Geophysical Research Abstracts
Vol. 16, EGU2014-9099, 2014
EGU General Assembly 2014

Constraining aggradation and degradation phases of alluvial fans in the sedimentary record: a case study from the Namib Desert, NW Namibia

Christoph von Hagke (1), Harald Stollhofen (2), Luca C. Malatesta (1), and Ian Stanistreet (3)

(1) Geological and Planetary Sciences, California Institute of Technology, Pasadena, USA (vonhagke@caltech.edu, luca@caltech.edu)), (2) GeoZentrum Nordbayern, Friedrich-Alexander-University (FAU) Erlangen-Nürnberg, (3) Dept. of Earth, Ocean & Ecological Sciences, University of Liverpool, UK

Controversy exists over when alluvial fans propagate, when they incise and how this is expressed in the sedimentary record. The Horingbaai Fan-delta at the Skeleton coast provides an end member due to its location in a hyper-arid area and a tectonically quiescent, although continuously uplifting setting. Accordingly, the influence of climate changes on alluvial fan sedimentation is directly assessable. There is pronounced interaction with the marine system during fan evolution, which provides the opportunity to constrain phases of fan progradation based on marine terrace stratigraphy. In this contribution, we will (1) present a detailed stratigraphic framework of the Horingbaai Fan-delta and associated marine terraces, and (2) analyze this framework in order to identify the imprint of past climatic changes on the sedimentary record. The of the Horingbaai Fan-delta sediments have been laid down between 2.6 and 2.4 Ma, based on age constraints from under- and overlying marine terraces. After 2.4 Ma, fan sedimentation was generally reduced and much more irregular due to intervening erosion phases. We propose a new model for late stage sedimentation and erosion phases, using offshore bathymetric and onshore sedimentological data, and conclude that generally decreasing sea-surface temperatures and glacial cycles largely govern the mode of sedimentation since the Early Pleistocene. We compare these findings to other fans at the Skeleton Coast, as well as other systems worldwide. Our study shows that climatic variations may leave distinct imprints in the sedimentological record. Recognizing these in depositional systems worldwide will improve understanding how fan sediments are preserved through time, and whether the reported worldwide increase in sedimentation rates since the Late Cenozoic is real or apparent.