

Aeolian transport of cohesive sand: relaxation process and saturated state

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The effect of cohesion on the aeolian transport of solid particles remains a scientific challenge. Most exiting studies have focused on the effect of humidity on the threshold friction velocity, leading to a wide dispersion of results. This was largely due to the difficulties caused by water evaporation during experiments. Recent studies have circumvented this problem by using a particle/oil mixture. However, studies about the influence of cohesion on transport parameters remain scarce.

We present here an experimental study involving a cohesive bed (sand/oil) with variable length, in order to explore the transient aeolian sand transport regime and its progression toward a saturated state. Our results show that cohesion increases the relaxation length, while saturated mass flux remains unchanged compared to its value in the dry sand case. Additionally, temporal measurements showed that the intermittent transport, observed in the transient regime, is closely linked to the erosion initiation mechanism.