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Average and extreme regimes of the ocean wave climate surrounding the northwestern Iberian Peninsula under present and future climate conditions

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In this study, the mean and extreme regimes of the ocean wave model integrations developed within the MarRISK project are assessed for the eastern North Atlantic region surrounding the Iberian Peninsula. First, existing model integrations from the CAWCR project driven by wind fields from the historical CMIP5 experiments are compared to the reanalysis-driven integration in order to assess model performance in present climate conditions. This is done for the mean, higher percentiles and for the entire distribution of the 3-hourly significant wave height time series. Then, using the scenario integrations of the best performing models for downscaling with the WaveWatch III model, the relative change of these statistics under future climate conditions is calculated. The study is complemented by an extreme value analysis focussing on the return periods of potentially harmful wave events. Surprisingly, albeit significant wave heights are projected to decrease on average, the number of extreme events is expected to increase, including the advent of events with unprecedented magnitude.