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Observed Regional Sea Level Trends: Climate Drivers and Implications for Projecting Future Change

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The satellite altimeter record has provided an unprecedented climate data record for understanding sea level rise and has recently exceeded 27 years in length. This record of sea level change is becoming sufficiently long that we can begin to infer how sea level will change in the future. Results from Large Ensembles (LEs) of climate model simulations reveal that (a) the trend pattern of the Forced Response (FR) of sea level due to aerosols and Greenhouse gases (GHGs) is beginning to emerge from the altimeter record, (b) this pattern is likely to continue similarly for decades into the future, (c) the altimeter record falls during an interesting period when we are transitioning from an aerosol-dominated FR to a GHG dominated FR. All of these results provide clues into the causes of regional variations in the altimeter-observed regional trend pattern. In addition, these results suggest a possible path forward for performing short-term data-driven extrapolations of the satellite altimeter record to better understand future sea level change. We will review all of these results, show initial attempts at extrapolating the measurements, and discuss potential societal implications of the results.