



An integrated methodology on the suitability of offshore sites for wind farm development

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During, the last decades the potential and interest in wind energy investments has been constantly increasing in the European countries. As technology changes rapidly, more and more areas can be identified as suitable for energy applications. Offshore wind farms perfectly illustrate how new technologies allow to build bigger, more efficient and resistant in extreme conditions wind power plants.

The current work proposes an integrated methodology to determine the suitability of an offshore marine area for the development of wind farm structures. More specifically, the region of interest is evaluated based both on the natural resources, connected to the local environmental characteristics, and potential constrains set by anthropogenic or other activities. State of the art atmospheric and wave models and a 10-year hindcast database are utilized in conjunction with local information for a number of potential constrains, leading to a 5-scale suitability index for the whole area. In this way, sub regions are characterized, at a high resolution mode, as poorly or highly suitable for wind farm development, providing a new tool for technical/research teams and decision makers.

In addition, extreme wind and wave conditions and their 50-years return period are analyzed and used to define the safety level of the wind farms structural characteristics.