

Modeling the impact of contemporary ocean stratification changes on the global M_2 tide

Lana Opel¹,

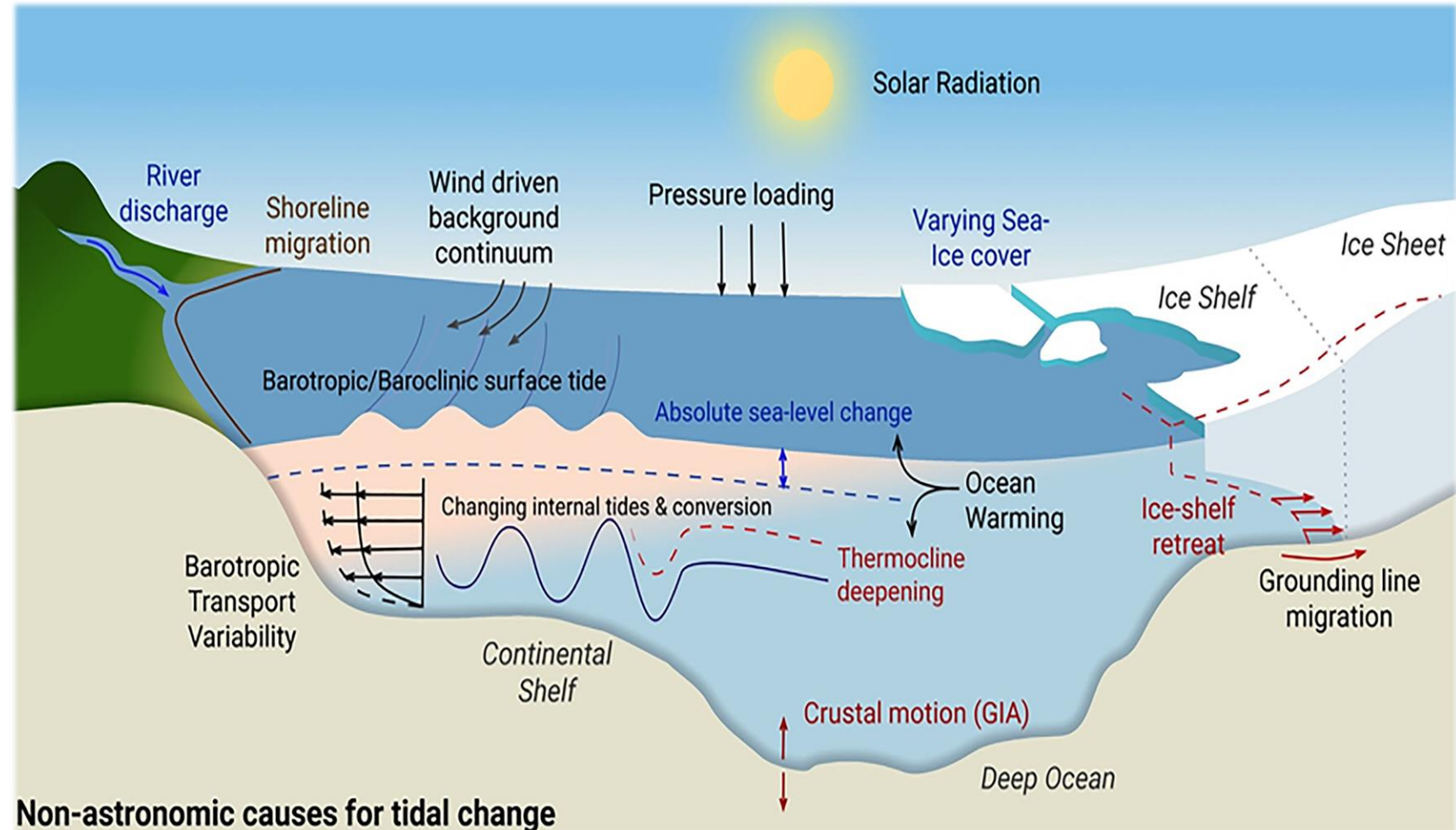
Michael Schindelegger¹

✉ opel@igg.uni-bonn.de



Session: tides in the past, present and future. OS4.1

¹ Institute of Geodesy and Geoinformation, University of Bonn, Germany



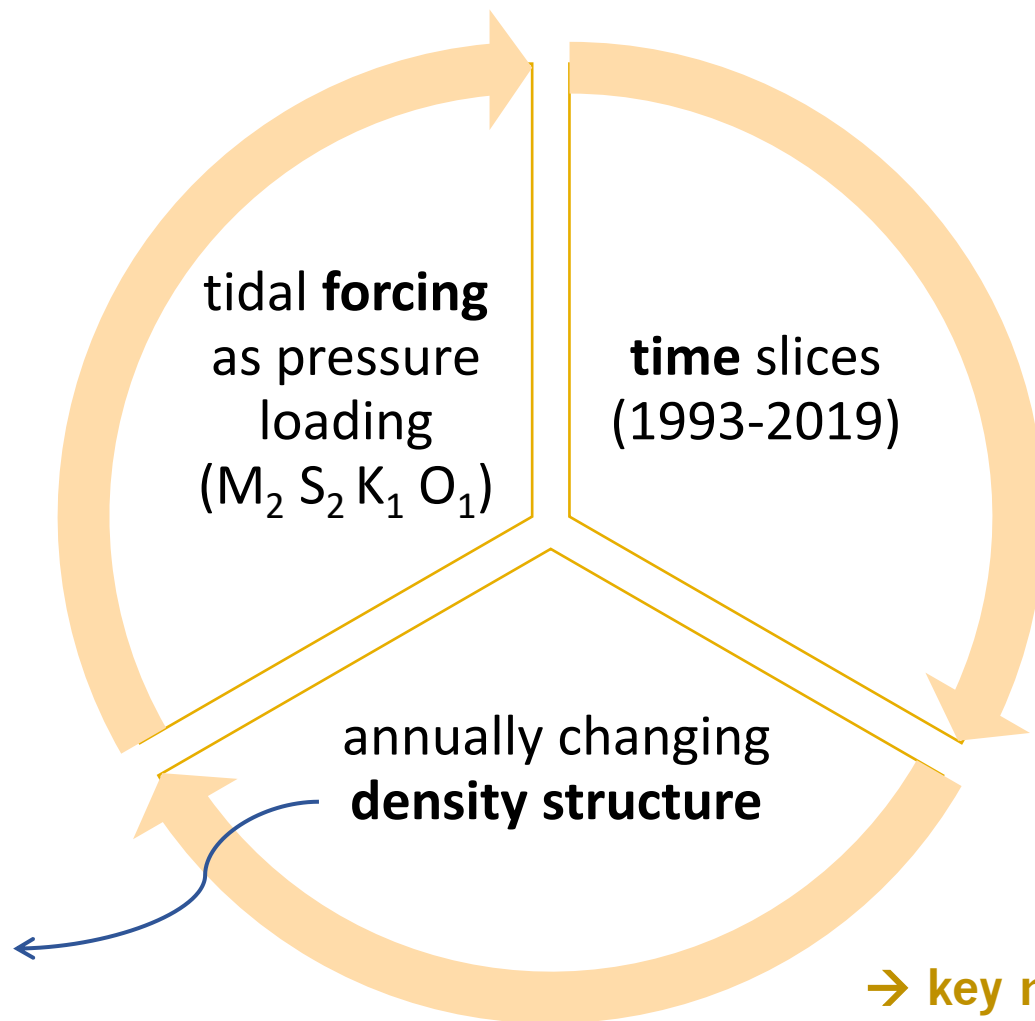
[Haigh et al., 2020]

MITgcm

- Simulations with high resolution general circulation model
- Our analysis focus: M_2



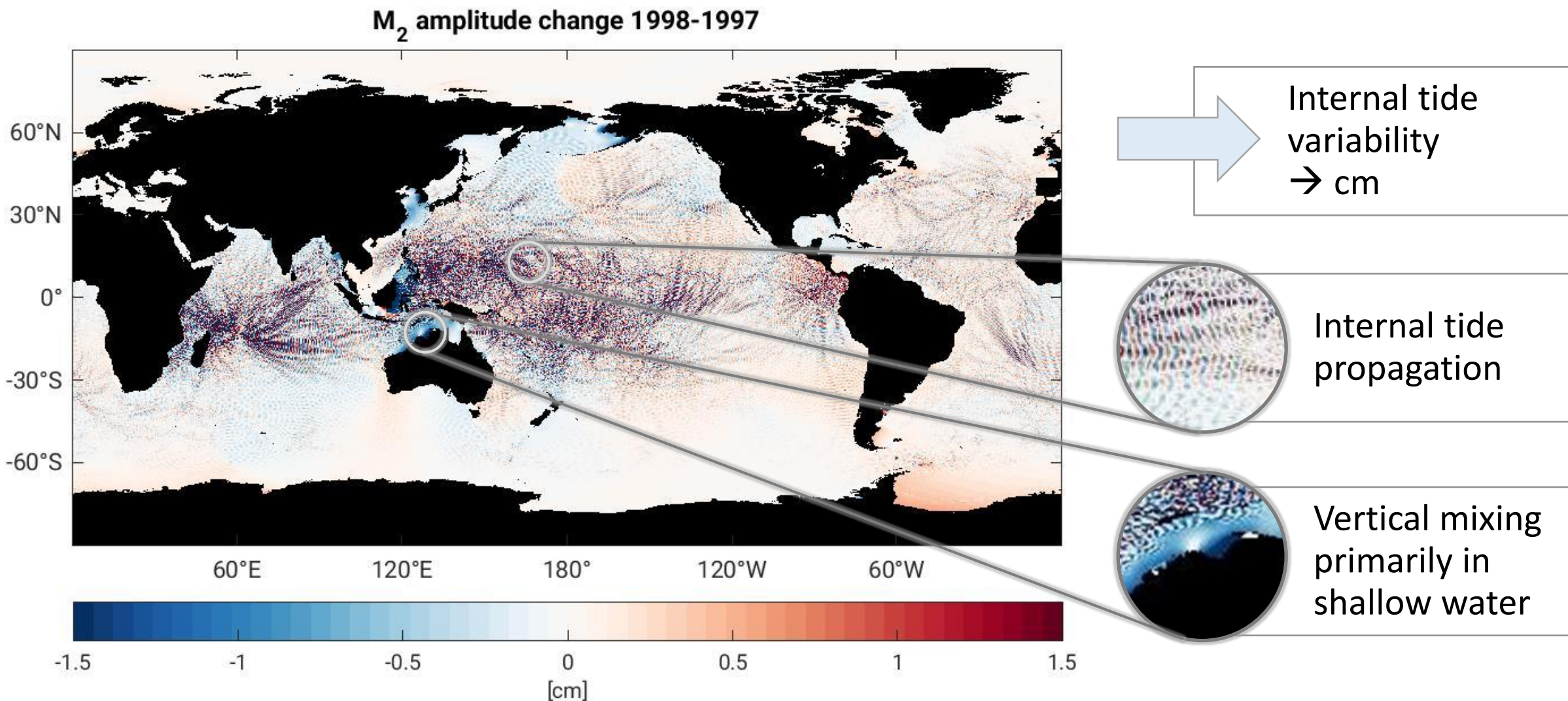
GLORYS12V1 → Global Ocean Physics Reanalysis



LLC1080

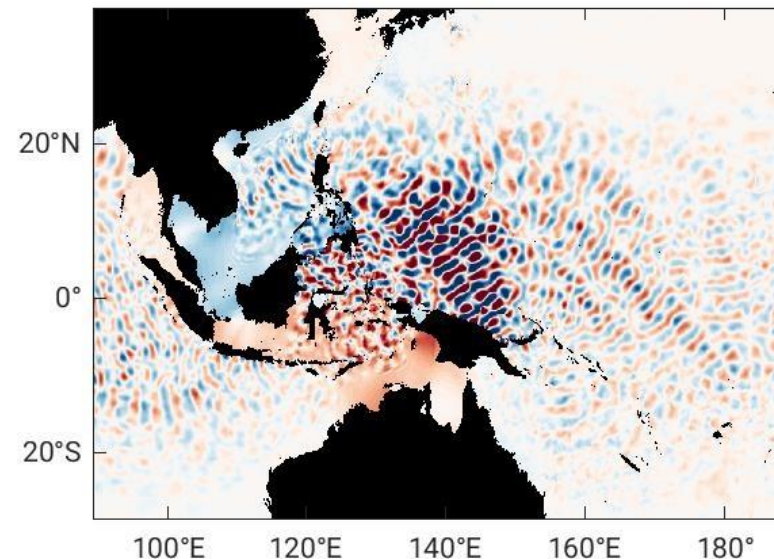
- Horizontal $1/12^\circ$
- Vertical 59 layer

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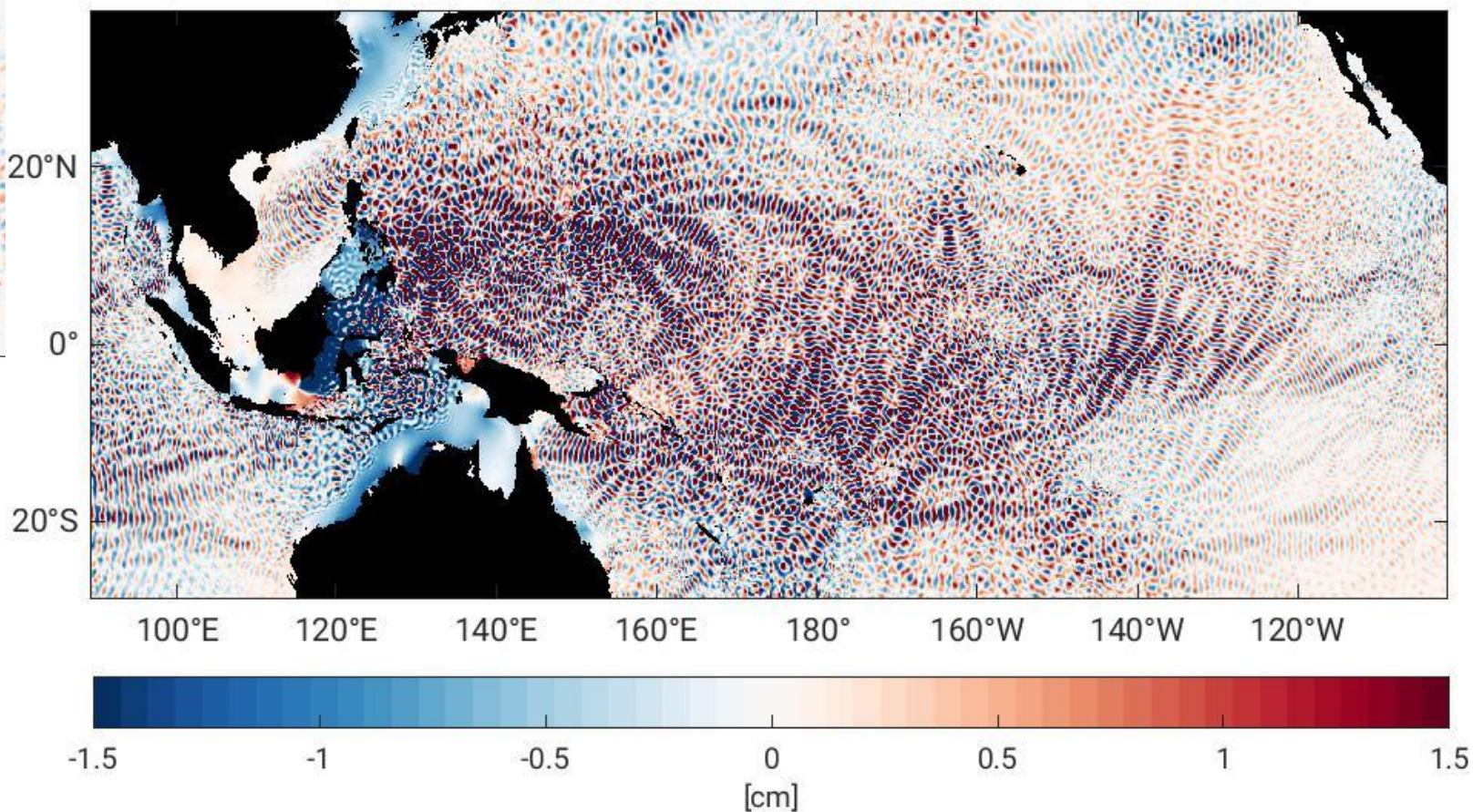


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O_1 amplitude change 1998-1997



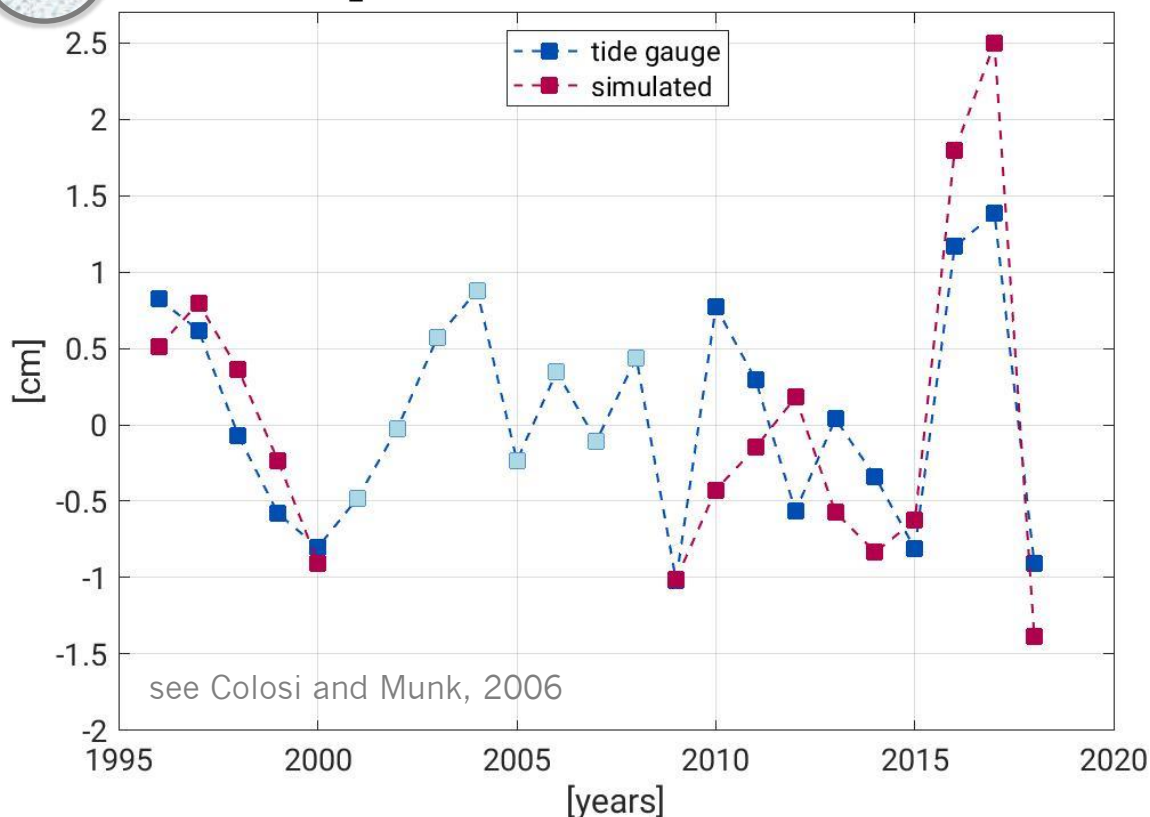
M_2 amplitude change 1998-1997



Validation with tide gauge data (GESLA3) → *work in progress*

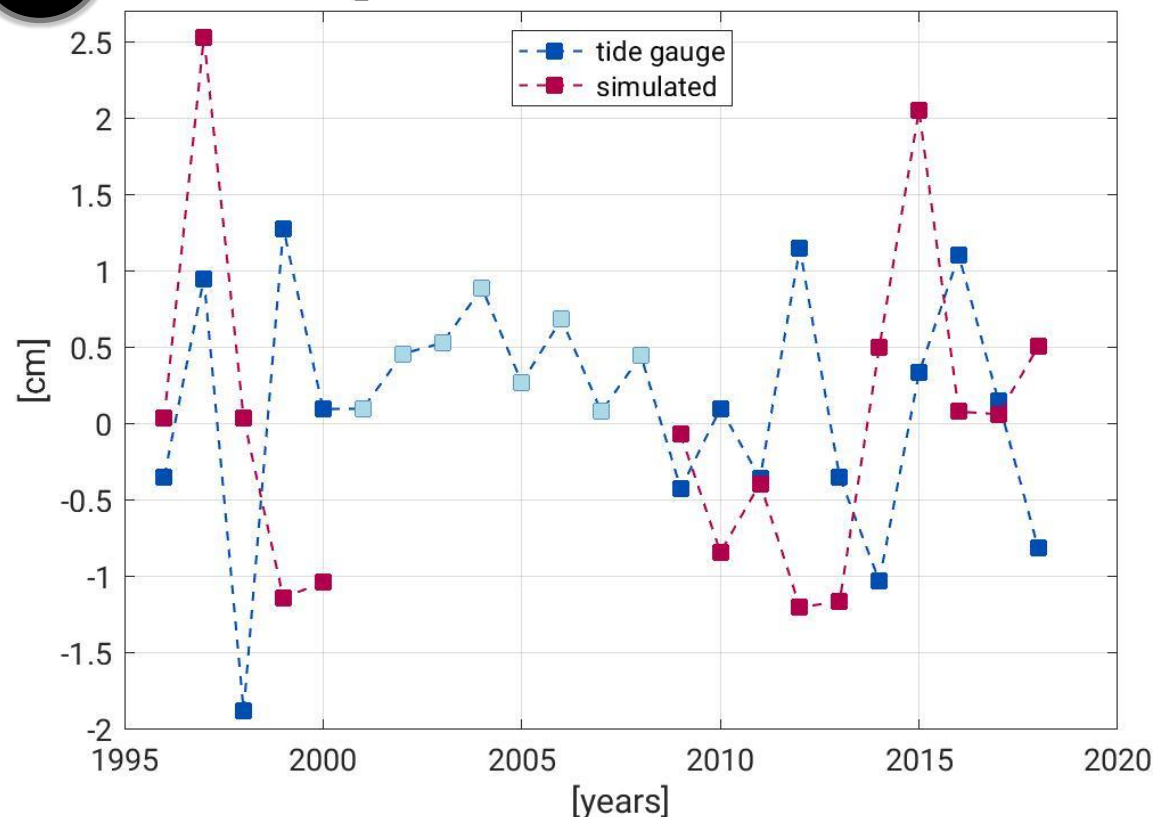
a) **Honolulu**, Hawaii (21.31°N, 157.87°W)

M_2 amplitude, mean and trend reduced



b) **Darwin**, Australia (12.47°S, 130.85°E)

M_2 amplitude, mean and trend reduced



References

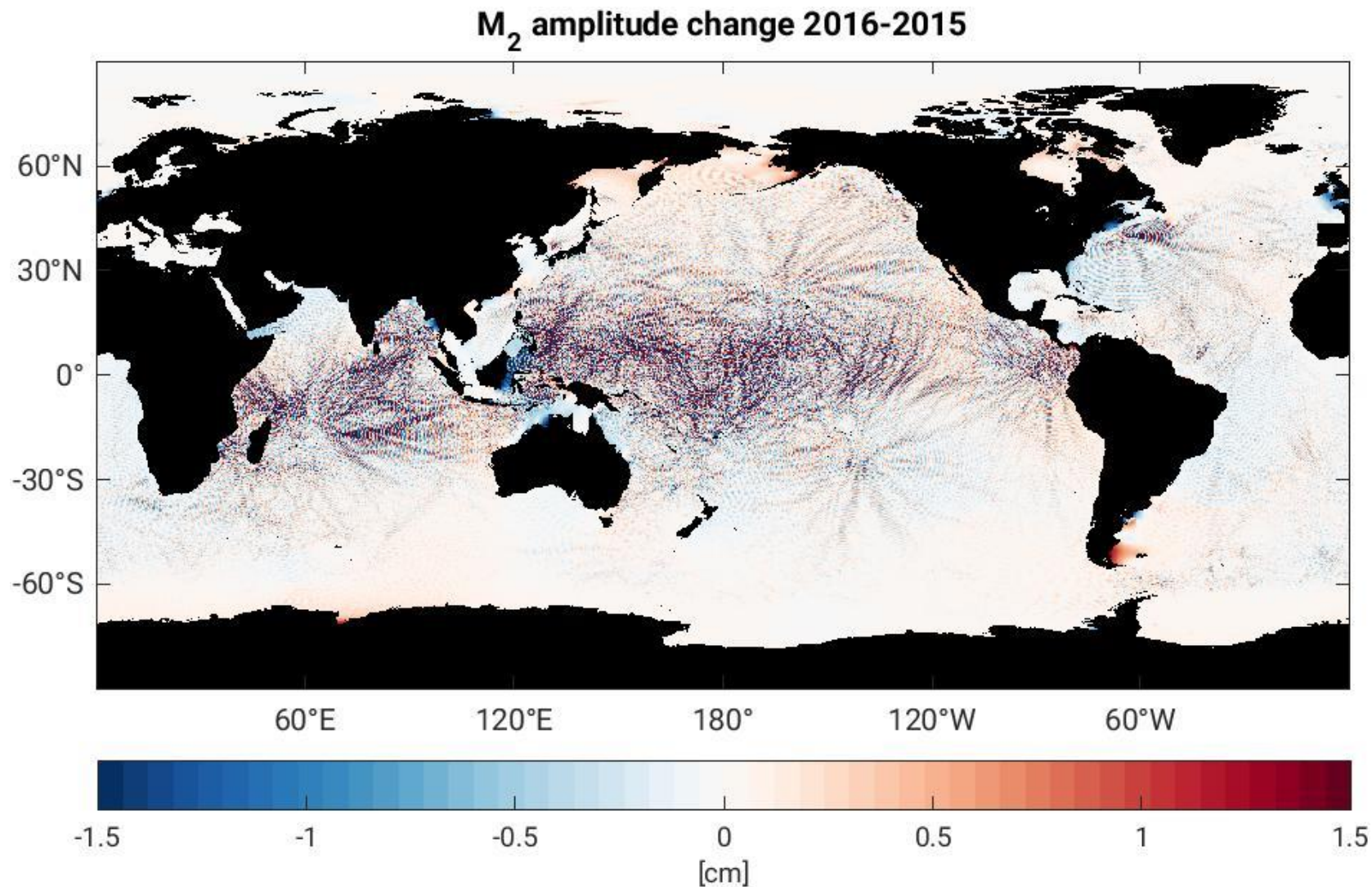
- MITgcm, https://github.com/MITgcm-contrib/llc_hires
- GLORYS12V1, Copernicus Marine Service, https://resources.marine.copernicus.eu/product-detail/GLOBAL_MULTIYEAR_PHY_001_030/INFORMATION
- GESLA3, <https://gesla787883612.wordpress.com/>

Acknowledgments

- The authors gratefully acknowledge the Gauss Centre for Supercomputing e.V. (www.gauss-centre.eu) for funding this project by providing computing time on the GCS Supercomputer JUWELS[1] at Jülich Supercomputing Centre (JSC).
- The work is funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), project number: 451039647 (project SCOOP)

Extended material

Modeling the impact of contemporary ocean stratification changes on the global M_2 tide

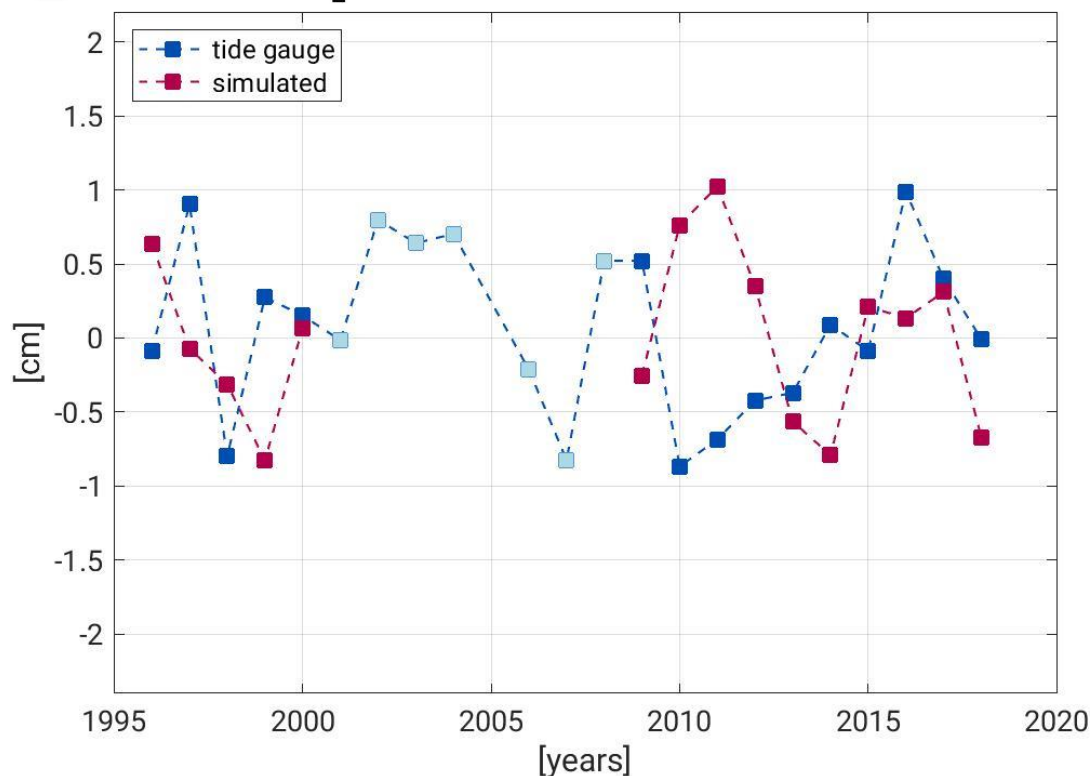


Validation with tide gauge data (GESLA3) → *work in progress*

a) Malakal-B, Palau

(latitude 7.3 °N, longitude 134.47 °E)

M_2 amplitude, mean and trend reduced



b) Robbensudsteert, Germany

(latitude 53.64°N, longitude 8.4452 °W)

M_2 amplitude, mean and trend reduced

