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Coastal sea level projections with warming of 1.5 to 2 degree

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Holding the increase in the global average temperature to below 2 degree above pre-industrial levels, and pursuing efforts to limit the temperature increase to 1.5 degree, has been agreed by the representatives of the 196 parties of United Nations, as an appropriate threshold beyond which climate change risks become unacceptably high.

Conventional approach to project future sea level rise is based on simulation of sea level components by process -based models with Representative Concentration Pathway (RCP) scenarios. However, these RCP scenarios are not designed to address specific warmings of 1.5 and 2 degree. We blend process- based and semi-empirical approaches to provide global and coastal sea level projections with warming of 1.5 degree and 2 degree by 2100.

Coastal sea level rise generally exceeds the global average, with exceptions of coastline in the areas close to Greenland and Antarctic ice sheets. The largest differences between 1.5 degree and 2 degree scenarios along coastlines are $\sim$15 cm for median projections (up to 20 cm at 95th percentile) and occur for the USA east coast and the small-island nations in the Pacific and Indian oceans. These low-lying island nations in the Tropics are particularly vulnerable to flooding from storms today, and a significant increase in flooding frequency with climate change will further challenge the sustainability of these coastal communities.