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Coastal risks induced by Mediterranean hurricanes

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Medicanes, for Mediterranean hurricanes, are mesoscale cyclones with morphological and physical characteristics similar to tropical cyclones. Although less intense, smaller and rarer than their Atlantic counterparts, Medicanes remain very hazardous events threatening islands and continental coasts within the Mediterranean Sea. The latest strong episode Medicane Ianos (September 2020), resulted in severe damages in Greece and several casualties. This work investigates the oceanic response to these extreme events along the Mediterranean coasts under present-day and future (21 st century) conditions. To this end, a coupled hydrodynamic-wave model is used to simulate both storm surges and wind-waves generation and propagation in the Mediterranean Sea at high resolution (~2 km) along the coastlines. A dataset of thousands of Medicanes synthetically generated from twenty global climate models and two reanalyses is used to derive the atmospheric forcing fields. Regional coastal risks assessment is performed for the present and future climate. We found increased coastal extreme sea levels in line to the reported changes in Medicane activity, with fewer events but of larger intensity projected by late 21 st century.