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Downscaling ERA-5 reanalysis data for coastal short-term and long-term risk assessment in the North Western Mediterranean sea.

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In assessing the impact of climate change along the coasts, great attention has been paid to sea level rising scenarios while only a few studies are dedicated to assessing the potential impact on the coast due to the change of circulation regimes.
A relative increase in the frequency of events from the southern quadrants compared to the northern ones has been observed in several European areas, also in relation to the impact of the wave climate along the coast (Thomas et al., 2010).
Similar variations have also been observed in the Mediterranean. For example, in the Western Mediterranean extreme events from S-SE, rather than events from SW associated with perturbations of Atlantic origin, changes in some cases the criteria and design parameters of coastal defense works. An example is the storm at the end of October 2018, whose impact has been destructive on many shores of the North-Western Mediterranean.
These potential long-term wind and wave climate trends can have consequences not only in the assessment of long-term risk, induced to the main morphodynamic variations of the coast with shoreline erosion, but also in short-term risk assessments, related to the impact of sea storms on the coast.
This work presents the methods and some preliminary results of the reconstruction of the coastal wave climate by using a cascade of state-of-the-art atmospheric and wave numerical models, forced by the best (in terms of model cycle, output temporal frequency and horizontal resolution) reanalysis data currently available from ECMWF (ERA5; Hersbach and Dee, 2016).
A high resolution atmospheric model (BOLAM-MOLOCH) run at a horizontal resolution of about 3 km, and an unstructured grid wave model (WW3) is able to compute high-resolution waves along the coast, at a resolution up to 500 meters.
We present the preliminary results regarding the characteristics of such high-resolution wind/wave data and a comparison with the local observed data, including spectra obtained by coastal wave radar, and global reanalyses.