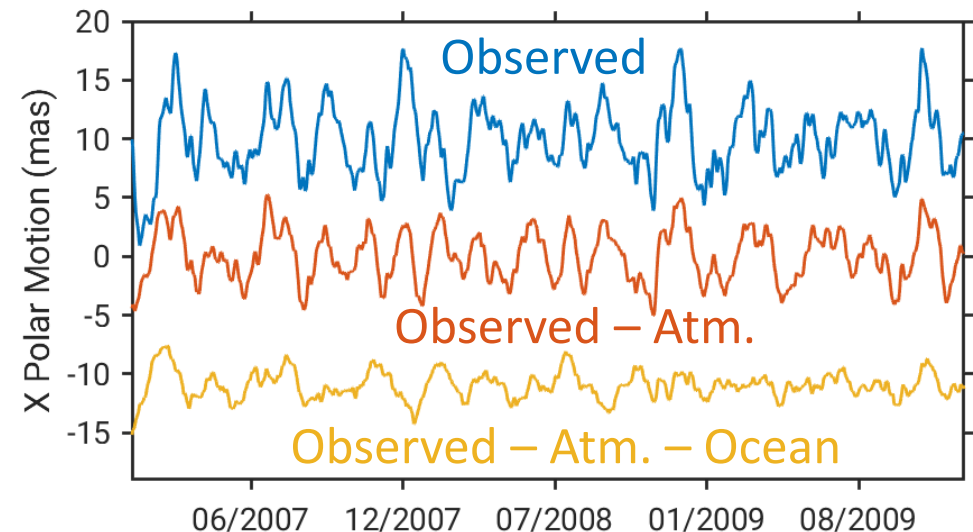


Modeling rapid Earth rotation variations – where are we going next?

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General thoughts in the end, specific focus here:

- Providing accurate estimates of oceanic angular momentum (OAM)
- Sub-seasonal band, periods < 120 days



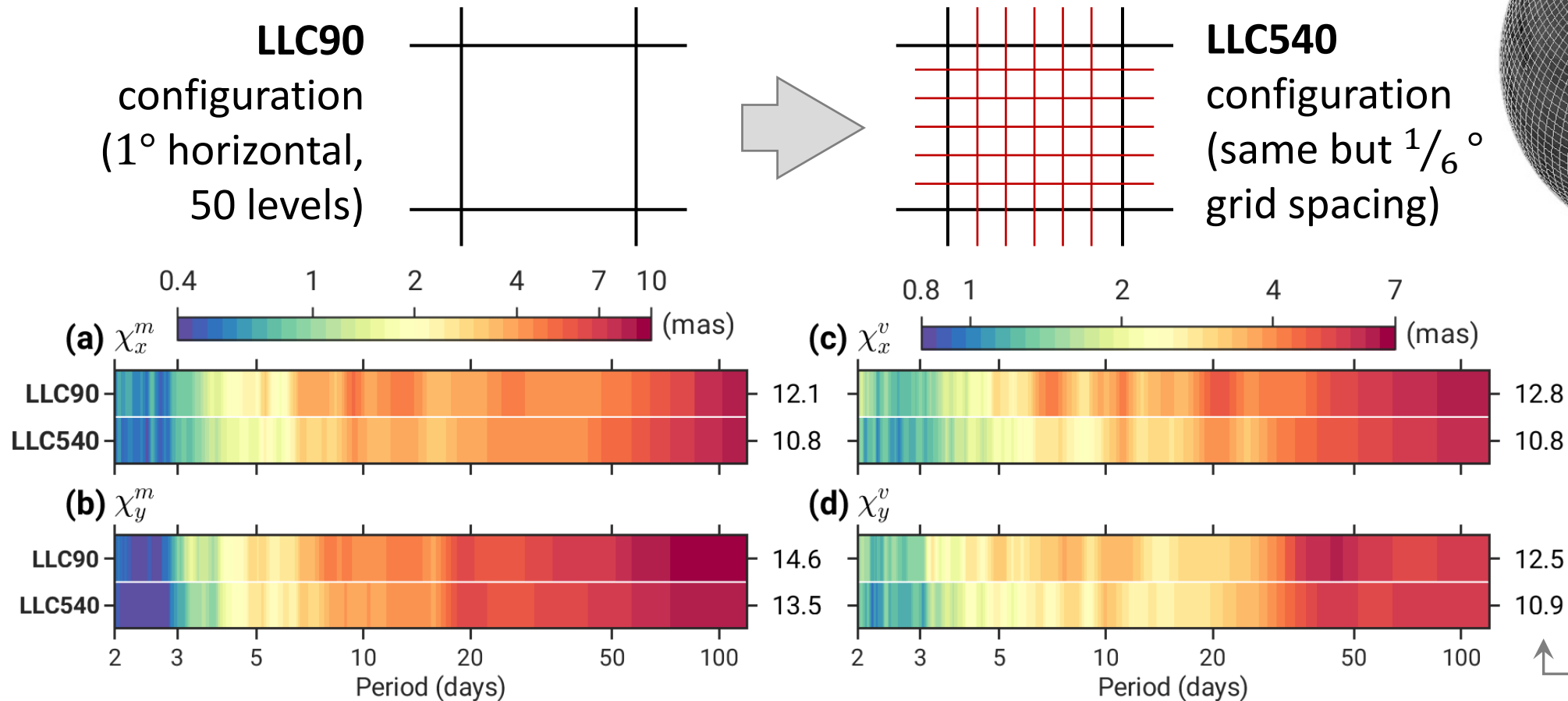
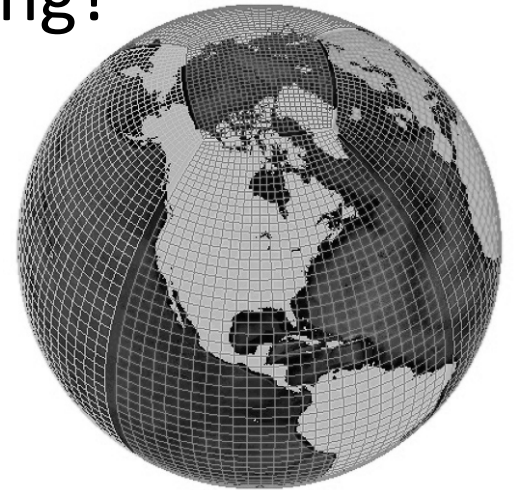
 **EGU General Assembly 2021**

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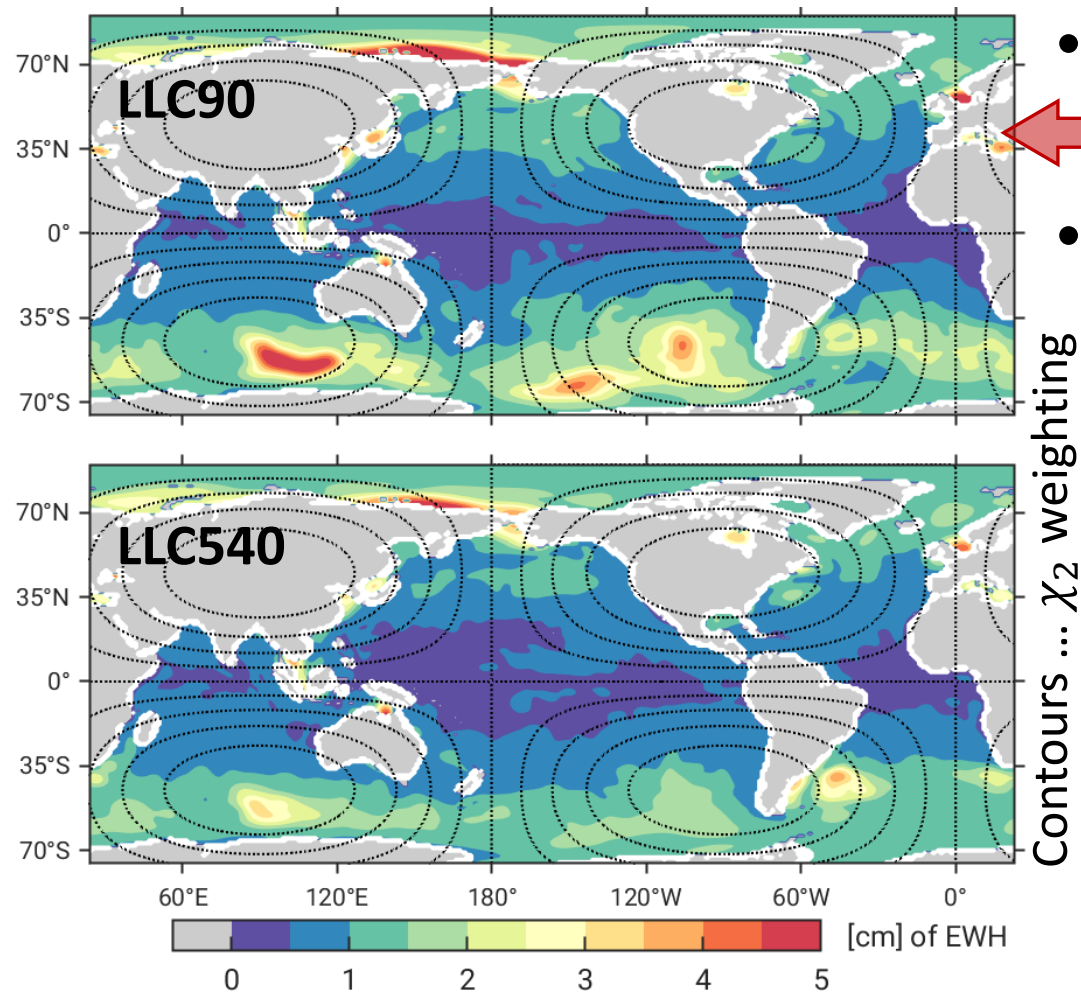


OAM → what can be achieved with pure forward modeling?

- Twin experiment with MITgcm on the **impact of grid spacing**



OAM → Extended validation of LLC* simulations



- Bottom pressure variability (mass terms) → models vs. daily **GRACE** series (ITGS2018, [1])
- Excitation functions χ → Earth **rotation data**, 2007–2011, periods < 120 days:

	$\chi_1 + i\chi_2$ (mas)	χ_3 (μ s)
ERA-Interim +IB	27.5 (52.8%)	34.4 (93.6%)
ERA(+IB) + ECCOv4r4	18.7 (53.8%)	21.8 (59.9%)
ERA(+IB) + LLC90	19.1 (52.0%)	22.6 (56.8%)
ERA(+IB) + LLC540	16.1 (65.7%)	20.3 (65.0%)

Values are RMS of χ residuals (% of variance explained)

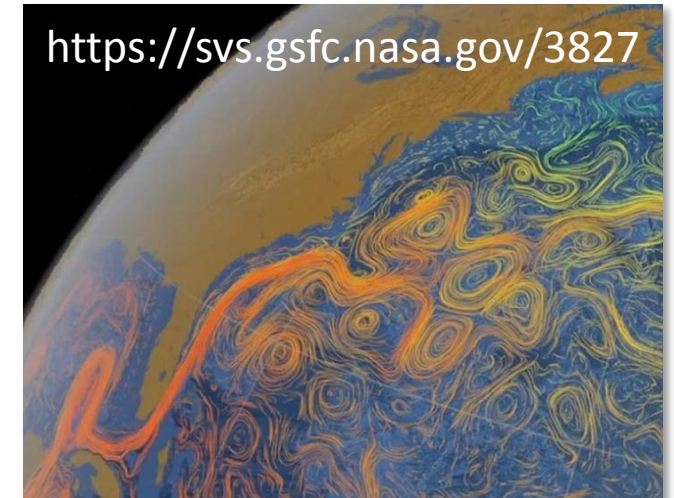
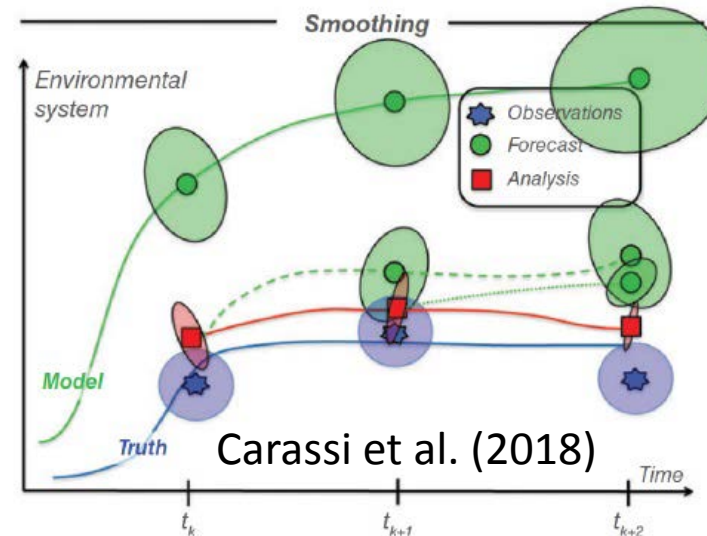
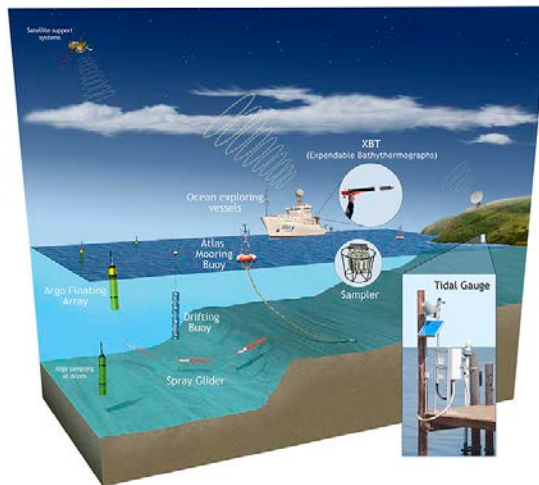
Where are we going next? (oceanic “blinker”)

- Higher model resolution (not necessarily $1/6^\circ$)
- **Physically consistent combinations models / oceanographic data (incl. GRACE)**

FWF Der Wissenschaftsfonds.

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<https://cpo.noaa.gov>



Numerical model constrained to observations

4D ocean (x, y, z, t)

ECCO Estimating the Circulation and Climate of the Ocean

<https://www.ecco-group.org/>