



A two-dimensional model for the dynamics of sand patches

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Sand patches are one of the early stages of aeolian bedforms. They form on non-erodible surfaces in both desert and coastal environments. Their initiation is associated with the

change of saltation transport law on rigid and granular beds [1]. Here we present a two-dimensional model that couples these surface-dependent transport laws with the feedback of the bed elevation on the wind flow. Analysing the spatio-temporal evolution of an initial very flat sand patch, we emphasise the central role of the input flux as well as the lengthscale over which occurs the transition between the two transport laws. We also show that, for adjusted parameters of the model, we are able to reproduce the growth and the propagation of these small metre-scale bedforms over time, in quantitative comparison with field measurements.

[1] P. Delorme, J.M. Nield, G.F.S. Wiggs, M.C. Baddock, N.R. Bristow, J. Best, K.T. Christensen and P. Claudin, Field evidence for the initiation of isolated aeolian sand patches, *Geophys. Res. Lett.* 50, e2022GL101553 (2023).