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Wave energy potential along the southern coast of the Caspian Sea

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Abstract

We have investigated wave energy potential near the coast of northern Iran. Our main goal, in this study, was to find a suitable location for installing wave energy conversion systems along the southern coast of the Caspian Sea, within Iran's territorial waters, based on the data obtained from ECMWF² between 1999 and 2013. We plotted annual and seasonal diagrams of wave height, period, and energy at 17 different locations. We observed that, despite some minor fluctuations, wave energy generally reaches its peak value in autumn. Based on the analyzed data, we suggest that cities of Noshahr and Babolsar are suitable locations for installation of wave energy conversion systems. We further studied wave roses nearby the aforementioned cities. We found that strongest waves occur in South-southeast (SSE) direction with the maximum magnitude of 8.37 and 9.67 Mwh (per unit length of the wave front) at Babolsar and Noshahr, respectively. Finally based on our study, we suggest an optimal range of significant wave height and period for designing an efficient wave energy converter in these areas.

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