WAVE ENERGY ASSESSMENT IN THE CASPIAN SEA

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Estimation of ocean wave energy as a renewable energy is necessary due to the importance of using these kinds of energy resources instead of fossil fuels. Wave energy contains the highest energy density among the other sources (Leijon et al., 2003). Hence, many investigations have focused on wave energy potential in the world. Defne et al. (2009) evaluated the wave power in the southeastern coasts of United States. Valuable researches were also conducted by Iglesias et al. (2009), Iglesias and Carballo (2010a) and Iglesias and Carballo (2010b) in the Spain coasts. Saket and Etemad-Shahidi (2011) assessed the wave power potential along the northern coast of the Gulf of Oman and near the Chabahar port located in the southeastern coasts of Iran. They produced 23-years hindcast data and located the hot spots and then assessed the wave power properties there.

In this paper, wave energy in the southern part of the Caspian Sea, near the Iranian coasts was assessed. Wave dataset were obtained from Iranian Seas Wave Model (ISWM) in 0.125º resolution produced by Iranian National Institute for Oceanography, consisting of 13-years wave hindcast data. Wave energy was calculated for Iranian coasts of the Caspian Sea in every point of the model and the results are shown in Figure 1. According to this figure, the highest values of the wave energy are located in central part of the southern coasts of the Caspian Sea. Furthermore, wave energy values in the southwest coasts are higher than those of southeast coasts. After wave energy assessment in the region, three locations were selected for wave energy assessment based on their energy amount and importance. These locations are Anzali, Noshahr and Amirabad ports located in the west, center and east of domain, respectively. The average wave powers were 2.7, 2.9 and 2.2 kW/m for Anzali, Noushahr and Amirabad,

respectively.

Combined scatter and wave power isolines were used to specify the wave energy in terms of the sea state. It was found that the most of the energy was obtained from waves with significant wave heights between 0.5 m and 2.5 m and wave periods between 4 s and 8 s for Anzali, significant wave heights between 1 m and 2.5 m and wave periods between 4 s and 7 s for Noushahr and significant wave heights between 0.5 m and 2 m and wave periods between 4 s and 7 s for Amirabad. This could help to select the appropriate wave energy converter in order to extract the wave energy.

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5 Leijon M., Bernhoff H., Berg M., Ågren O. (2003), 'Economical considerations of renewable electric energy production-especially development of wave energy', *Renewable Energy*, Vol. 8, 1201–1209.

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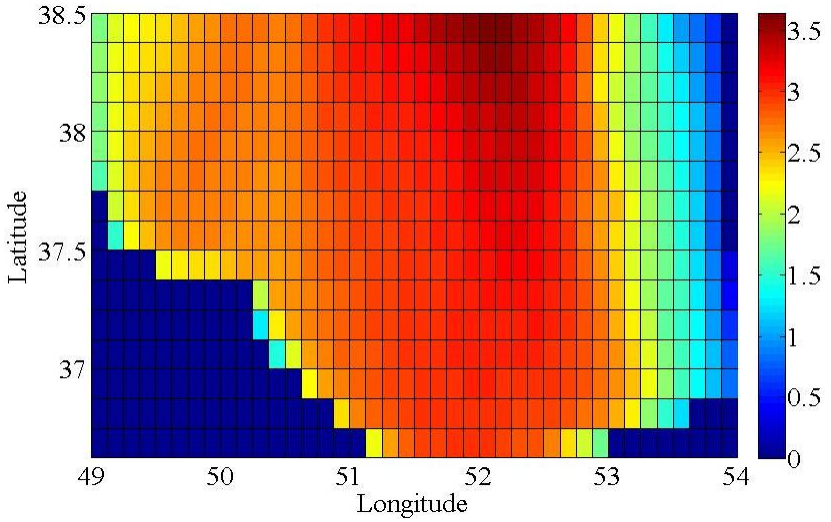

Figure. 1 Wave power values (kW/m) in the Caspian Sea