# The Scaling Behavior of Windblown Sand and Fluvial Bedload Transport

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## Abstract

Loose sand and gravel composed of minerals, organics, and/or ice covers much of the windblown (i.e., aeolian) and water-worked (i.e., fluvial) surfaces of Earth and other planetary bodies. To predict how such surfaces evolve in response to aeolian and fluvial flows, one needs to understand the rate at which sand-sized and larger grains are transported for given environmental parameters, such as the fluid density, fluid viscosity, and flow strength. In particular, one needs to know the threshold flow conditions below which most transport ceases. We will present a conceptually simple model that unifies most aeolian and fluvial transport conditions, predicting both the transport threshold and rate in agreement with a large range of measurements and numerical simulations of terrestrial and extraterrestrial flow-driven particle transport.

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