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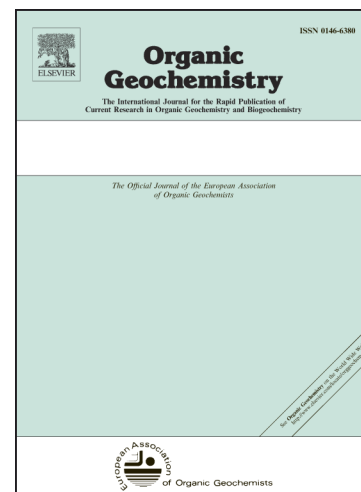
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n-Alkan-2-one biomarkers as a proxy for palaeoclimate reconstruction in the
Mfabeni fen, South Africa

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ABSTRACT

The sub-tropical Mfabeni fen is the only continuous coastal peat deposit that documents glacial and interglacial palaeoenvironmental conditions since the late Pleistocene (ca. 47 cal kyr BP) in southern Africa. Published bulk geochemical, biomarker and leaf wax $\delta^{13}\text{C}$ data, along with palynology and stratigraphic studies of the Mfabeni peat sequence, renders it an ideal record for testing new palaeoreconstruction proxies. In this study, we aimed to establish the proxy potential of *n*-alkan-2-one (*n*-ket) compounds by tracing their source/origin and post-depositional diagenetic change, and if they preserve or not a robust palaeoenvironment signal that complements our understanding of palaeoclimatic variations. In the Mfabeni archive the most likely source for *n*-kets is via microbial decarboxylation of *n*+1-alkanoic acids (*n*-FAs) and, to a lesser degree, oxidation of same chain length *n*-alkanes (*n*-alks). The *n*-ket average chain length (ACL_{ket}) and *n*-C₂₃ and C₂₅_{ket}/precursor ratios displayed a statistical significant negative relationship with the *n*-alk aquatic plant proxy (P_{aq}), suggesting the source of *n*-kets to be submerged aquatic plants during waterlogged conditions that suppressed microbial activity during the ensuing anoxic conditions. Both the mid-chain and long chain *n*-ket/precursor ratios displayed predominant water level fluctuation controls, with temperature as a secondary regulator. By comparing the *n*-ket data with published environmental and climate reconstructions from the same core, and with geomorphology and palynological studies of the Mfabeni

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