stERic INvestigations (ERIN): how well does ECCO capture the steric sea-level signal?

Erin Robson (erobson@tulane.edu)

Overview:

To compare the steric sea-level signal from ECCO to the steric sea-level signal from the most recent global mean sea level (GMSL) reconstruction Dangendorf et al. (2024)

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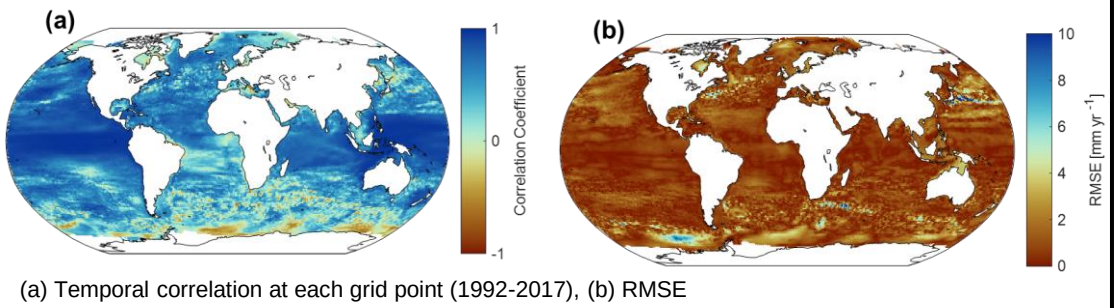
D24 sterodynamic sea level (SDSL) = RSOI – GRD – GIA – IB
ECCO steric SL= absolute sea level [SSHDYN] – (manometric – IB [OBPNOPAB])



(a) Temporal correlation at each grid point (1992-2017), (b) RMSE

Strong positive correlations and low RMSE in open ocean, weak/negative and higher RMSE at boundary currents, coasts, and in the Southern Ocean

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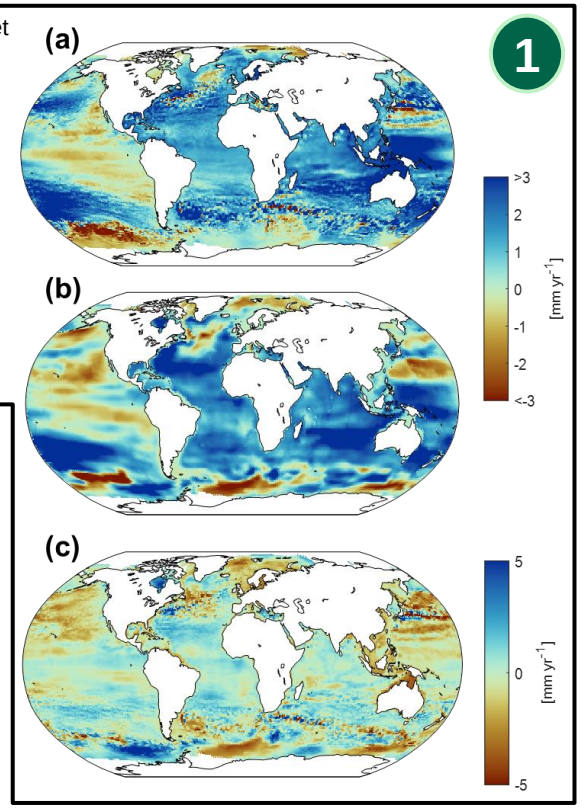
Annual linear trends (1992-2017): (a) Dangendorf et al. (2024), (b) ECCO output, (c) trend differences [ECCO – D24]

Pattern correlation = 0.51

ECCO is underestimating the steric sea-level trend in key locations (coasts/boundary currents)



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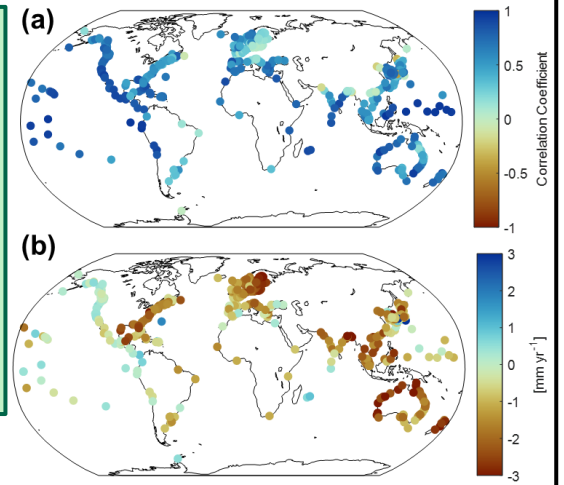
Mostly consistent that in regions with lower trend differences at tide gauges, models are better correlated



(a) Correlations at tide gauges, (b) trend differences at tide gauges

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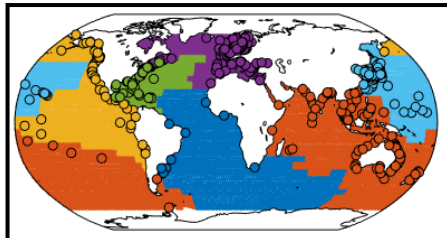
Tools used:

- ECCO v4r4
- Dangendorf et al. (2024) GMSL reconstruction



Tide gauges used in D24 shown as black-edged markers

South Atlantic	0.37
Indo-Pacific	0.78
Northwest Pacific	0.98
Subpolar North Atlantic	0.72
Subtropical North Atlantic	0.91
East Pacific	0.94

Challenges:

- New to Python
- Re-gridding ECCO output onto the same grid as D24