Modelling desertification risk in the north-west of Jordan using geospatial and remote sensing techniques

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Remote sensing, climate, and ground data were used within a geographic information system (GIS) to map desertification risk in the north-west of Jordan. The approach was based on modelling wind and water erosion and incorporating the results with a map representing the severity of drought. Water erosion was modelled by the universal soil loss equation, while wind erosion was modelled by a dust emission model. The extent of drought was mapped using the evapotranspiration water stress index (EWSI) which incorporated actual and potential evapotranspiration. Output maps were assessed within GIS in terms of spatial patterns and the degree of correlation with soil surficial properties. Results showed that both topography and soil explained 75% of the variation in water erosion, while soil explained 25% of the variation in wind erosion, which was mainly controlled by natural factors of topography and wind. Analysis of the EWSI map showed that drought risk was dominating most of the rainfed areas. The combined effects of soil erosion and drought were reflected on the desertification risk map. The adoption of these geospatial and remote sensing techniques is, therefore, recommended to map desertification risk in Jordan and in similar arid environments.