



Late Quaternary palaeoenvironmental information inferred from terrestrial archives in the central Sahara

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Reconnaissance surveys in northeastern Niger since 1977 have revealed, from such evidence as diatomite-lined depressions, the existence of palaeolakes there. Initial research has shown that the palaeolimnic sediments and palaeosoils found are suitable for reconstructing its Late Quaternary palaeoenvironment.

The most valuable and best-investigated study site is the sebkha of Seggedim, where a core of 15 meters length could be extracted which revealed a composition of high-resolution sections. Stratigraphical, structural and geochemical investigations as well as the analysis of thin sections allow the characterisation of different environmental conditions throughout the core. Most importantly, a complex age-depth model could be constructed, based on 21 accelerator mass spectrometry (AMS) radiocarbon measurements and reaching from Early to Mid Holocene. The results obtained from the core are compared with those from terrestrial and lacustrine sediments from outside the depression, situated a few hundred kilometres further to the north. Within the plateau landscape of Djado, Mangueni and Tchigai, two depressions and a valley containing lacustrine deposits, were investigated for palaeoenvironmental reconstruction. Depending on modifying local factors, these sediment archives were of shorter existence than the lake, but reveal additional information about the landscape dynamics from Early to Mid Holocene.

The few perennial lacustrine climate archives still active to present day within the Sahara reveal apparently unique characteristics, as the local conditions that led to their existence are indeed exceptional. The interpretation of such a standalone location has to be performed with caution, as it inhibits several sources of error. The Seggedim depression may be considered such a unique spot at least for a limited time. The information obtained from the initial and freshwater lake sediments showed no noticeable signs of climatic alterations until Mid Holocene. Nevertheless, the supplementary sediment archives evidenced the previous onset of aeolian activity and simultaneous presence of alternating amounts of precipitation, as well as the preceding removal of several metres of sediment within a tributary of Enneri Achelouma. These processes were most likely implemented by increasing precipitation seasonality, an incidence that was not recorded in the Seggedim core.

Regional factors determined by the particular environmental setting provided the basis for a series of feedback processes and controlled the individual timing of lacustrine and arid phases. Depending on the investigated archive, climatic information can be suppressed by local properties (e.g. aquifer inflow); therefore, different archives may show time lags (non-linear behaviour) regarding the overall environmental progression.

Only the investigation of a multitude of dissimilar spots within a designated study area has the potential to provide a complete picture of landscape succession. This is especially true in a study area of limited palaeoenvironmental archives, where solitary under favourable conditions information has been conserved.