



Do swarms of migrating barchan dunes record paleoenvironmental changes? An example from the coastal desert of southern Peru.

R. Hesse

Department of Geography, Friedrich Schiller University Jena, Germany

Swarms of barchan dunes are common in arid environments. Contrary to immobile or slowly moving dunes whose stratigraphy can be used to reconstruct paleoenvironmental changes, the high migration velocity of barchans seems to prohibit their use as geoarchives because it leads to a complete overturning of the material within several months or a few years.

Here, a possible use of barchan swarms for paleoenvironmental reconstruction is presented. The approach is based on dune migration itself. Using the relationship between dune size and migration velocity, the time of dune initiation at the known sediment source is calculated for all dunes in a given barchan swarm. Reconstructed temporal changes of dune volume are interpreted as indicating variations in sediment supply which may in turn be linked to tectonic and fluvial activity.

This approach is applied in a case study based on 500 dunes in the Pampa de Jaguay, an aeolian transport corridor in the coastal desert of southern Peru. The results indicate a general long-term stability of aeolian sediment supply throughout the Mid- to Late Holocene. Possible causes for deviations from this stability are spatial and temporal variations in the strength of the prevailing winds as well as variations in sediment supply which may in turn be linked to tectonic and fluvial activity. Limitations posed by the assumptions underlying this approach are discussed.