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# Challenges in Aeolian Geomorphology: Investigating Aeolian Streamers

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This paper reviews some of the challenges involved with instrumentation, data acquisition, analysis, and the application of theory when conducting field experiments in natural aeolian environments. This is presented in the context of a field investigation into the formation and behaviour of aeolian sand streamers. Also known as sand snakes, streamers are a familiar manifestation of pronounced spatial and temporal variability in wind blown sand over beaches, dunes, and other sedimentary surfaces. Streamers represent complex and dynamic transport patterns that change over temporal scales on the order of 0.1 seconds and over a range of spatial scales from 0.1 to 10 meters. These transport features are likely governed by near-surface turbulent structures in the wind, necessitating detailed measurements of turbulence dynamics in association with sediment transport patterns. This review will focus on all stages of the investigation, from field site selection to the evaluation of theoretical models. Issues to be discussed include: site selection and environmental conditions, instrumentation requirements and limitations, fieldwork logistics, experimental design and measurement techniques, scale and precision of data acquisition, data processing and visualisation, description and parameterisation of results, challenges of spatio-temporal data analysis, turbulence measurements in the saltation layer, scaling issues and non-dimensionalisations in fluid dynamics theory, and the application of theory and numerical models to the complexities of real natural environments.

Many of the above challenges and issues also apply to geomorphological field experiments in other environments, and this paper will attempt to summarise their implications for theoretical and numerical development in geomorphology in general.