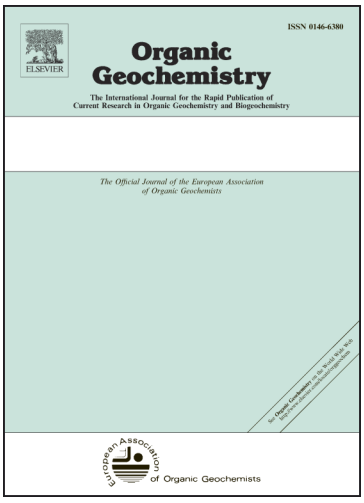

n-Alkan-2-one biomarkers as a proxy for palaeoclimate reconstruction in the Mfabeni fen, South Africa

Andrea Baker, Joyanto Routh, Alakendra N. Roychoudhury

PII: S0146-6380(18)30044-5
DOI: https://doi.org/10.1016/j.orggeochem.2018.03.001
Reference: OG 3691

To appear in: *Organic Geochemistry*

Received Date: 19 September 2017
Revised Date: 27 February 2018
Accepted Date: 4 March 2018

Please cite this article as: Baker, A., Routh, J., Roychoudhury, A.N., *n*-Alkan-2-one biomarkers as a proxy for palaeoclimate reconstruction in the Mfabeni fen, South Africa, *Organic Geochemistry* (2018), doi: https://doi.org/10.1016/j.orggeochem.2018.03.001

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

Andrea Baker[a*], Joyanto Routh[b], Alakendra N. Roychoudhury[a]

[a] *Department of Earth Sciences, Stellenbosch University, Stellenbosch, South Africa*
[b] *Department of Thematic Studies – Environmental Change, Linköping University,58183 Linköping, Sweden*

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 $\delta^{13}C$ 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*-C_{23} and C_{25}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

*Corresponding author
Department of Earth Sciences, Stellenbosch University, Private Bag X1, Matieland, 7600, South Africa. beensknees@gmail.com