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Opportunities, limitations, and methodologies for deciphering information of late Quaternary environments from discontinuous aeolian archives

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Linear sand dunes and aeolian sand sheets cover large areas in arid regions. This makes them potentially valuable archives of late Quaternary regional and local climates and environments, particularly with regard to windiness and former vegetation cover. Linear dunes, especially the vegetated linear dune type, have been reported to vertically accumulate along their axis and are often characterized by sedimentological and stratigraphic similarity. Being environmentally sensitive landforms, linear dunes and sand sheets record geomorphic processes in aeolian environments such as rapid phases of sand sedimentation and erosion, periods of stabilization frequently showing local sand shifting as well as preservation, in some cases by pedogenesis. Thus, dune stratigraphies are per se discontinuous. This talk will outline opportunities, limitations and methodologies for deciphering information regarding past environments and climates from such discontinuous aeolian archives.
While continuous sedimentological archives often yield valuable palaeoclimatic information from direct interpretations of even sole records, reliable palaeoenvironmental information from vegetated linear dunes can only be retrieved after completing a holistic study program. This approach can usually be adapted to every individual study area, requiring special attention to spatial scale, geomorphology, site selection, sampling design, dating techniques, and analytic and palaeoenvironmental interpretation of the data. Following this approach, robust chronologies and interpretations of aeolian sedimentation and discontinuities can be of prime importance for highlighting certain past conditions and geomorphic thresholds that may not be fully recognized from continuous sedimentological archives.