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Assessment of the present and near future wave potential along the Mediterranean coasts: a high resolution numerical modeling study.

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So far only the large wave energy resources of the northern oceans have been deeply explored. However, a significant part of the world potential wave energy resources can be found in calmer seas characterized by a milder and steady wave climate. Among others, the Mediterranean Sea can be considered as a typical example of such a seas.
Here we present the wave climate of the Mediterranean Sea as produced by a high resolution numerical modeling simulation. This study is basically based on two simulations representing the present and near future wave climate respectively. From a renewable energy perspective the wave climate has been mainly focalized along the Mediterranean coasts, both offshore and nearshore.
The two simulations have been carried out with a third generation wave model. Wave fields have been computed for the 2001–2050 period of the A1B emission scenario and for the 1958–2001 period of the present climate. The present climate simulation represents the reference simulation. It has been validated against most of the available data for the Mediterranean region.
The wave model has been forced by the wind and surface current field computed by a regional atmosphere-ocean coupled model recently developed in the framework of the CIRCE Project (6FP EU).
The coupled system is composed of the RegCM3 atmospheric regional model and the MITgcm ocean model. The atmospheric component has a uniform horizontal grid spacing of 30 km on a Lambert conformal projection and 18 sigma-levels. The
simulation is performed on an area going from 20° N to 60° N including the entire Mediterranean
Sea. Lateral boundary conditions are supplied every 6 hour by interpolating horizontal wind components, temperature, specific humidity and surface pressure from the global atmospheric model.
The ocean component is based on the MITgcm. The model has a resolution of 1/8°x1/8° equivalent to rectangular meshes of variable resolution with the meridional side of about 14 Km and the zonal one ranging from about 9 Km in the northern part of the domain to about 12 Km in the southern part. The model has 42 vertical Z-levels with a resolution varying from 10 m at the surface to 300 m in the deepest part of the basin, and an intermediate resolution of about 40-50 m between the depths 200-700 m.
Results obtained from the analysis of the two simulations will be presented.