

Molecular stratigraphic records of climatic and environmental change at Lake Olduvai (~1.8 Myr)

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Lake sediments recovered by the Olduvai Gorge Coring Project (OGCP) facilitate evaluation of the role of climatic and environmental changes on hominin evolution [1,2]. Thus, stratigraphic variations in $\delta^{13}\text{C}_{\text{org}}$ for sediments (**Fig. 1a**) from an interval (~1.85-1.88 Ma) of high hominin diversity record precession-scale transitions of grassland to woodland similar to outcrop data [3]. The sediments contain high C_{org} (ave. 2.5 %; **Fig. 1a**) and biomarker abundances [4] (relative to $n\text{-C}_{31}$; **Fig. 1b-d**) that show changes in terrestrial vegetation (C_{31} , C_{33} n -alkanes) consistent with grassland/woodland transitions and variations in inputs from phytoplankton (C_{17} n -alkane; $\Delta^{17(21)}$ -hopene; alkenones; C_{29} $\Delta^{4,22}$ -steradiene; γ -carotane; chromans), and sponges (C_{28} A-norsterane) that reflect biotic responses to lake dynamics (e.g., salinity, oxygenation, nutrients) and confirm the coupling of biogeochemical signatures to climate.

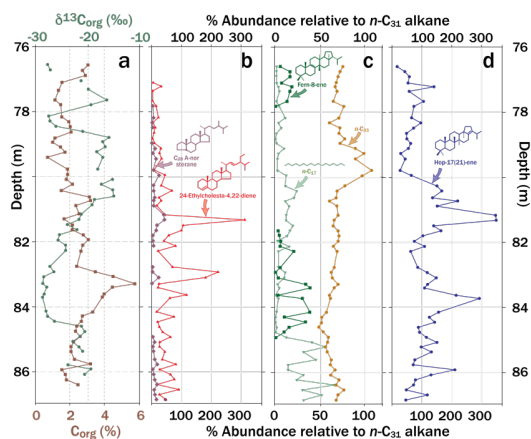


Figure 1: Stratigraphic profiles for (a) $\delta^{13}\text{C}_{\text{org}}$ and C_{org} , and (b) - (d) biomarker abundances in OGCP Core 2A.

- [1] Potts (1996) *Science* **273**, 922-923. [2] Magill *et al.* (2016) *PNAS* **113**, 2874-2879. [3] Ibid (2013) *PNAS* **110**, 1167-1174. [4] Castañeda & Schouten (2011) *QSR* **30**, 2851-2891.