

Regionalizing the Sea-level Budget Using a Neural Network Approach

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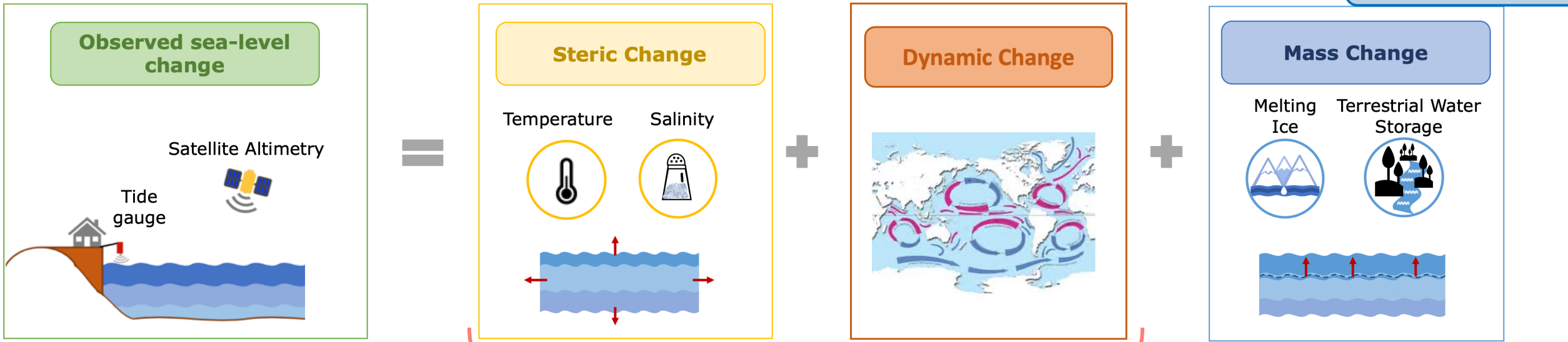
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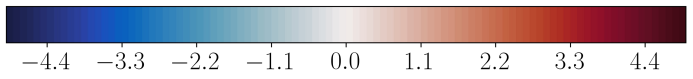
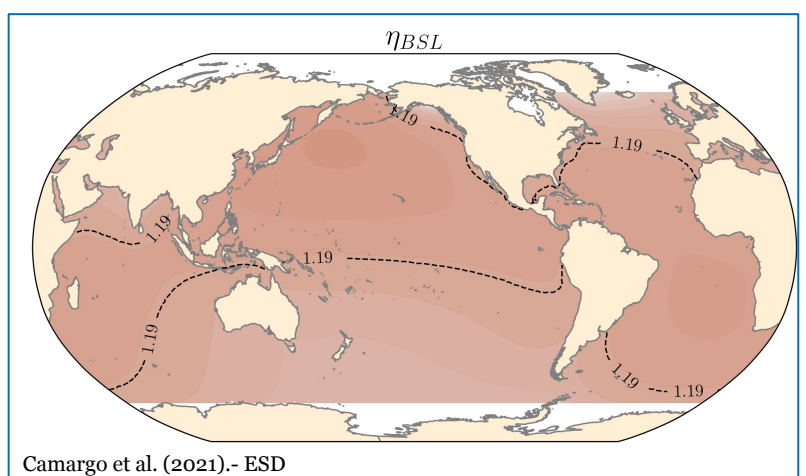
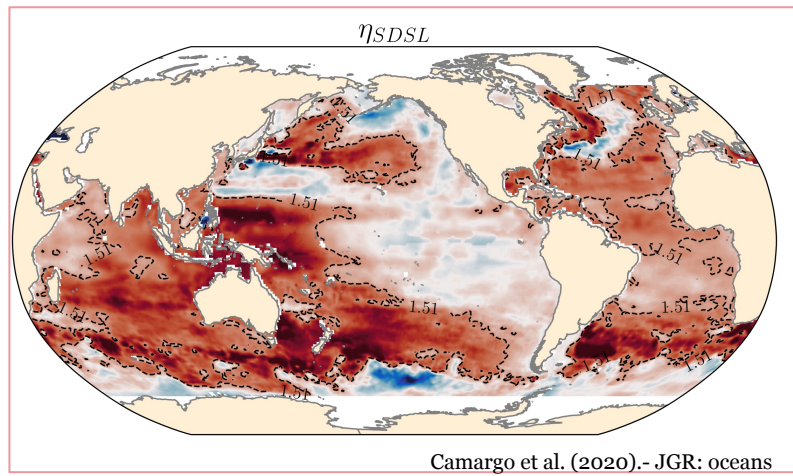
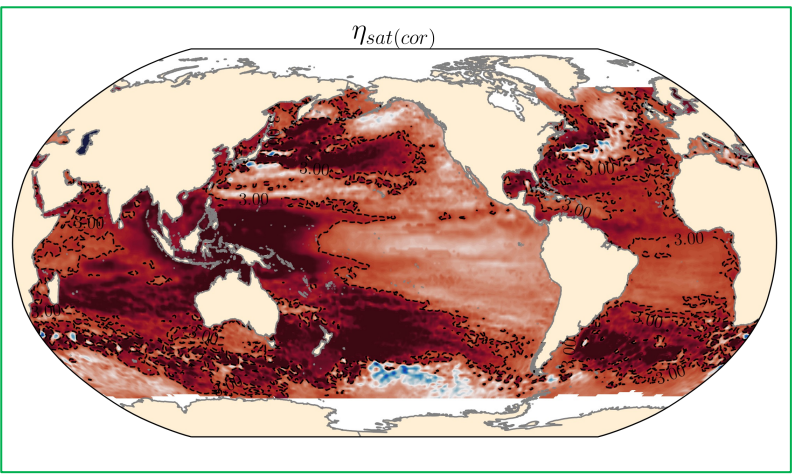
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The Sea-level Budget



Sterodynamic change

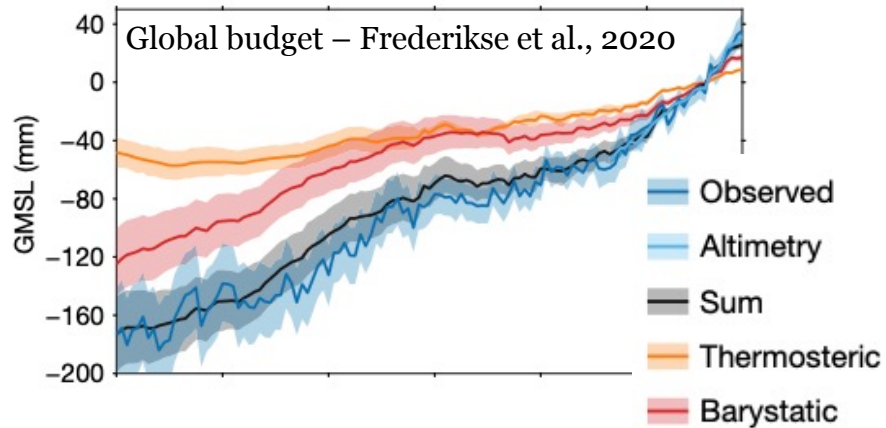


Trend 1993-2017 (mm/yr)

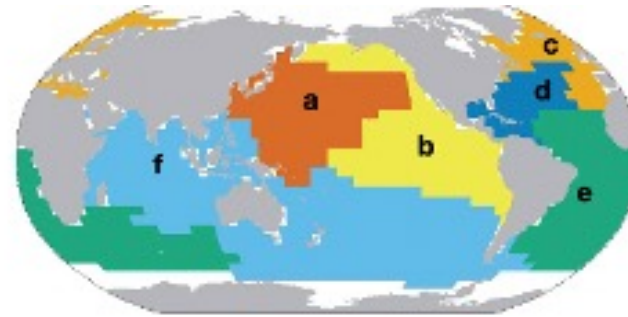
Regional Sea-level Budget

Can we close the sea-level budget?

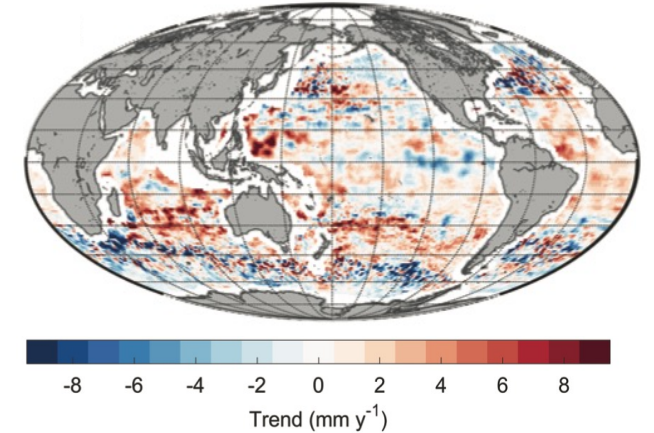
Global ✓



Basins ✓



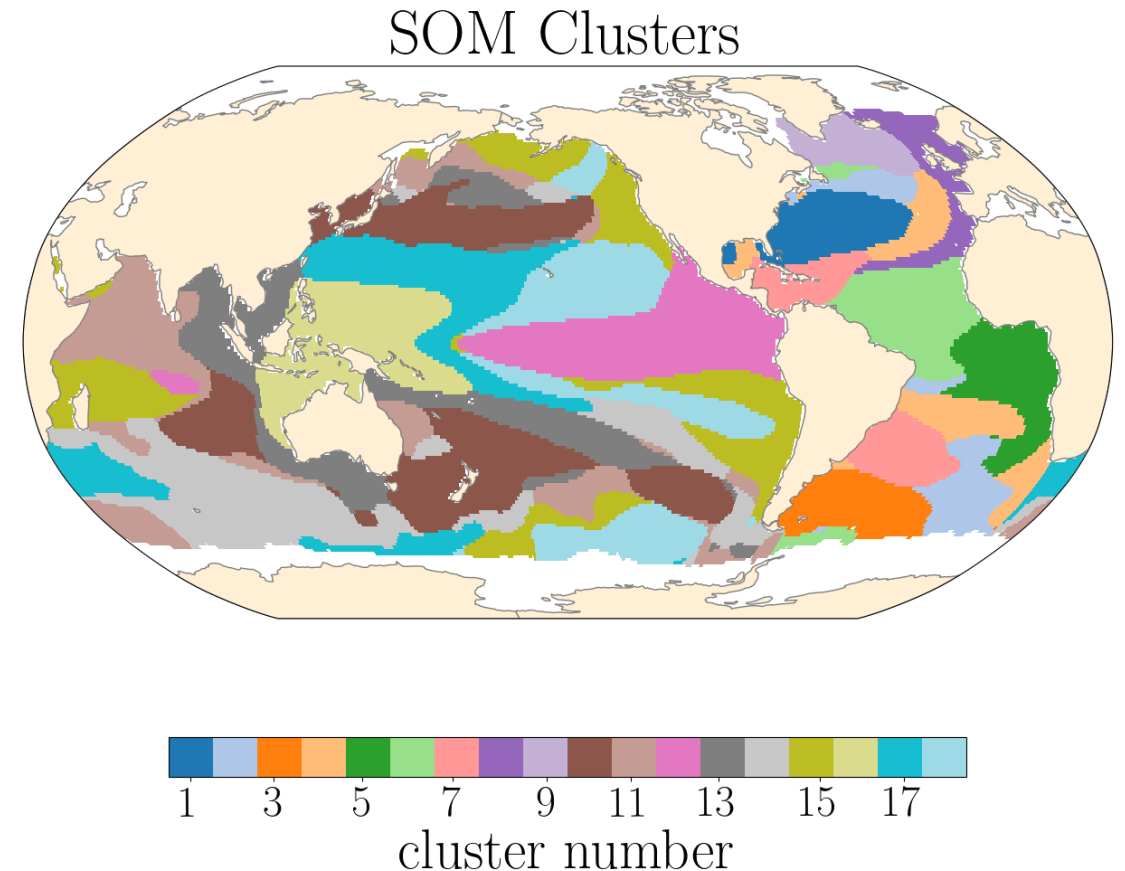
1 degree ✗



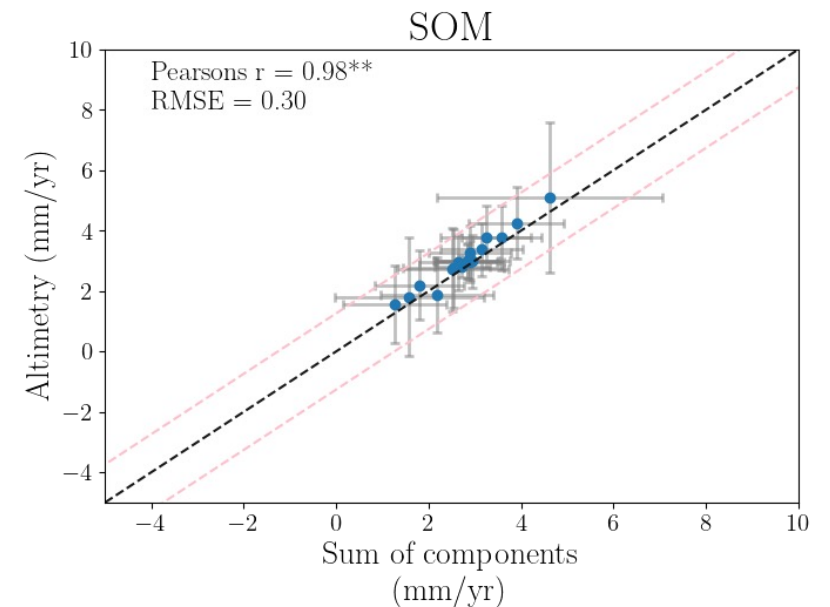
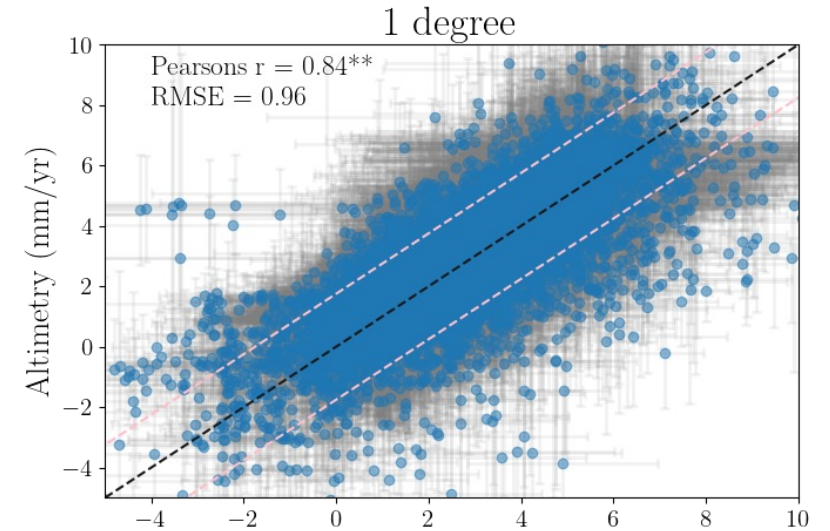
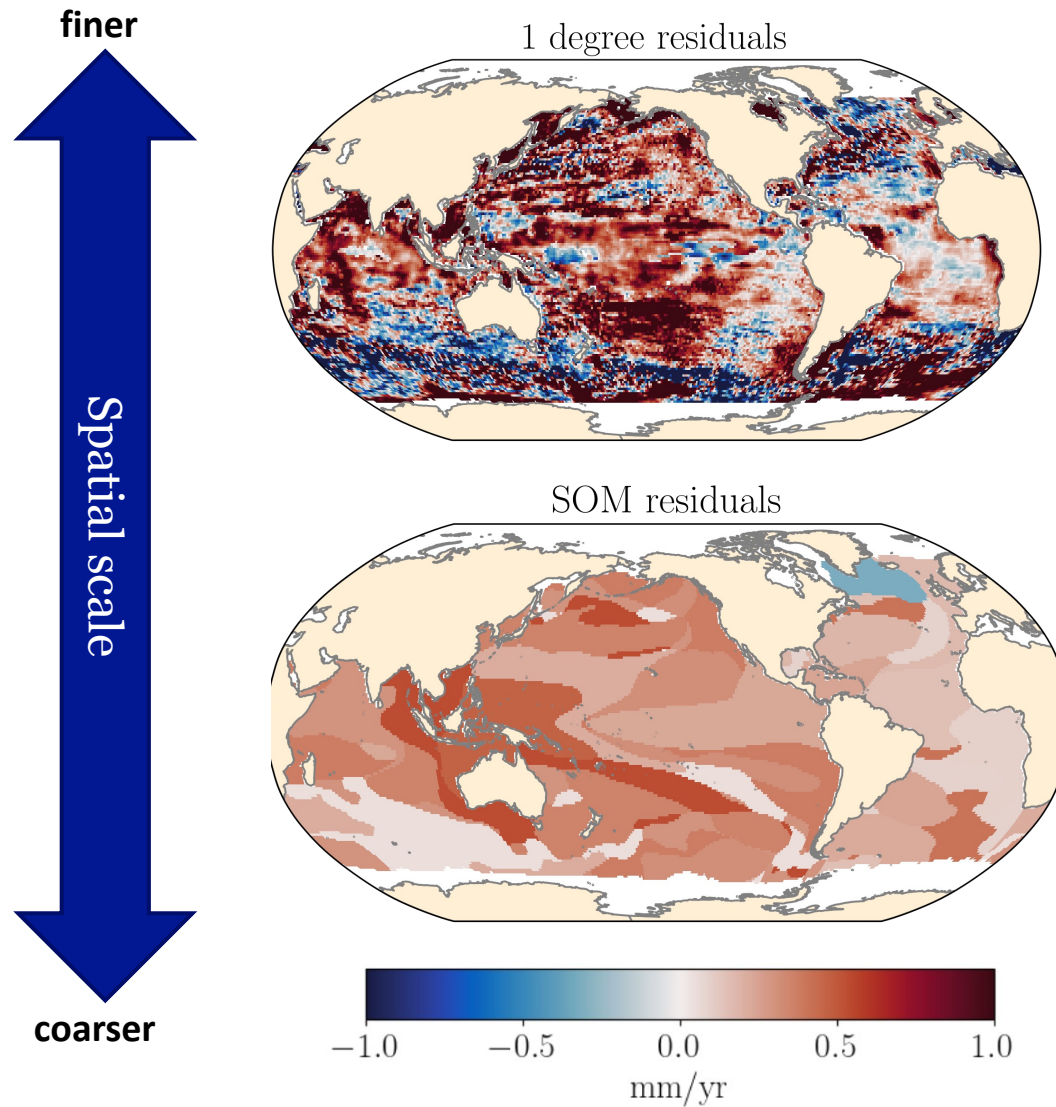
Can we find something in between?

Self-Organizing Maps (SOM)

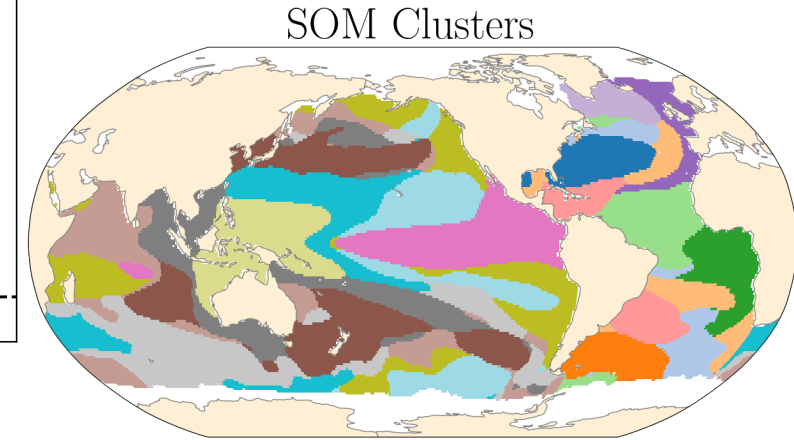
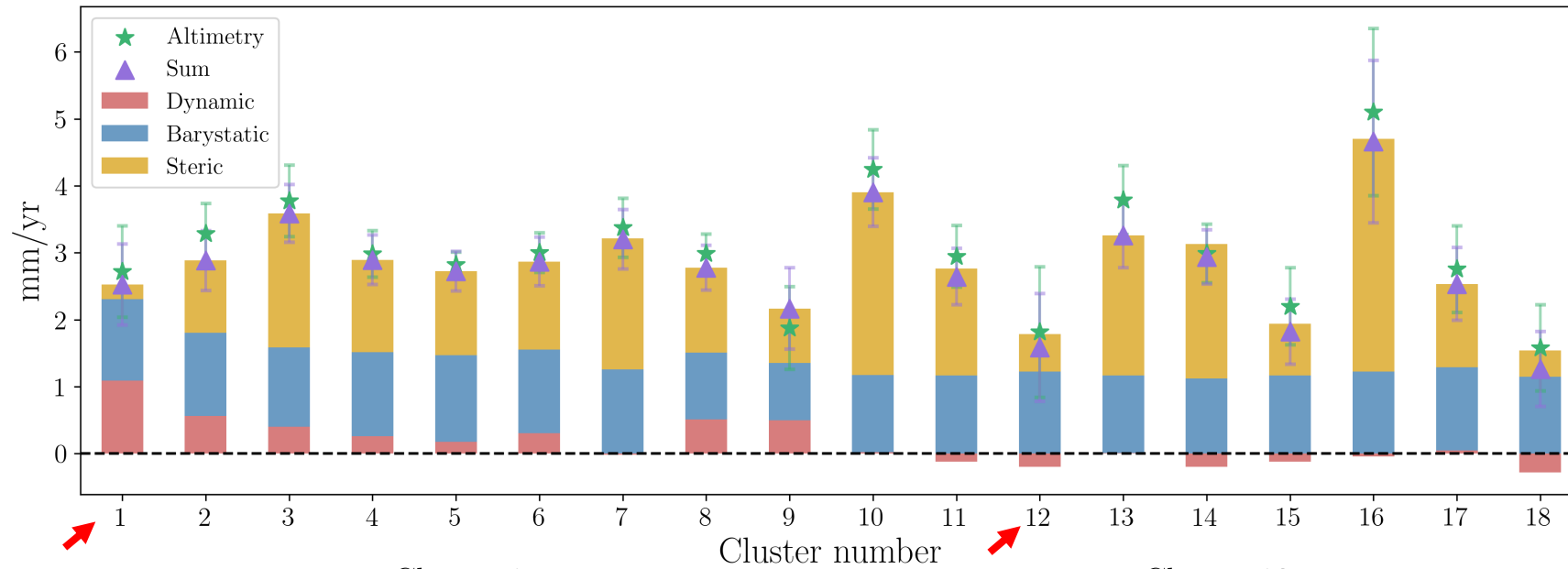
- Unsupervised learning neural network
- Feature extraction and pattern recognition
- **Regions of coherent sea-level variability**
- Input data: sea-surface height (SSH) from Altimetry (detrended, deseasonalised, filtered at 300km)
- Number of clusters (18) as input parameter



Closing the Regional Sea-level Budget

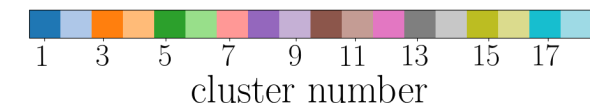
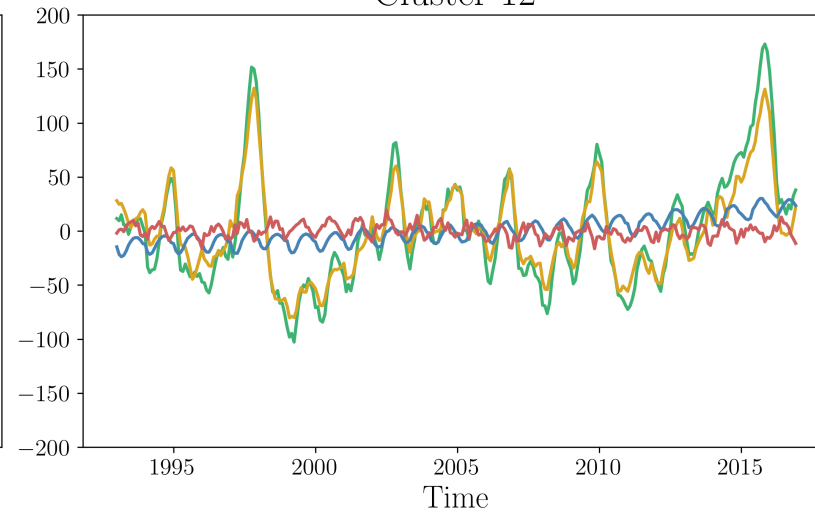
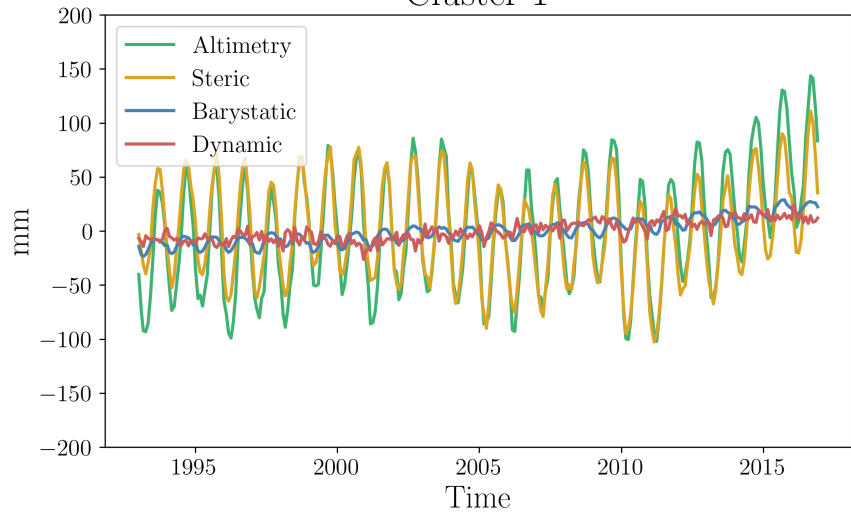


Dominant Drivers of the Budget



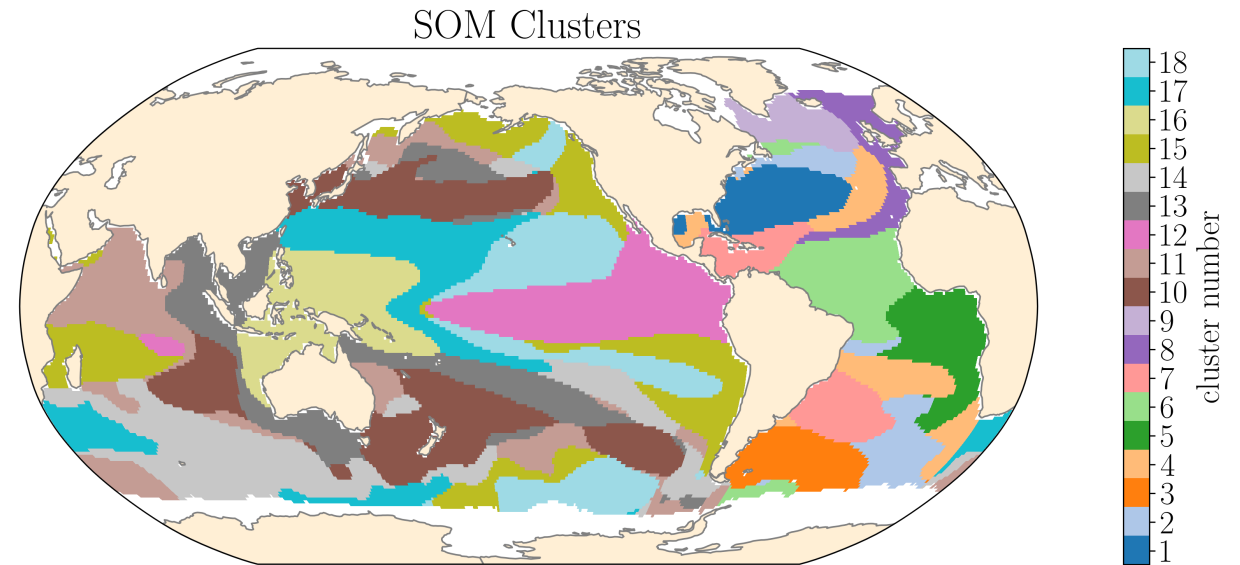
Cluster 1

Cluster 12



Take Home Messages

- Neural networks (SOM) identify regions of coherent sea-level variability
- These regions allow us to close the sea-level budget on a regional to local scale.



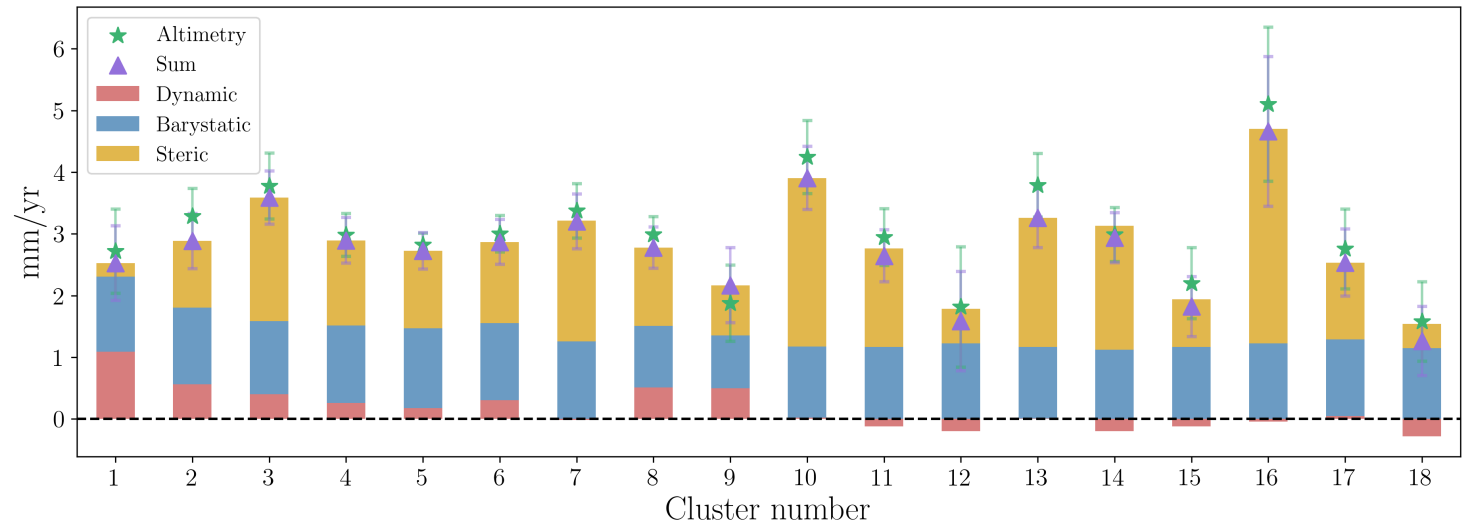
- Questions or want to know more?



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References

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- Frederikse et al., 2020: The causes of sea-level rise since 1900. *Nature*, 584 (August), <https://doi.org/10.1038/s41586-020-2591-3>,
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