



Barchan dune corridors: field characterization and investigation of control parameters

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The structure of the barchan field located between Tarfaya and Laayoune (Atlantic Sahara, Morocco) is quantitatively investigated and compared to that in La Pampa de la Joya (Arequipa, Peru). On the basis of field measurements, we show how the volume, the velocity and the output sand flux of a dune can be computed from the value of its body and horn widths. The dune size distribution is obtained from the analysis of aerial photographs. It shows that these fields are in a statistically homogeneous state along the wind direction and present a ‘corridor’ structure in the transverse direction, in which the dunes have a rather well selected size. Investigating the possible external parameters controlling these corridors, we demonstrate that none among topography, granulometry, wind and sand flux is relevant. We finally discuss the dynamical processes at work in these fields (collisions and wind fluctuations), and investigate the way they could regulate the size of the dunes. Furthermore we show that the overall sand flux transported by a dune field is smaller than the maximum transport that could be reached in the absence of dunes. This demonstrates the bistability of aeolian transport.