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Graduate Management
Faculty of Water and Soil

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Department of Range and Water Shed Management

Title:

Spatial modeling of soil properties associated with erosion Soil wind in a part of Hamoon Sabouri wetland

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Abstract

Hamoun Lake leaded in occurrence of dust storms due to having erodible soil and low vegetation cover. However, wind erosion and susceptibility of soil to erosion over the lake have not been investigated. In this study, the soil properties were determined in Hamoun Saberi and their relation to wind erosion was assessed. The spatial modeling of wind soil erosion was determined. ۸۵ points were selected based on randomized method and at each point soil samples were collected from the top soil (۰-۵ cm) to measure wind erodible fraction (EF) and dry aggregate stability (DAS) and chemical and physical soil properties including soil texture, electrical conductivity (EC), pH, percentage of saturated paste, soil organic carbon (SOC) and calcium carbonate equivalent (CCE). ArcGIS and GIS+ (version ۱۰) was used to geostatical modelling and Random Forest modelling. Fine texture of soil, EC (۰,۷۶-۲۹,۶۰ dS), pH (۸,۳٤), soil organic matter (۱,۶۳٪ equals to ۰,۹۵ percentage of soil organic carbon), calcium carbonate equivalent (۱,۵ – ٤۰٪) and soil crusting factor (۰-۱٪) indicated that the soil is erodible to wind erosion. Amongst soil properties, the rate of clay, silt and crust showed statistical correlations with measured EF in laboratory. Correlations were observed between measured EF using formula and soil properties except for calcium carbonate equivalent. A correlation was found between DAS and measured EF in laboratory but no correlation was observed between DAS and measured EF using formula. No correlation was found between measured EF in laboratory and measured EF using. DAS, EF lab and formula and soil crusting had a strong spatial correlation over the study area. Exponential power was the best model to show the spatial variations of DAS, EF lab and formula and soil crusting Comparing various geostatical models and Random Forest model indicated that Random Forest model has higher ability to show the spatial variations of EF lab and formula and soil crusting and geostatical model show btter the spatial variation of DAS.

Keywords: Soil properties, Erodible fraction, Dry aggregate stability, Hamoun Saberi