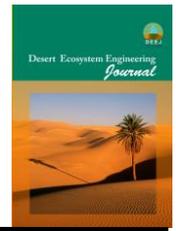




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Monitoring and Predicting the Effect of Climatic Factors on Sand-Mobility Using Lancaster Index: A Case Study of Dayer, Bushehr Province

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Extended Abstract

Introduction: As one of the most significant and sensitive landforms to wind erosion, sand dunes vary in their extent of activities based on the influence exerted on them by various climatic and terrestrial factors. The study area comprises a Bushehr province's county located in southern Iran, where sand dunes activity causes great problems for the local community. Therefore, the identification of active sand dunes by using wind regime of the region and the factors involved in their activity based on the Lancaster index, the aim of this research is.

Methodology: First, the trends of climate factors, including precipitation, temperature, potential evapotranspiration, wind velocity, and local and non-local-originated dust were investigated at an annual scale using the data concerning the hourly-based wind velocity, weather codes, monthly precipitation, temperature, and potential evapotranspiration data collected from Dayer meteorological station over a 30-year period (1989–2018). Then, the sand dunes' mobility status was examined by calculating the frequency of erosive wind and the aridity index over the whole study period using the Lancaster Index. Moreover, Sensitivity analysis was performed to predict the effect of meteorological parameters' potential changes on sand dunes' mobility.

Results: The study's results indicated that according to the Lancaster index, sand dunes were fully active during the 30-year period. Furthermore, the aridity index was found to be subjected to real, extremely serious, and serious risks of desertification in three classes hyper-arid, arid, and semi-arid, respectively. On the other hand, the results of sensitivity analysis suggested that if the frequency of upper-erosive-threshold winds would increase by 30% in the future, the sand dunes' activity and mobility would increase by 30%. However, if the precipitation rate increases by 30%, sand dunes' mobility, and activity will decrease by 23%. Moreover, no significant trend was observed in meteorological parameters, including precipitation, temperature, and potential evapotranspiration throughout the whole study period.

Conclusion: In general, an increasing trend was found in sand dunes activity during the 30-year study period, suggesting a direct correlation between such an increase and precipitation. Moreover, the study's results indicated that the management measures carried out over the past 30 years (for instance, planting seedlings, hand-planting afforestation, and grazing management) have proved insufficient, necessitating the application of new management policies in this regard.

Keywords: Sand Dunes, Sensitivity Analysis, Dayer, Lancaster index .

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