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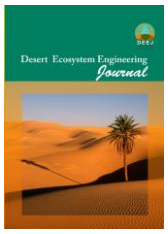

Mapping of possible maximum wind speed at different return periods in the central part of Iran

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Abstract

Wind is one of the important natural phenomena in arid and semi-arid ecosystems of the world. Although several studies have been conducted using the wind speed and direction to provide wind rose in each area, only a few of them investigated the possibility of wind speed at different return periods. Analysis of the maximum wind speed at different return periods, in a variety of projects such as the construction of high-rise buildings, windbreaks, billboards along highways and all structures that are expose to wind, will be used to calculate risk-taking. In this study, using data from maximum wind speed of 22 synoptic stations in Iran in the centrality of Yazd province and by using the P10 software, maximum wind speed was estimated in the return periods of 2, 5, 10, 25, 50 and 100 years. By examining the Normal, Lognormal, Pearson, Log Pearson and Gamble statistical distributions, it was found that the Gamble distribution in 56% of stations have the lowest standard error and so it is more efficient. Then, with the method of ordinary kriging interpolation on Surfer 13.4 software, maps of wind speed at different return periods were prepared. The results revealed that the strongest possible winds in 100 years return period belong to Eghlid (59.9 m/s), Sirjan (47.3 m/s), Shahreza (43.1 m/s), Kabootarabad (42.8 m/s) and Natanz (41.6 m/s) stations. On the other hand, wind speed at different return periods in the west areas of the region has more intensity and the main reason can be described by synoptic conditions and local topographic corridors. Also, relations governing the temporal distribution of wind speed, indicated logarithmic relationship between speed and different return periods.

Keywords: Arid region, possible risk, Gumbel distribution, Gust, Yazd.

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