



## Revisiting Lake Garba Guracha, high altitude lake in the Bale Mountains, Ethiopia: reconstructing Late Glacial – Holocene lake level history using $\delta^2\text{H}/\delta^{18}\text{O}$ biomarker analyses

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Our knowledge of East African paleoclimate is largely based on marine core and paleolimnological reconstructions. Accordingly, more humid climatic conditions such as the African Humid Period (AHP) are usually associated with summer insolation-driven increased monsoonal precipitation and the movement of the Congo Air Boundary.

In order to contribute to this discussion and to reconstruct the paleoclimate of the afro-alpine Bale Mountains, Ethiopia, within the DFG Research Unit 2358 'The Mountain Exile Hypothesis: How humans benefited from and re-shaped African high-altitude ecosystems during Quaternary climate changes' we re-cored Lake Garba Guracha. This site represents one of the best dated Late Glacial - Holocene continuous, high altitude (3950 m asl) paleoenvironmental archives in East Africa.

We investigated sugar and lipid biomarkers and their compound-specific stable oxygen and hydrogen isotopic composition ( $\delta^{18}\text{O}_{\text{sugar}}$  and  $\delta^2\text{H}_{\text{n-alkane}}$ ) to infer past hydrological patterns. The  $\delta^{18}\text{O}_{\text{sugar}}$  record reflects lake water and can thus be used to reconstruct lake evaporation history.

Our results suggest that a virtually permanent lake overflow existed from about 10 to 7 cal. ka BP, whereas the period from about 7 to 5 cal. ka BP is characterised by increased lake evaporation. We present initial results of  $\delta^{18}\text{O}_{\text{diatom}}$  analyses and organic geochemical and XRF data that document dominant minerogenic input during the Late Glacial and increased input of almost exclusively aquatic organic matter from 11 cal. ka BP on. Reconstructed mean annual temperatures (n=20,

-2.2 to 2.5°C), inferred from brGDGT-based proxies, indicate that colder conditions prevailed in the high-altitude Bale Mountain ecosystem during the Younger Dryas.