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CHALLACEA: High-resolution, multi-proxy climate reconstruction for equatorial East Africa (21 ka BP to present) from laminated lake sediments near Mt. Kilimanjaro

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Assessing how tropical climate dynamics may drive or amplify climate change at higher latitudes is central to our understanding of natural climate variability and the modelling of its future interaction with anthropogenic climate change. Climate-proxy records from across Africa and Asia underscore the fact that tropical climates have been anything but stable even during the Holocene, but the regional synchrony and extra-tropical links of decade-to-century scale moisture-balance variation remain uncertain because of the lack of complete, highly-resolved continental archives with good age control from the Equator. Also contentious is to what extent reconstructed lake-level fluctuations, and oxygen-isotope signatures in tropical archives such as glacier ice, cave stalagmites and fossil diatoms mostly reflect variations in rainfall and drought, or also of temperature and its effect on evaporation.

The EuroCLIMATE project CHALLACEA will answer some of these questions by reconstructing -with excellent time resolution and age control- the post-glacial history (21 ka BP to present) of temperature and moisture-balance variation in equatorial East Africa from the continuous and finely laminated sediment record of Lake Challa, a crater lake on the lower East slope of Mt. Kilimanjaro. This reconstruction will advance understanding of past tropical climate dynamics by 1) establishing the detailed patterns and timing of late-Glacial and Holocene moisture-balance fluctuations in equatorial Africa; 2) by distinguishing between contributions of temperature change and monsoonal rainfall variation to those moisture-balance fluctuations; and 3) by placing the highly resolved but poorly dated Mt. Kilimanjaro ice-core record of

atmospheric chemistry and dust in an absolute temporal framework.