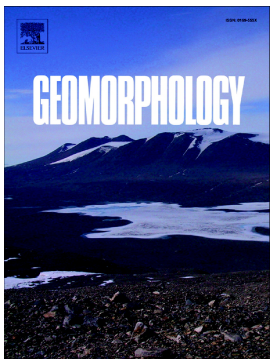

Dune mobility in the St. Anthony Dune Field, Idaho, USA: Effects of meteorological variables and lag time

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DUNE MOBILITY IN THE ST. ANTHONY DUNE FIELD, IDAHO, USA: EFFECTS OF METEOROLOGICAL VARIABLES AND LAG TIME. R. H. Hoover[1*⌘], D. R. Gaylord[1], and C. M. Cooper[1], [1]Washington State University, Pullman, WA ⌘RHoover@Boulder.SwRI.edu

Abstract

The St. Anthony Dune Field (SADF) is a ~300 km^2 expanse of active to stabilized transverse, barchan, barchanoid, and parabolic sand dunes located in a semi-arid climate in southeastern Idaho. The northeastern portion of the SADF, ~16 km^2, was investigated to examine meteorological influences on dune mobility. Understanding meteorological predictors of sand-dune migration for the SADF informs landscape evolution and impacts assessment of eolian activity on sensitive agricultural lands in the western United States, with implications for semi-arid environments globally. Archival aerial photos from 1954-2011 were used to calculate dune migration rates which were subsequently compared to regional meteorological data, including temperature, precipitation and wind speed. Observational analyses based on aerial photo imagery and meteorological data indicate that dune migration is influenced by weather for up to 5-10 years and therefore decadal weather patterns should be taken into account when using dune migration rates as proxies from climate fluctuation. Statistical examination of meteorological variables in this study indicates that 24% of the variation of sand dune migration rates is attributed to temperature, precipitation and wind speed, which is increased to 45% when incorporating lag time.

Keywords:

Saint Anthony Dune Field; Dune Mobility; Mobility Index; Lag Time[1]

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