**Understanding uncertainty associated with global extreme wave events using a contemporary ensemble of reanalysis and hindcast products**

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**Abstract**

Extreme ocean waves pose significant environmental, geophysical and socioeconomic impacts, regionally and globally. It is thus paramount to understand historical variability and change of extreme wave characteristics across different timescales based on high-quality datasets with temporal continuity. In order to overcome well-documented spatial and temporal limitations of buoy records as well as satellite wave measurements, multi-decadal global wave reanalysis and/or hindcasts products have been traditionally used to assess historical ocean wave characteristics. To date, most global assessments of extreme wave conditions rely on a particular pre-selected wave reanalysis or hindcast product (driven by distinct global atmospheric reanalysis) over a given historical period, limiting our confidence about results and conclusions derived therefrom. Here, we use a community-driven ensemble of global wave products to understand how differences (uncertainty) amongst products affect historical extreme wave characteristics and their patterns. The present study covers a 34-year time period (1980-2014) and addresses different wave characteristics such as (Hs), mean wave period (Tm) and/or mean wave direction (θm) which are commonly used by coastal risk and vulnerability assessments.