



## Shear strength of aeolian sand sediments

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**Abstract:** The anti-erodibility of aeolian sand sediments represents its resistance by airflow shear and is closely associated with soil shear strength. However, there have been few studies about the anti-erodibility for sediments from the perspective of shear strength. In this study, we performed shear strength experiments for four categories of sediments at different values of normal stress and the water content of all samples were oven dried prior to conducting the shear tests. The main conclusions were: 1) The shear strength of sediments linearly increases with normal stress and grain diameter. The organic matter may weaken the soil shear strength. The impact of bulk density and  $\text{CaCO}_3$  content on the shear strength did not follow consistent rules, but  $\text{RCaCO}_3/\text{RBulk}$  (where  $\text{RCaCO}_3$  is the ratio of  $\text{CaCO}_3$  content between two samples and  $\text{RBulk}$  is their difference of bulk density) determines the relative contribution of each factor on shear strength. 2) The cohesion, internal friction angle, and shear strength increased with increasing grain diameter. They also increased with increasing sorting coefficient when the sorting coefficient was greater than 0.6, whereas it seemed to be the opposite trend for sorting coefficients of less than 0.6. 3) There is a linear positive correlation between the cohesion and threshold friction velocity ( $R^2 = 0.91$ ). This study improves our understanding of shear strength, providing basic data with which to construct a dynamic model of aeolian sand transport by wind action.