

## A High-Resolution Wave Climate Projection for the Coastal Northwestern Atlantic

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As part of the Tougou project, a high-resolution wave climate projection for the northwestern Atlantic Ocean has been conducted by the Coastal Engineering Laboratory at the Disaster Prevention Research Institute (Kyoto University). The projection includes several novel features and will be used to help assess regional impacts due to global climate change.

Here, the spectral wave model NOAA WAVEWATCH III is utilized with three coupled (two-way) grids to resolve the northwestern Atlantic and coastal eastern USA at approximately 21 km and 7 km respectively (see Fig. 1). The simulations cover periods 1979-2003 (historic) and 2075-2099 (future). Hourly wind field forcings are provided by the high-resolution MRI-AGCM 3.2S (21 km) and allow for better modeling of large storm events (important for extreme event statistics).

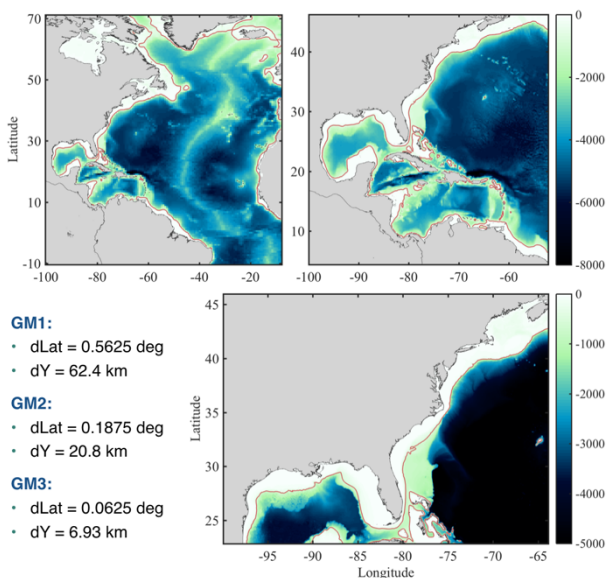


Fig. 1: Model bathymetries for 2-way-coupled grid setup [m]. Red contours indicate regions with 500 m depth

Climatological (25-year) significant wave height differences between future and historical periods indicate a seesaw effect will occur, with a northward decrease approaching 0.9 m in areas north of the 23<sup>rd</sup> parallel (north) in the northwestern Atlantic Ocean, and a southward increase approaching 0.4 m in the Caribbean Sea (see Fig. 2). Here, model validation, wave climate projection, and comparison with other relevant studies will be discussed.

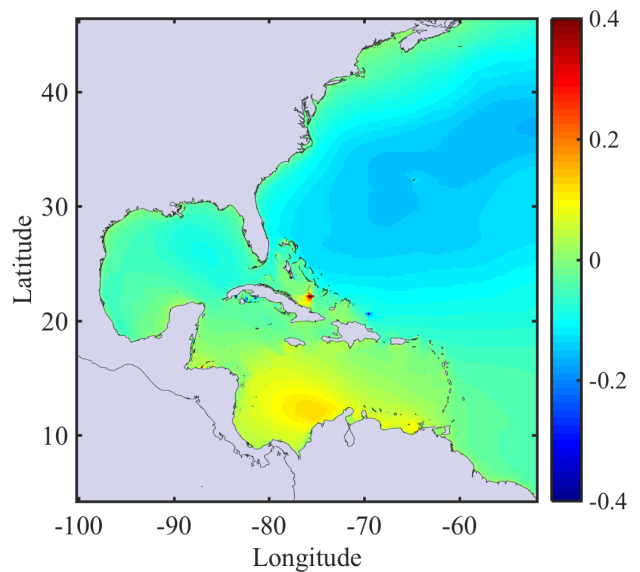


Fig. 2: Significant wave height climatology differences between future and historical periods examined [m]