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Kalahari salt pans as sedimentary archives for reconstruction of Quaternary environments

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Environmental changes in southern Africa come along with variations in atmospheric and oceanic circulation as well as anthropogenic caused landuse changes. The reconstruction of the paleoenvironment is complicated by the fact that continuous geoarchives are rare in the semiarid to arid parts of this region. In the south-western Kalahari lacustrine systems with constant sedimentary records are absent due to the low precipitation. Salt pans are common geomorphological structures in the Kalahari which are temporarily flooded during summer season when isolated showers occur in their local catchment area. So, they are potential archives preserving environmental signals in phases of sedimentation. However, marginal dunes on their leeward sides represent phases of deflation. The principle processes in salt pan formation are complex and so far under discussion. Our study follows a multidisciplinary approach integrating sedimentological, geochemical and microbiological methods to understand the formation of salt pans as a prerequisite for using them as geoarchives in reconstruction of the paleoenvironmental condition during phases of sedimentation and erosion. Sediment cores from five salt pans were analysed using XRD, XRF and grain size analyses. Additionally, age models can be given for four salt pans, based on δ^{14}C from bulk sediment TOC. As palynological material is lacking, different methods in organic geochemistry were applied (plant biomarkers, particularly leaf wax n-alkanes and n-alcohols and their stable carbon and hydrogen isotopic signatures) to reconstruct variations in local vegetation assemblages. Our results allow a better understanding of the sedimentology of salt pans and their interpretation as discontinuous archives.