

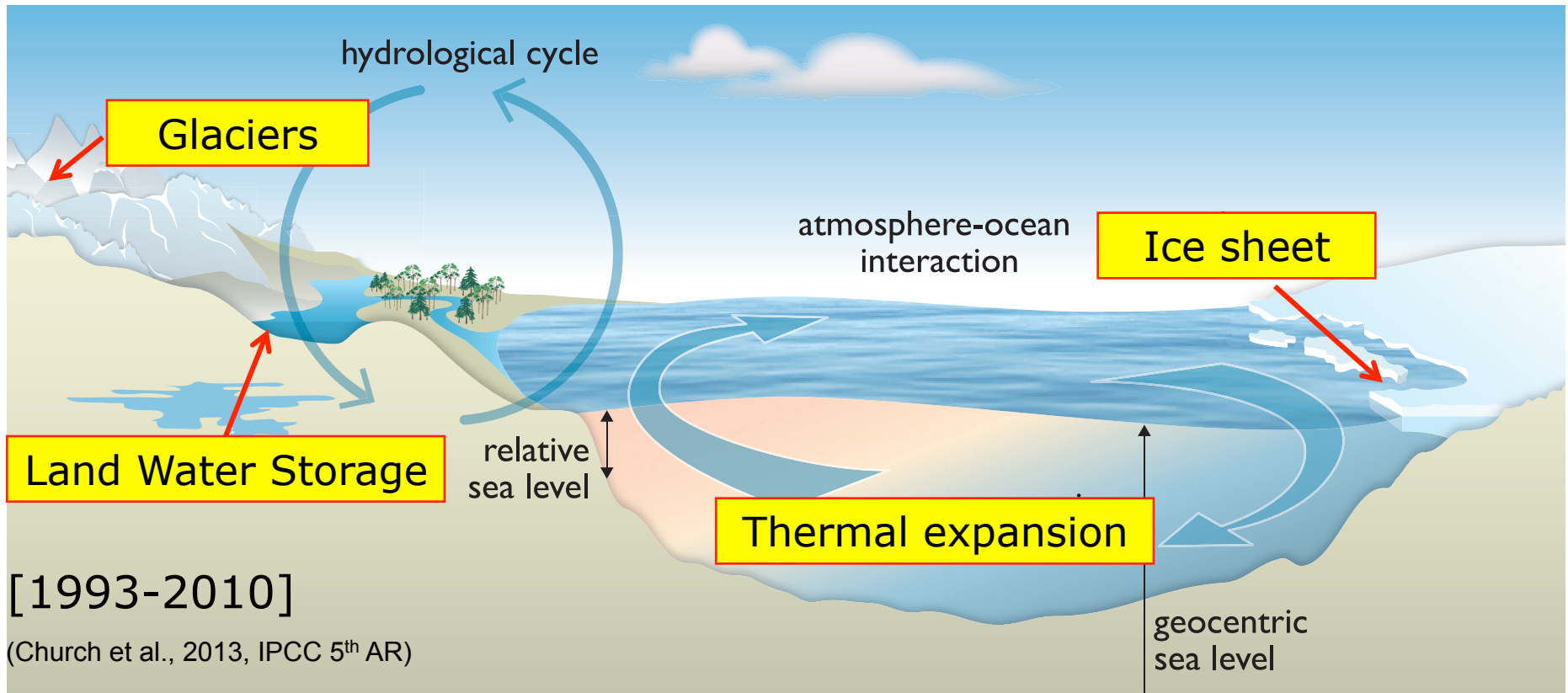
Global mean ocean mass changes from GRACE and its uncertainties

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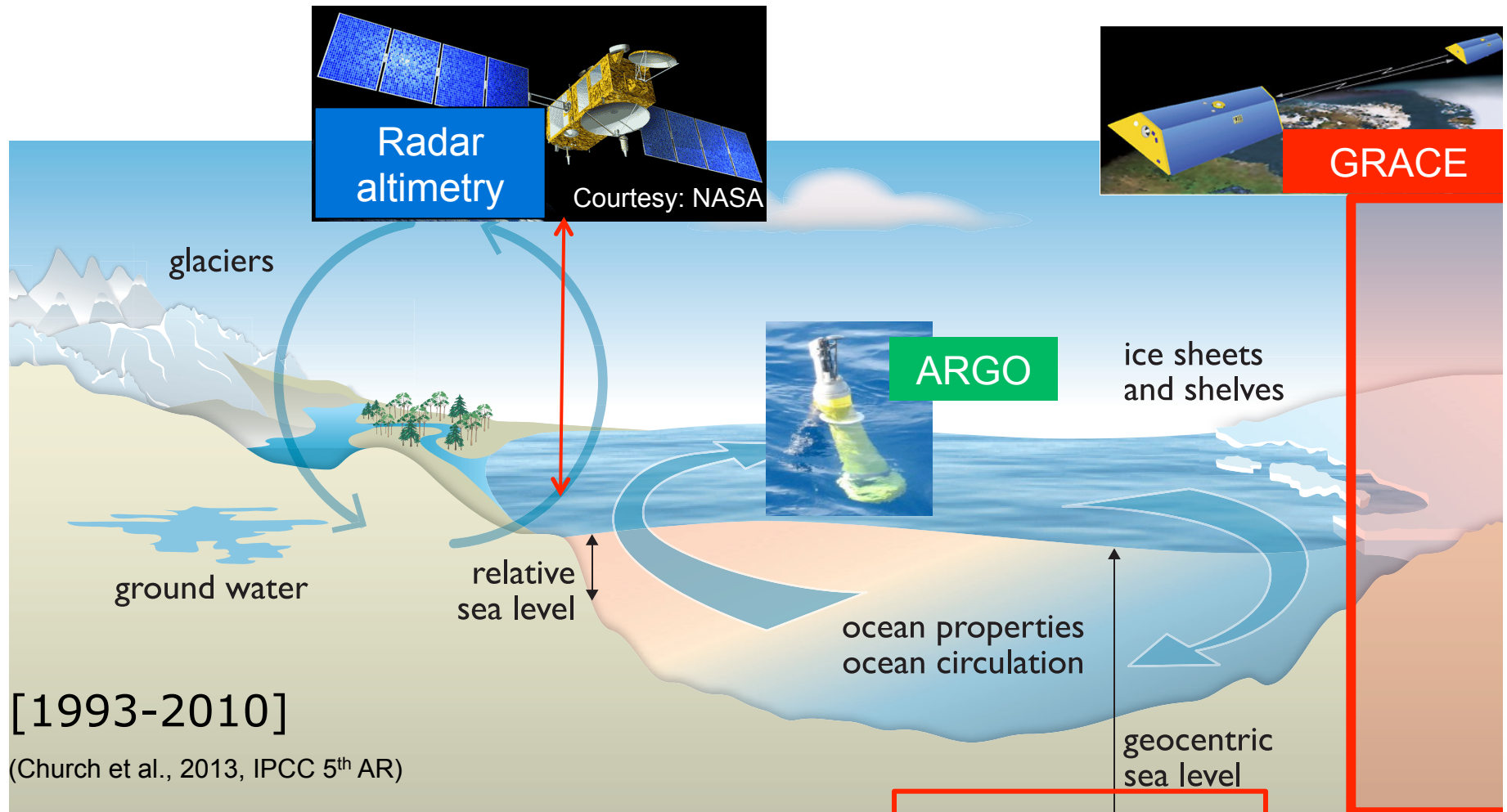
11.10.2017

Global mean sea level change



$$\text{mean sea level} = \text{steric sea level} + \text{ocean mass}$$

Global mean sea level change



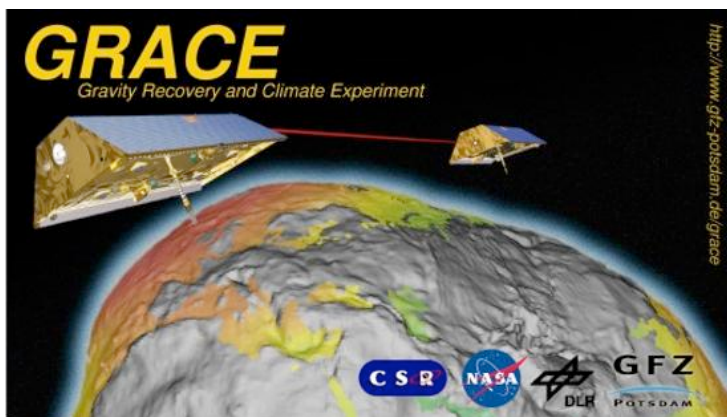
mean sea level = steric sea level + ocean mass

GFZ 3.4+0.4 mm/y

0.8+0.2 mm/y

1.8+0.3 mm/y

(NASA sea level change portal) 3

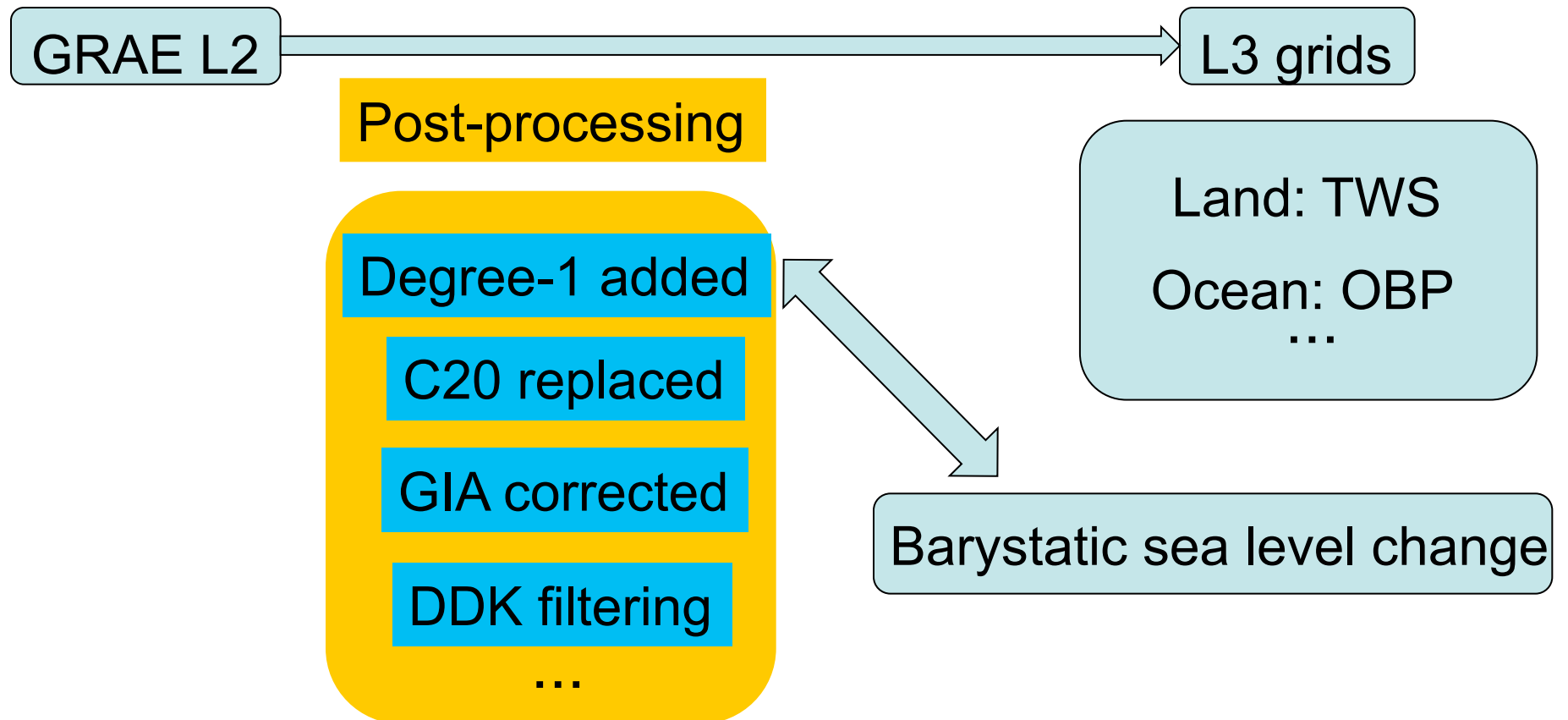


Ocean mass trend uncertainty from GRACE

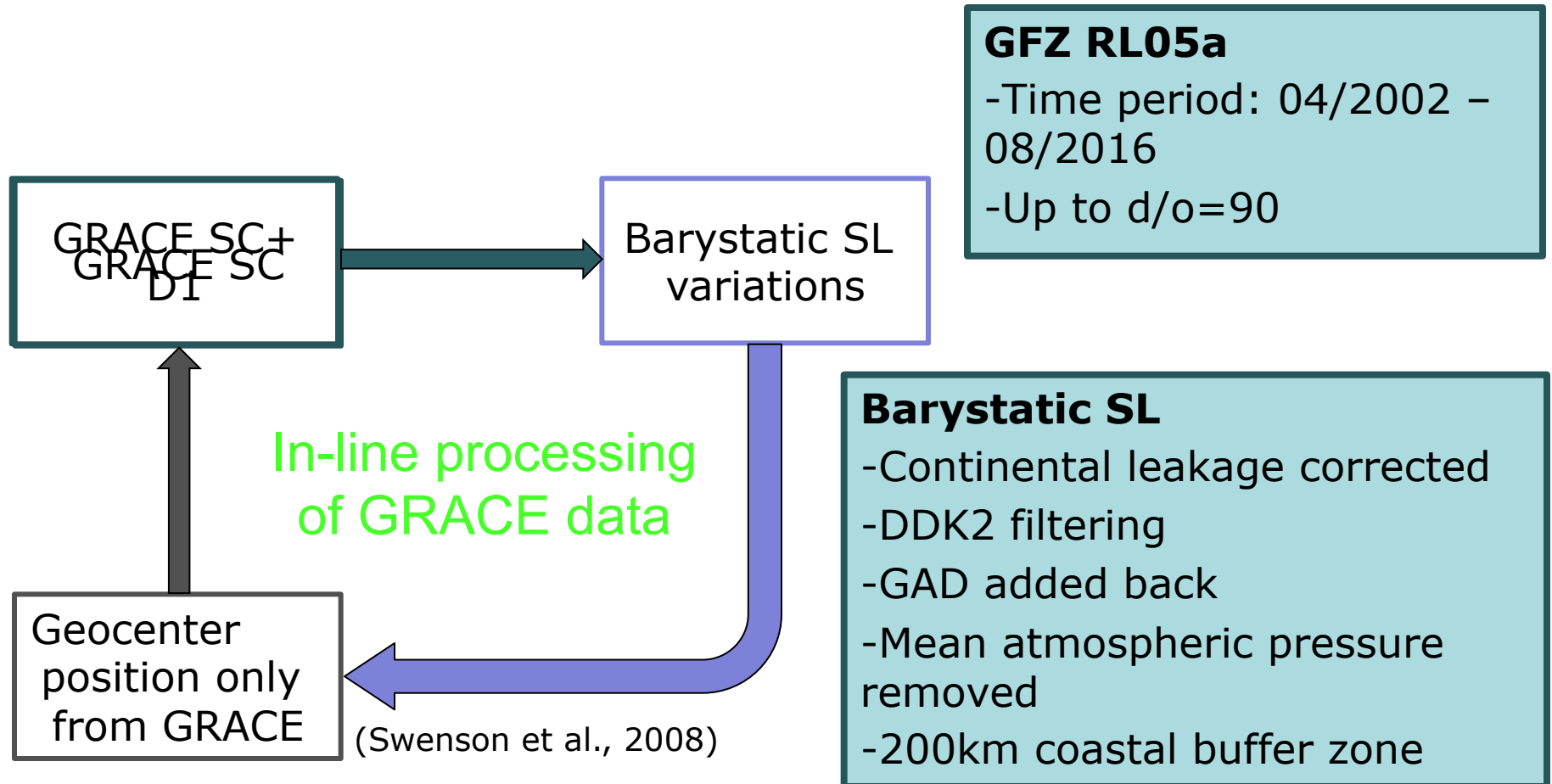
GFZ

- 1.08 ± 0.3 mm/y 2002-2014 (Rietbroek et al., 2016)
- 1.7 ± 0.13 mm/y 2003-2012 (Johnson and Chambers 2013)
- 2.11 ± 0.3 mm/y 2005-2013 (Dieng et al. 2015)
- 1.9 ± 0.3 mm/y 2005-2014 (Feng et al., 2015)

GFZ Level-3 post-processing

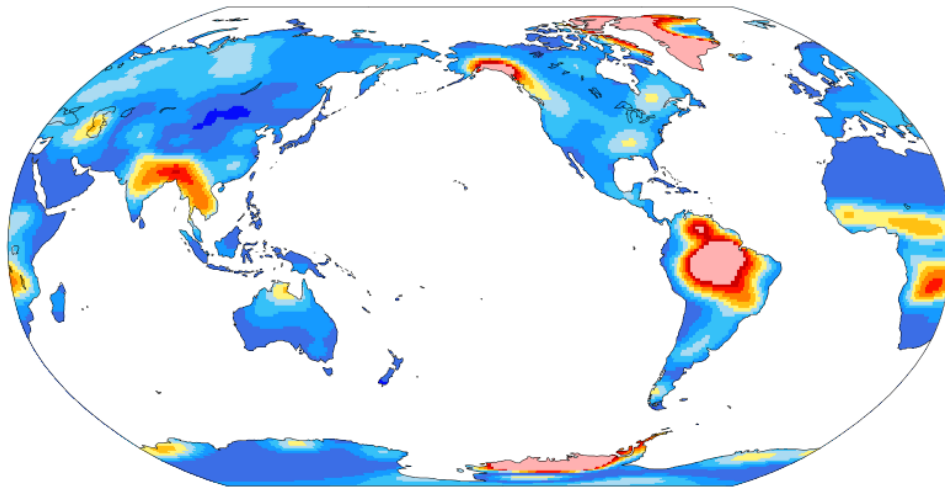


D-1 terms and barystatic SL Iteration



Gridded TWS

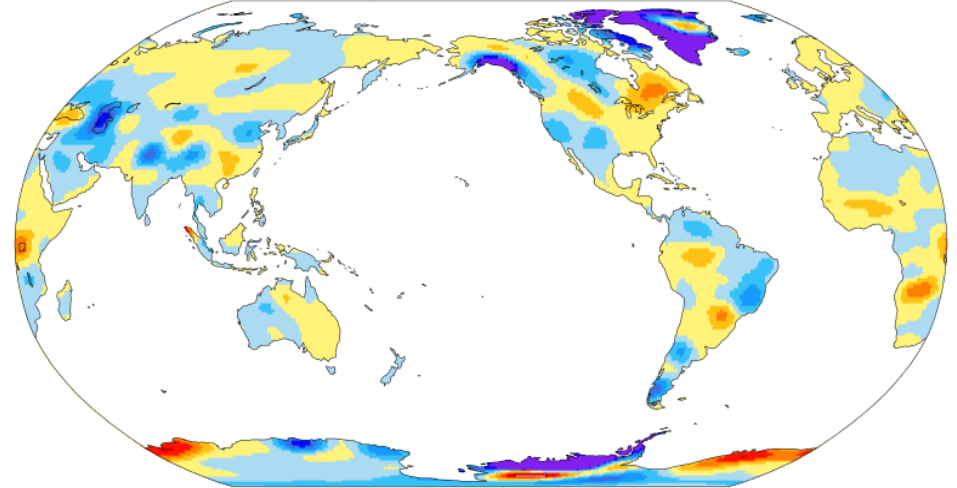
Standard deviation



cm



Trend

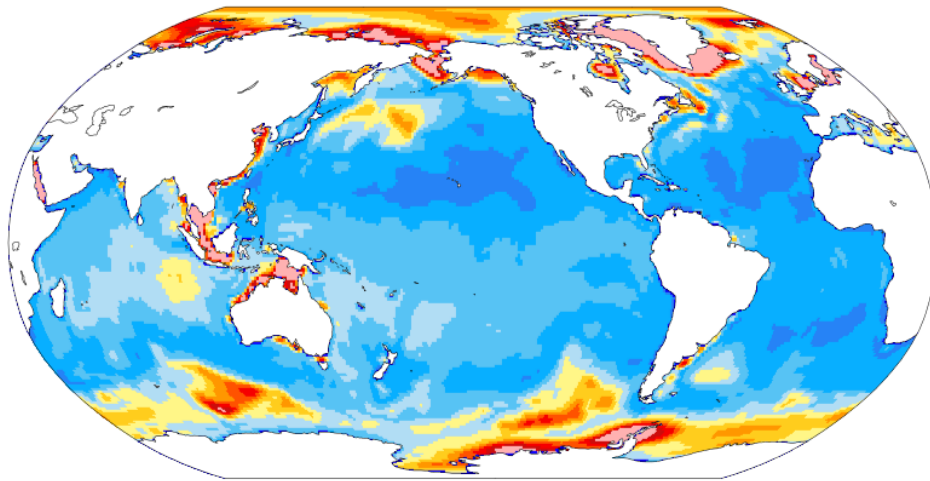


cm/y

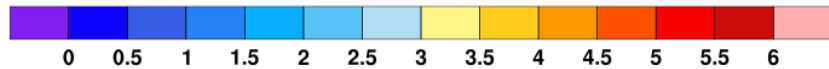


Gridded OBP

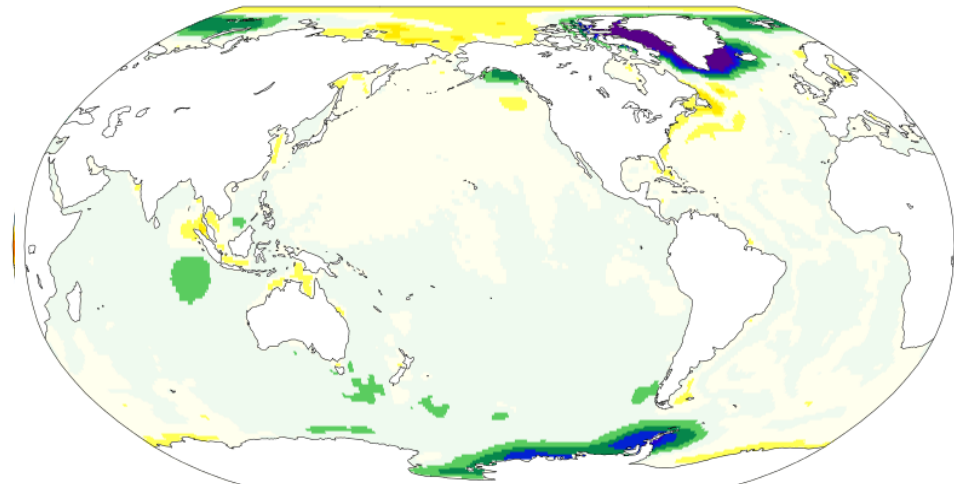
Standard deviation



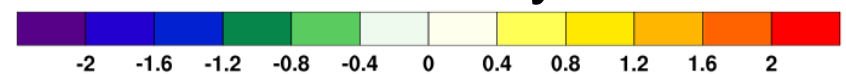
hPa



Trend



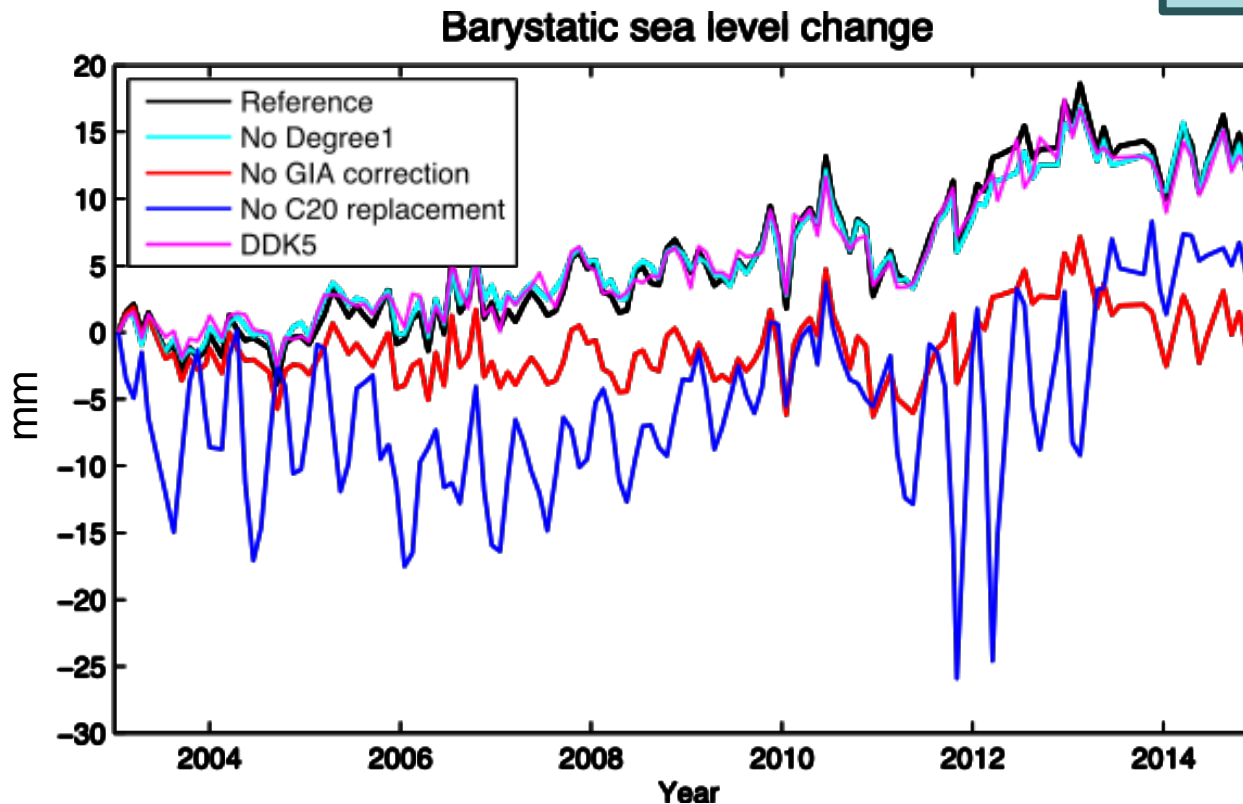
hPa/y



Ocean mass trend uncertainties

GFZ RL05a

-Time period: 04/2002 – 12/2014



Reference
 1.44 ± 0.3 mm/y

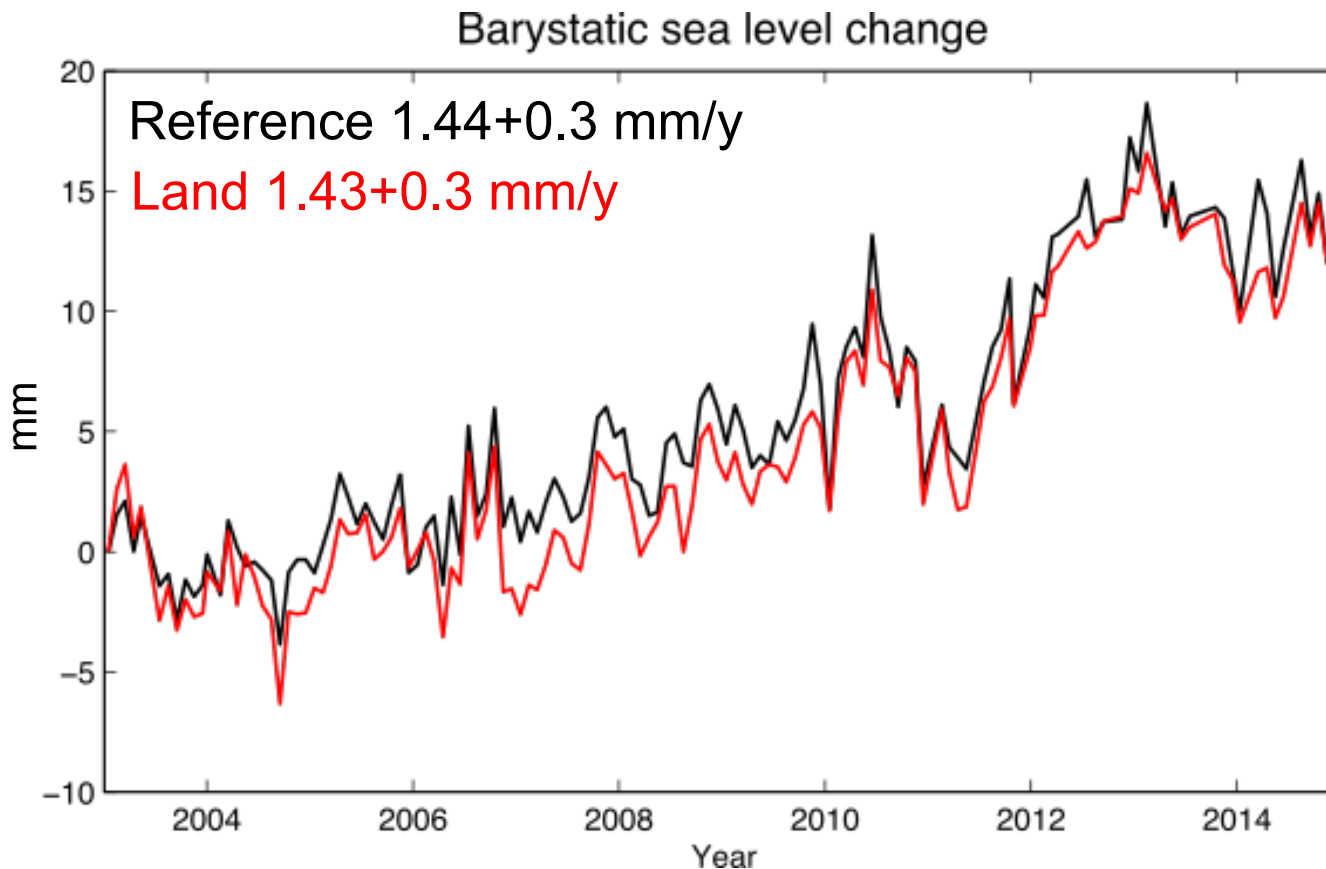
No Degree1
 1.29 ± 0.3 mm/y

No GIA correction
 0.30 ± 0.3 mm/y

No C20 replacement
 0.88 ± 0.3 mm/y

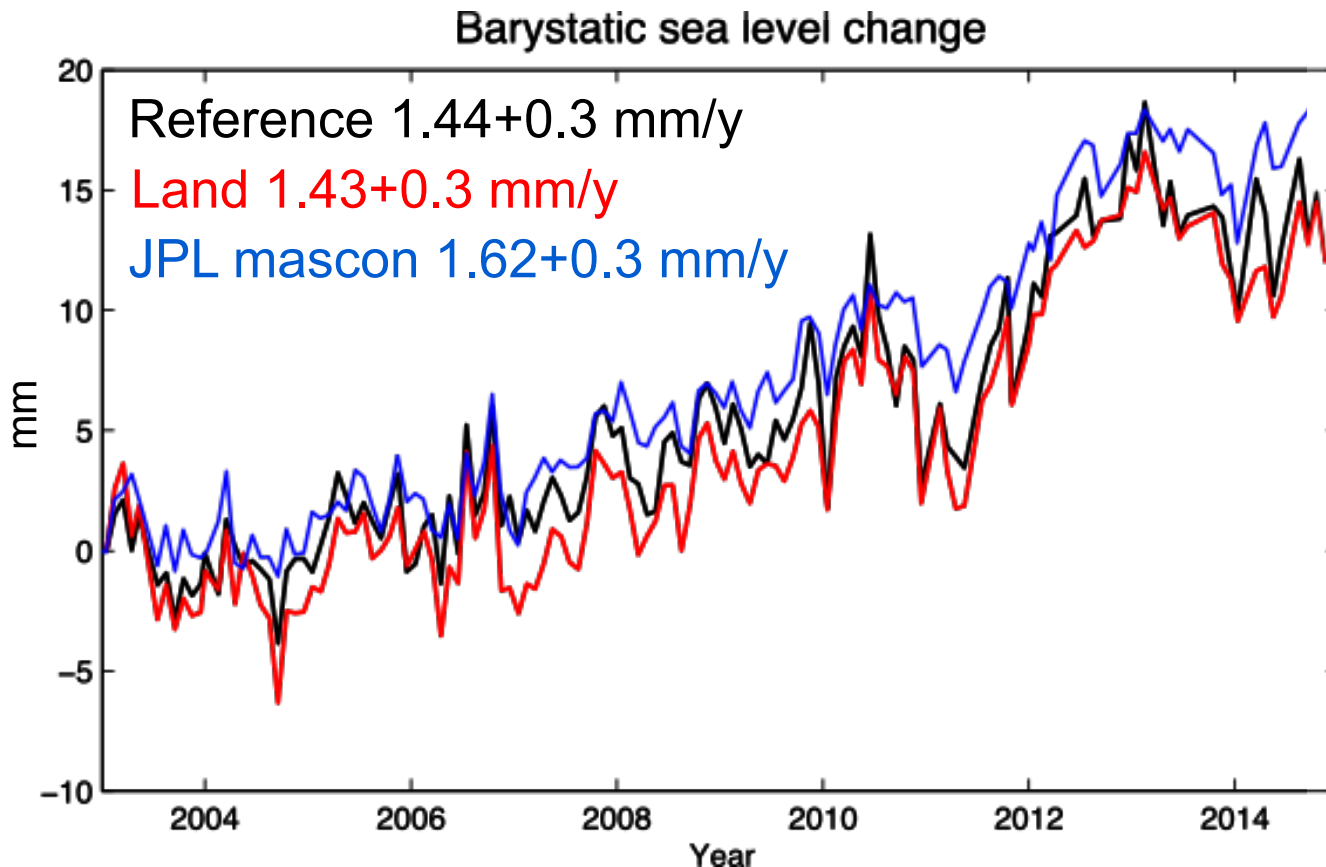
DDK5
 1.66 ± 0.3 mm/y

Ocean mass trend comparison



Land contribution
-Gridded TWS

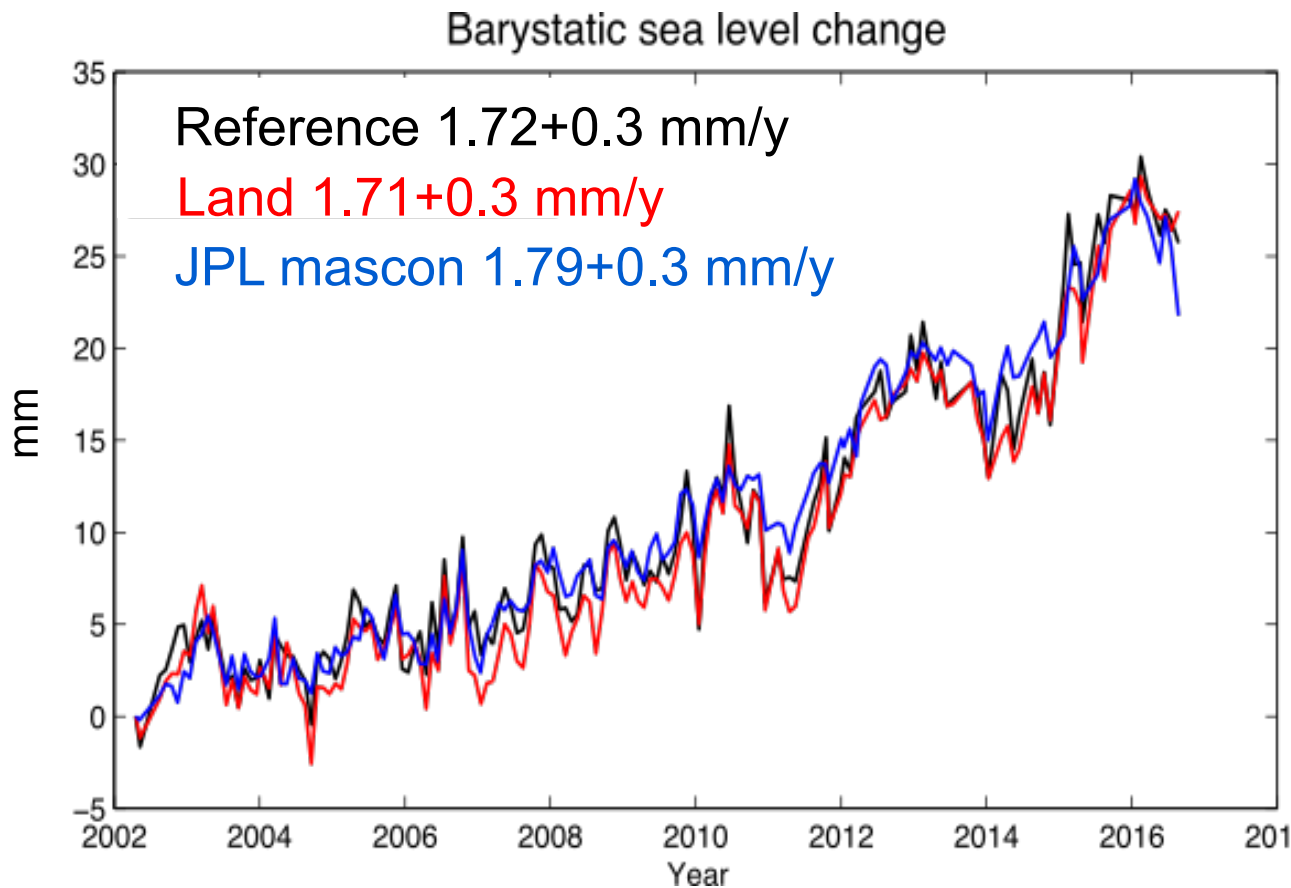
Ocean mass trend comparison



Land contribution
-Gridded TWS

1.08 ± 0.3 mm/y
(Rietbroek et al., 2016)

Ocean mass trend comparison



GFZ RL05

-Time period: 04/2002
- 08/2016

Acceleration:
 0.25 ± 0.12 mm/y²
 0.20 ± 0.12 mm/y²

Acceleration
(2002-2014):
 0.15 ± 0.12 mm/y²
 0.20 ± 0.12 mm/y²

Summary

- GFZ is now preparing to routinely process GRACE Level-3 data:
 - TWS grids
 - OBP grids
 - barystatic sea-level
- Post-processing choices critically affect sea-level results:
particularly important are GIA and C20
- GFZ RL05a L2 data provides slightly smaller sea-level rates than the JPL mascon solutions, but substantially larger rates than Rietbroek et al. (2016)

Thank you very much!