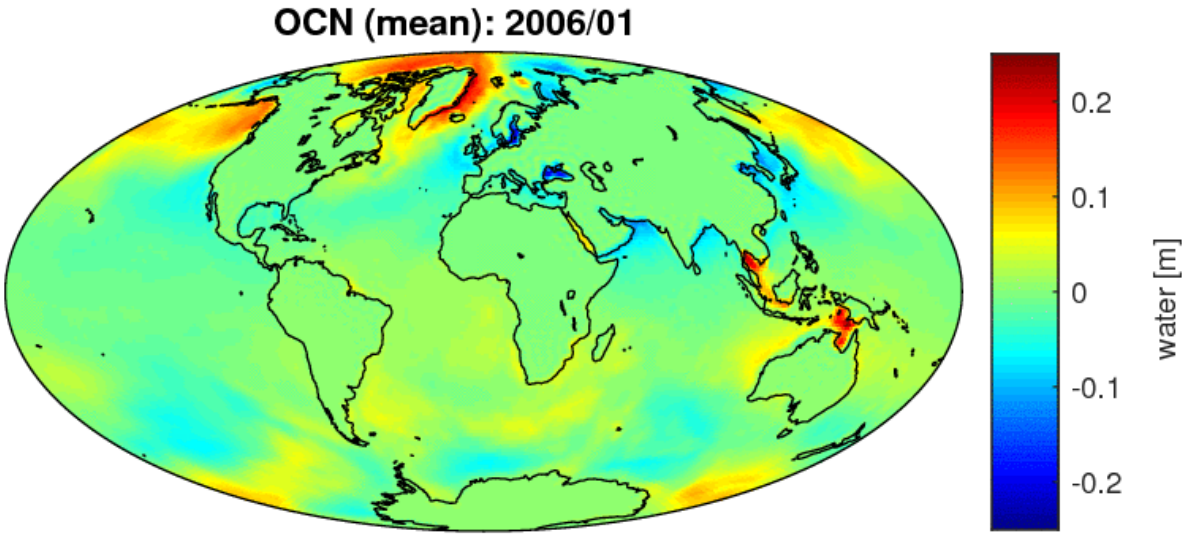
AIUB



GRGS



Mean:
w1 * AIUB +
w2 * ITSG +
w3 * GFZ +
w4 * GRGS



Conclusions

- EGSIEM monthly gravity field combination on NEQ-level is operational.
- Noise assessment by variance component estimation on solution level.
- Relative weigths based on noise levels.
- Monthly weighted means of ATM and OCN de-aliasing products for L3-generation.
- The EGSIEM combination service provides two test years (2006 + 2007):
  - SH-coefficients (Level-2): www.icgem.de
  - grids and de-aliasing (Level-3): www.egsiem.eu