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Other Conference Item**Author(s):**

Bittner, Lucas; Bliedtner, Marcel; Grady, Dai; Gil-Romera, Graciela; Martin-Jones, Catherine; Lemma, Bruk; Lamp, Henry F.; De Jonge, Cindy; Meyer, Hanno; Glaser, Bruno; Zech, Michael

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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

Lucas Bittner^{1,2}, Marcel Bliedtner³, Dai Grady⁴, Graciela Gil-Romera^{5,6}, Catherine Martin-Jones^{7,8}, Bruk Lemma², Henry F. Lamb⁴, Cindy De Jonge⁹, Hanno Meyer¹⁰, Bruno Glaser², and Michael Zech¹

¹Heisenberg Chair of Physical Geography with focus on paleoenvironmental research, Institute of Geography, Technical University of Dresden, Dresden, Germany (lucasbittner@yahoo.de)

²Institute of Agronomy and Nutritional Sciences, Soil Biogeochemistry, Martin-Luther-Universität Halle-Wittenberg, Halle (Saale), Germany

³Department of Physical Geography, Institute of Geography, Friedrich-Schiller-University Jena, Jena, Germany

⁴Department of Geography and Earth Sciences, Aberystwyth University, Aberystwyth, UK

⁵Department of Ecology, Philipps-Marburg University, Marburg, Germany

⁶Department of Geo-environmental Processes and Global Change, Pyrenean Institute of Ecology, CSIC, Zaragoza, Spain

⁷Department of Geography, University of Cambridge, Cambridge CB2 3EN, UK

⁸Limnology Unit, Department of Biology, Ghent University, B-9000 Gent, Belgium

⁹Geological Institute, Department of Earth Sciences, ETH Swiss Federal Institute of Technology, 8092 Zurich, Switzerland

¹⁰Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, Potsdam, Germany

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.