MONITORING SEA LEVEL CHANGE: FROM TOPEX/POSEIDON TO SENTINEL-6 MF AND BEYOND

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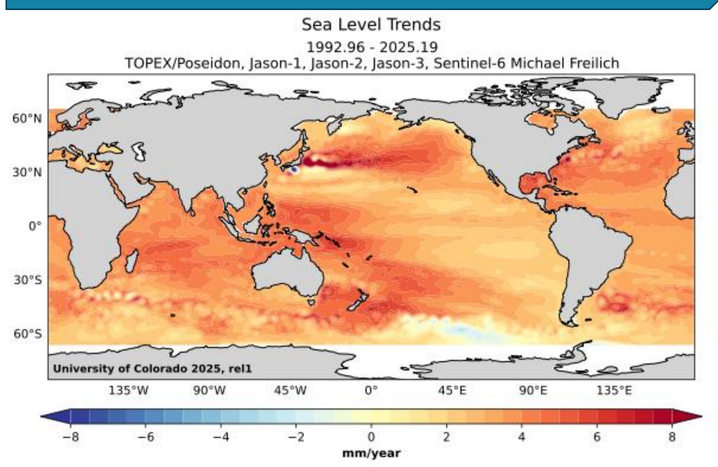
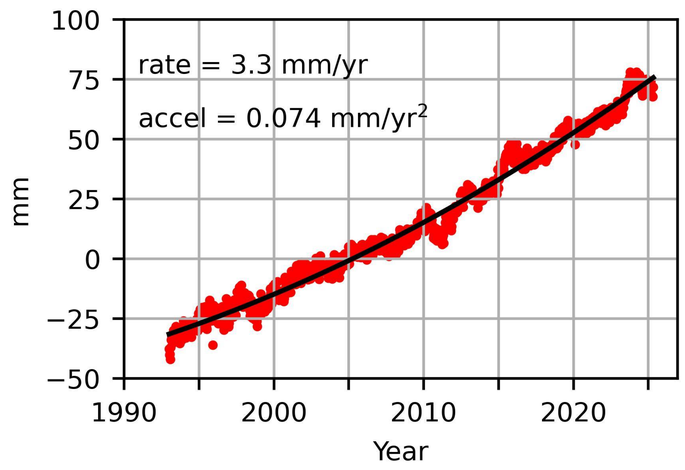
Introduction

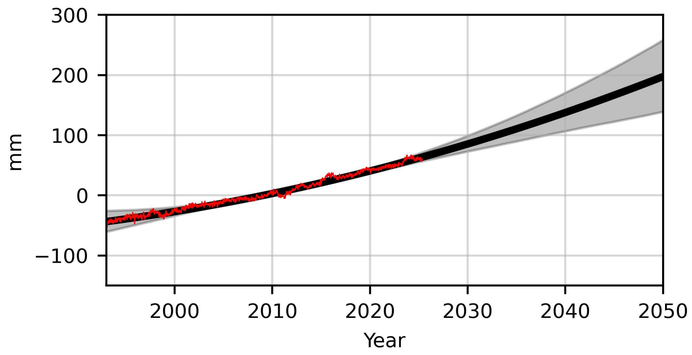
Satellite altimetry measurements from 5 separate missions over the last 33 years have provided a critical record of sea level change, even though this wasn't initially the goal. With each new launch, we have expanded our knowledge about sea level change. We now understand how quickly sea level is changing, how this varies regionally, and what the primary causes are. We know the rate of sea level change is increasing, and we can map the observed trajectory of sea level change forward to understand how this trajectory compares to climate model projections of future sea level change. We can also map the regional variations of sea level change and understand how ocean-atmosphere dynamics distributes heat around the global oceans. This fundamental data record will only become more valuable as the time series lengthens. The launch of the SWOT mission in 2022 enriches this record, and it improves the spatial resolution and extends into coastal regions and estuaries. Future research will address how best to combine these data sources.

Sea Level Trends: 1993-2025

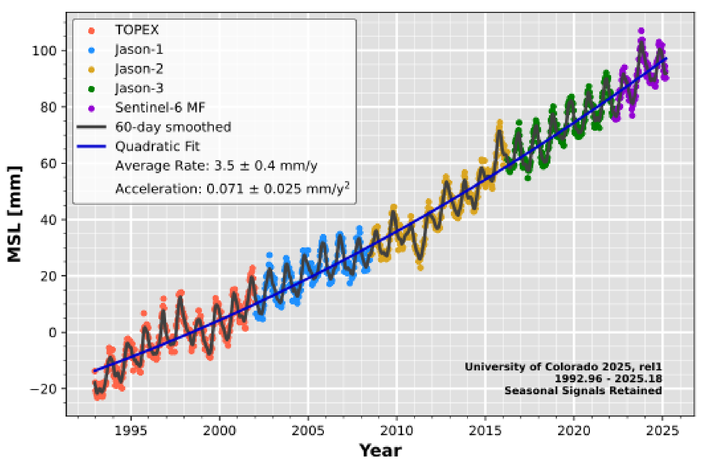


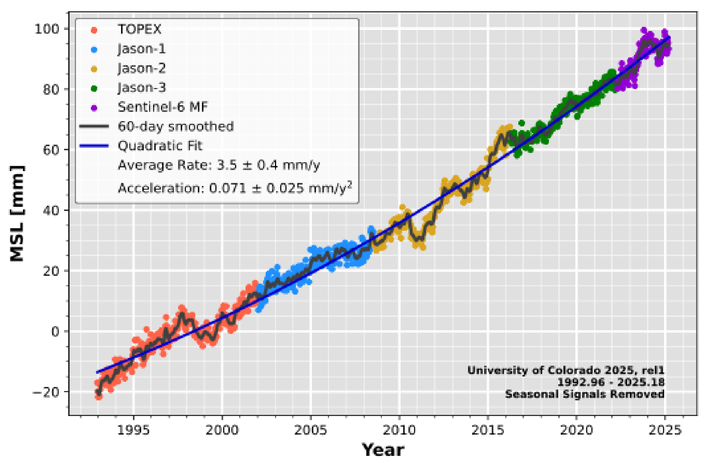
GMSL Extrapolation



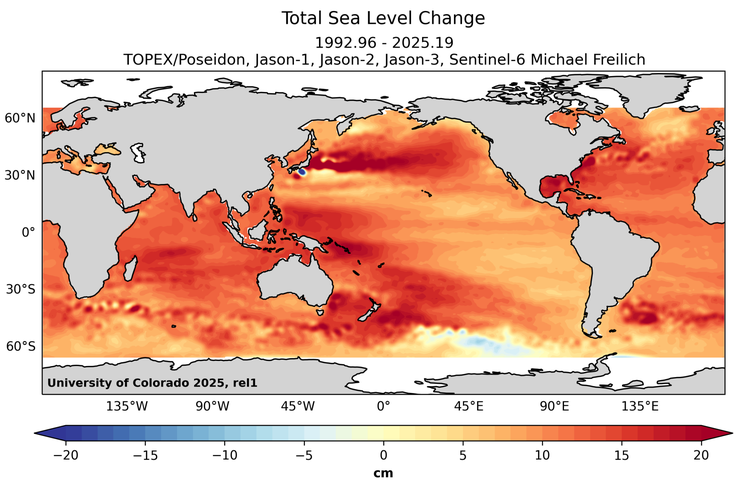


Global Mean Sea Level

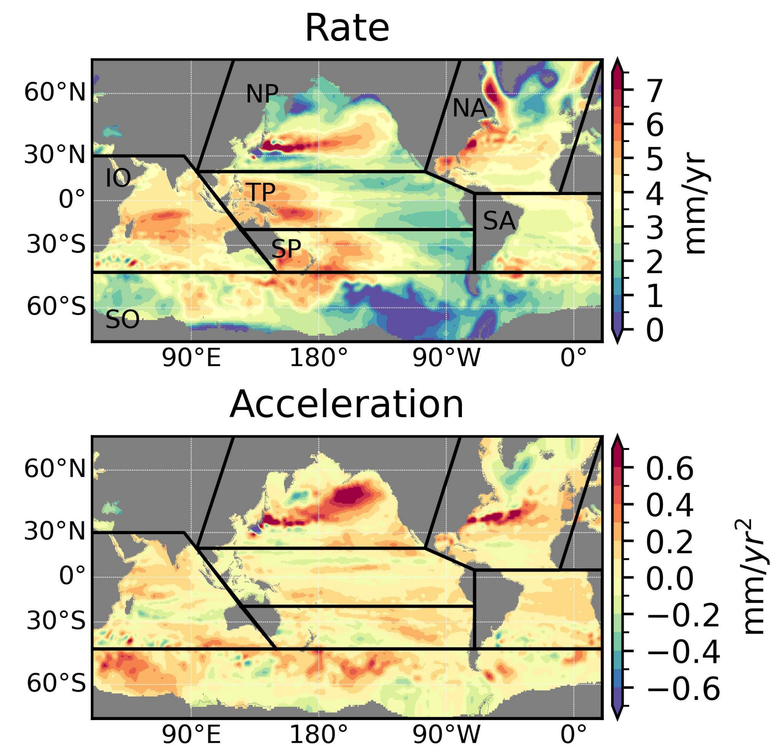




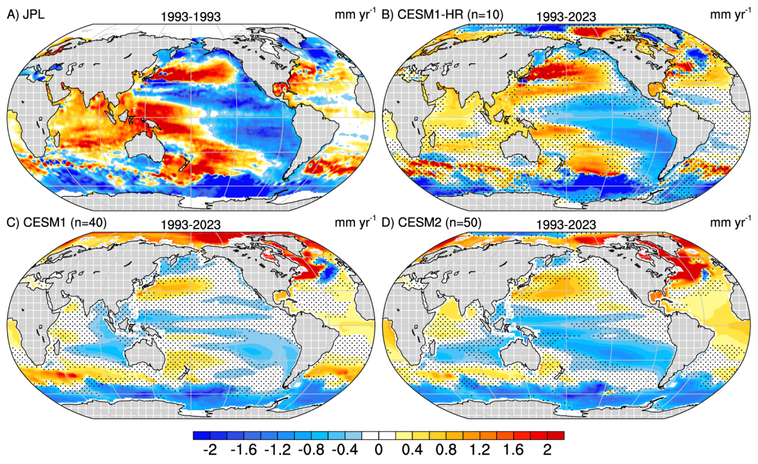
Total Sea Level Change: 1993-2025



Regional Extrapolation

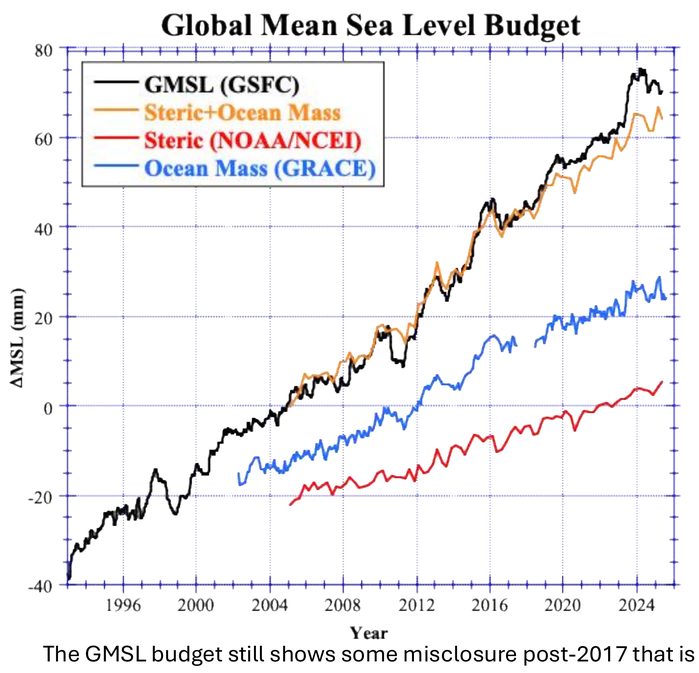


Comparison to Climate Models

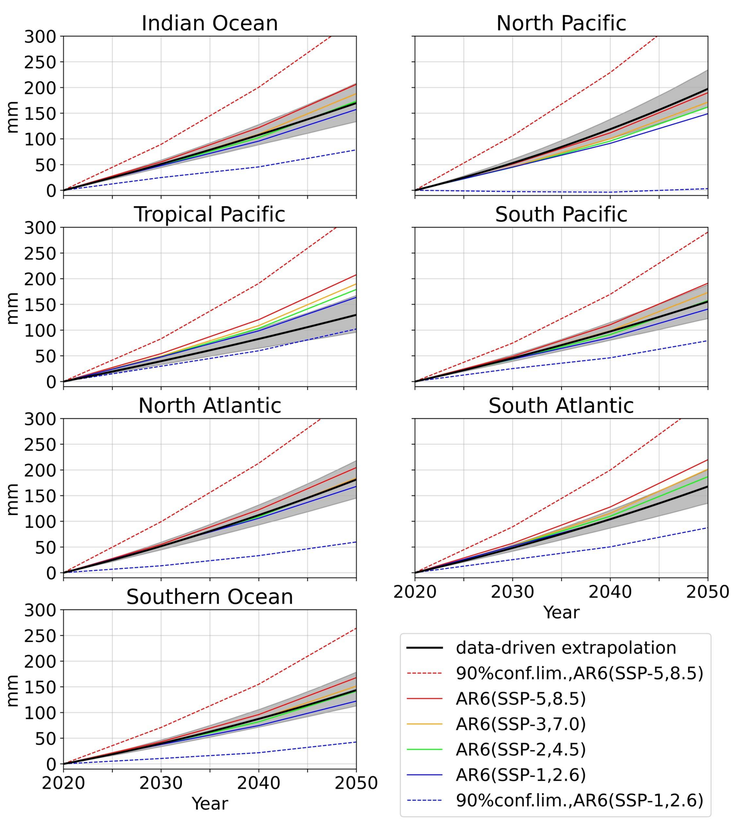


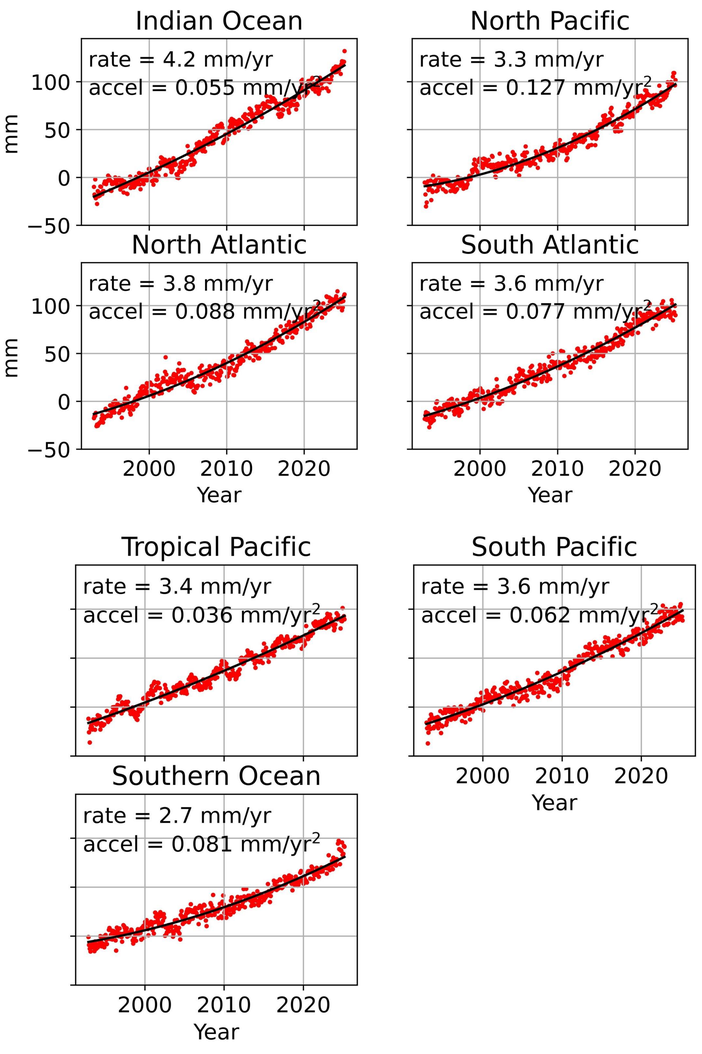
Regional sea level rise trends as a) observed from JPL altimetry data and simulated in b) MESACLIP, the c) CESM1-LE, and d) CESM2-LE. Stippling in b-d depict trends failing to exceed the two standard error range and the global mean has been removed from all fields.

GMSL Budget



The GMSL budget still shows some misclosure post-2017 that is being investigated.





Data

RADS: Radar Altimeter Database System. Gridded data from NASA-SSH Simple Gridded Sea Surface Height (PODAAC). Additional data from NASA Sea Level Portal.

Acknowledgements

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