

# Sea level budget closure: Status and prospects from an integrative study within ESA's Climate Change Initiative



sea level  
budget closure  
cci

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## Summary

Studies of the sea level budget are a means of assessing our ability to quantify and understand sea level change and its causes.

**Total sea level budget closure** implies that observed changes of global mean sea level equal the sum of observed (or otherwise assessed) contributions, namely changes in ocean mass and ocean thermal expansion.

**Ocean mass budget closure** implies that observed ocean mass change equals changes in mass from glaciers, ice sheets, land water storage, snow pack and atmospheric water content.

**Mis-closure** of these balances indicates errors in some of the components or contributions from missing or unassessed elements in the budget.

ESA's Climate Change Initiative (CCI) has conducted a number of projects related to sea level.

Using the improved, consistent, and well-documented data products from these CCI projects, it is time to re-assess the sea level budget closure. This is the aim of the CCI Sea Level Budget Closure (SLBC\_cci) project, started in April 2017.

The project will

- investigate the closure of the sea level budget in a coherent way
- use CCI products in conjunction with other products; assess the quality of CCI products
- study and analyze the regional variability of sea level and its steric and mass components. The Arctic Ocean is chosen as study region
- prepare the way to more comprehensive and more operational assessments of the global and regional sea level budget.

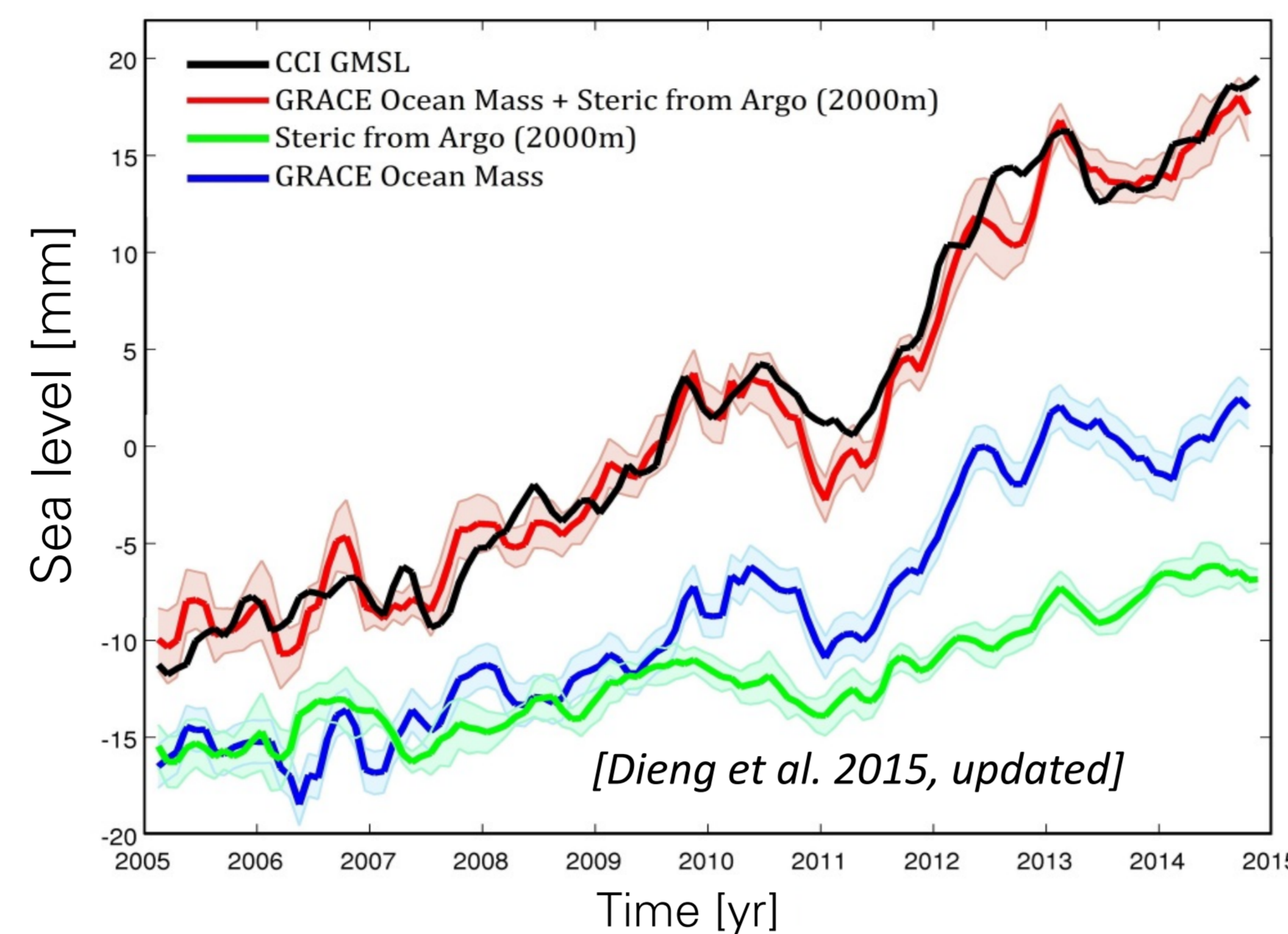
Scientists are welcome to interact with the project by offering their datasets and by using, and further assessing, the project output.

## References

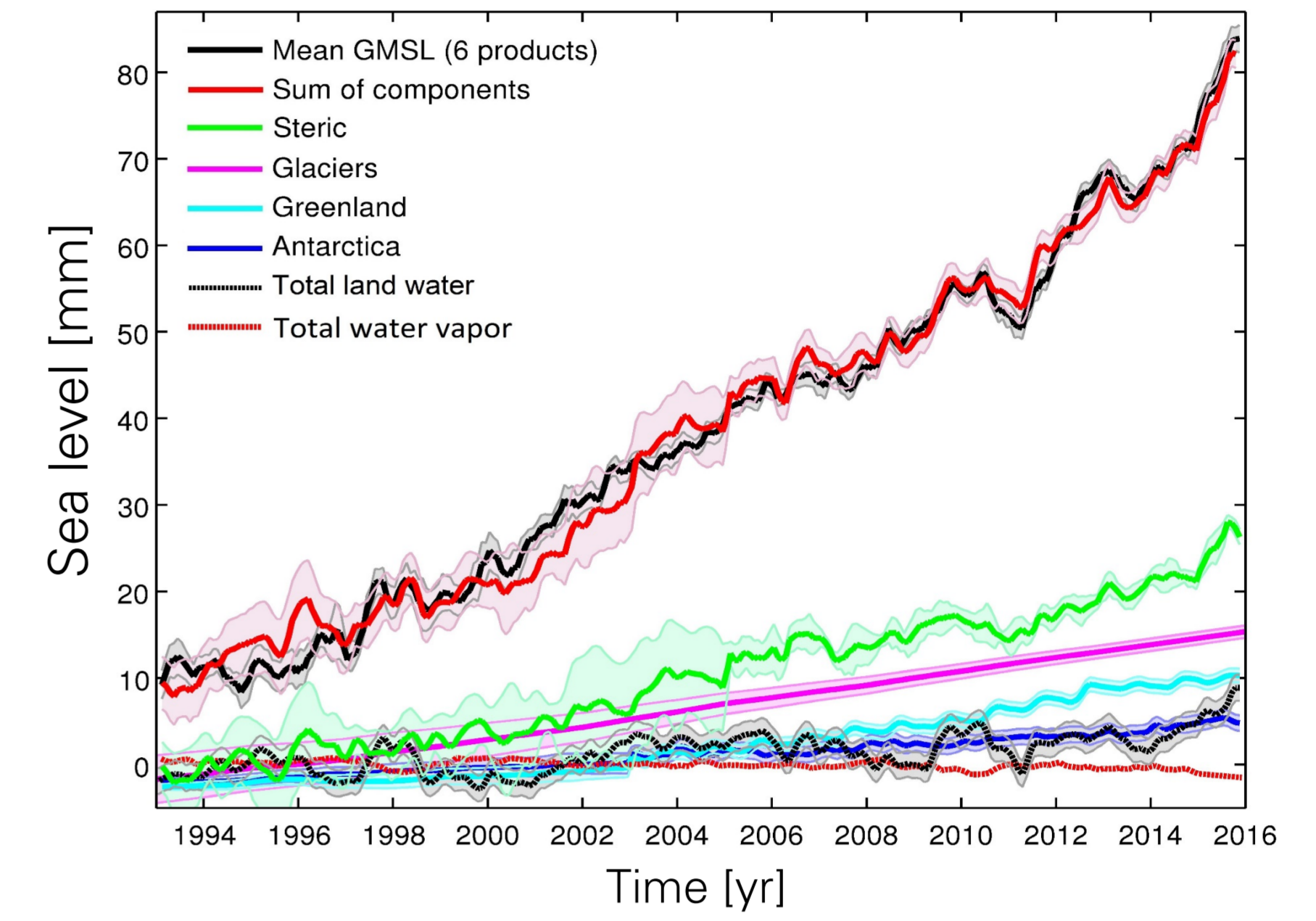
A collection of survey papers is freely available in the *Surveys of Geophysics* 2017, 38(1), special issue "ISSI Workshop on Integrative Study of the Mean Sea Level and its Components". <https://link.springer.com/journal/10712/38/1>

Dieng, H. B., Palanisamy, H., Cazenave, A., Meyssignac, B., & von Schuckmann, K. (2015). The sea level budget since 2003: inference on the deep ocean heat content. *Surv. Geophys.* 36(2), 209.

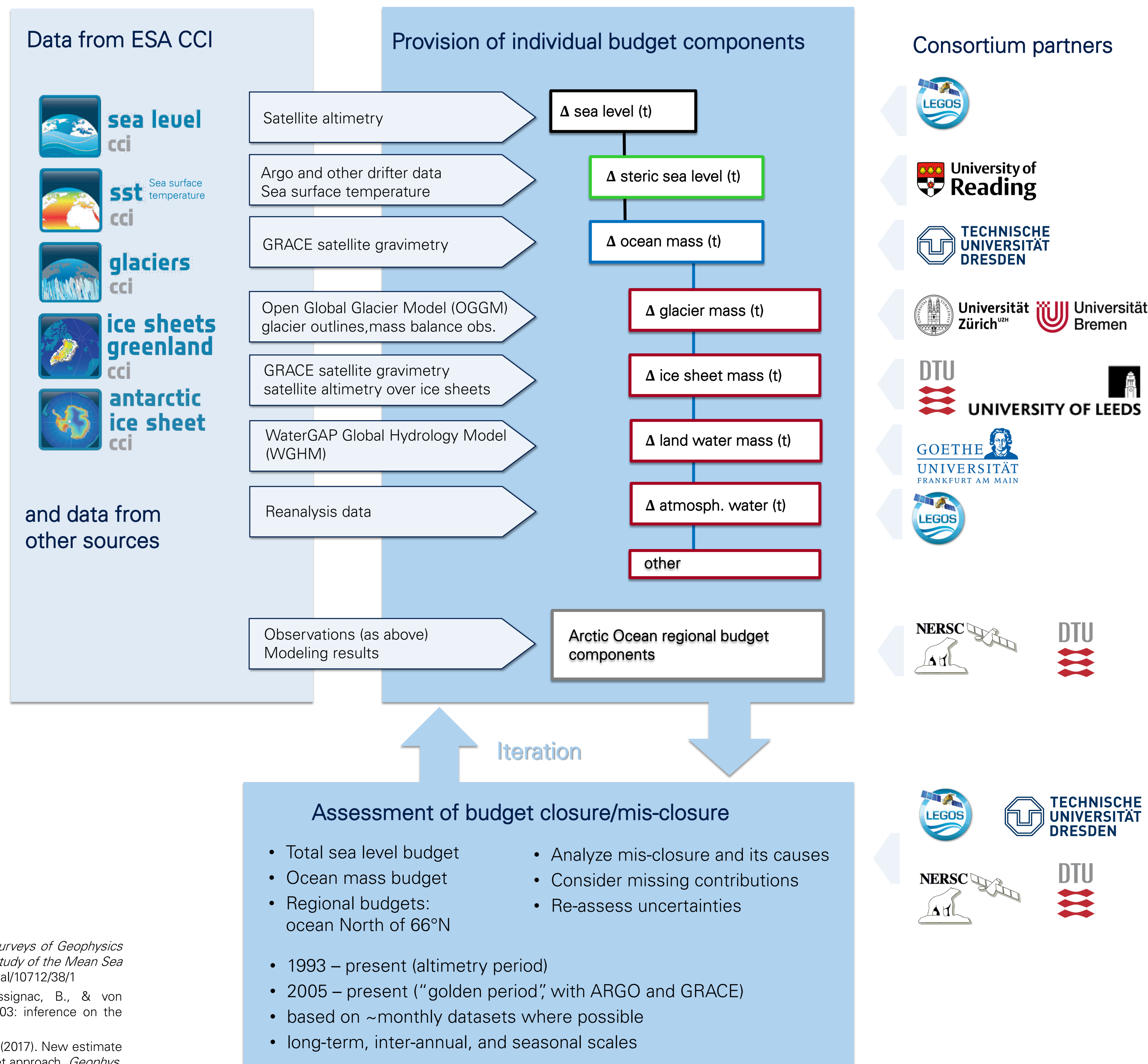
Dieng, H. B., Cazenave, A., Meyssignac, B., & Ablain, M. (2017). New estimate of the current rate of sea level rise from a sea level budget approach. *Geophys. Res. Lett.*, 44(8), 3744-3751.



Sea level budget 2005-2014 (updated from the previous study by Dieng et al. 2015). Global mean sea level from Sea Level CCI. The steric and ocean mass components are based on averages of 4 Argo and 3 GRACE products, respectively. Red curve: sum of assessed components



Sea level budget 1993-2015, including assessment of individual mass contributions (modified from the previous study by Dieng et al. 2017). Global mean sea level from the average of 6 altimetry products. Red curve: sum of assessed components



## Consortium partners

