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Statistical Analysis of Spatio-Temporal Variations of Dust Occurrences in Golestan Province

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Extended Abstract

Background and objective: Throughout recent years, the Iranian government has mainly been challenged by assessing the risk of dust storms and choosing the best method for their management. In this regard, Golestan province is subject to the high risks of intensified dust phenomenon due to its vicinity to Turkmenistan's vast deserts, inappropriate management of its northern desert lands, and the dryness of some of its wetlands and borderlands. Therefore, considering the increasing number of intensified dust storm occurrences in Golestan province within the past few years, this study sought to perform statistical and climatic analysis of the phenomenon.

Materials and Methods: The dust storm occurrences in Golestan province were analyzed based on their spatio-temporal frequency as recorded by seven synoptic weather stations throughout a 10-year period (2013-2022). Moreover, the collected data were checked daily in the form of synoptic codes during eight observations using statistical methods. Finally, the average hourly, monthly, and annual occurrences of dust storms and their frequency for the hot and cold periods in all synoptic stations were calculated using the R software.

Conclusion: The results of the annual analysis of the dust storm revealed that the Incheh-Borun and Maraveh-Tappeh regions experienced the greatest number of dusty days in the entire study area with an average frequency of eight days per year. Moreover, it was found that the highest frequency of dust storms in the province occurred in May, June, and July, and the lowest frequency of dust storms took place in November and December, respectively. Also, the analysis of dust storm occurrences during the statistical period showed that 26.21% and 73.79% of the dusty days originated in extra-local and local origins, respectively. On the other hand, the interpretation of synoptic codes of the statistical period indicated that 79.8% of extra-local dust events in the province occurred from 9:30 A.M. to 18:30 local time and 80.64% of the events took place from 9:00 A.M. 30 to 18:30 local time. Finally, the analysis of the duration of dust events in the study area suggested that currently, the majority of dust storms in Golestan province last for one to two days.

Keywords: Dust, Spatio-Temporal Analysis, Golestan Province, Iran.

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