

The late-Quaternary palaeo-environmental history of equatorial East Africa: implications from mineralogy and particle-size distribution of crater lake sediments

Research unit

Renard Centre of Marine Geology

Context

The occurrence and temporal characteristics of glacial-interglacial environmental change in East Africa are complex and considerably less understood than in many other parts of Africa. In order to expand our knowledge about these processes, this study will investigate the composition and possible sources of the siliciclastic sediment fraction in the 25,000-year sediment sequence from Lake Challa near Mt. Kilimanjaro (Kenya/Tanzania). Lake Challa is a small and deep freshwater lake of volcanic origin. During the “CHALLACEA” field campaign in 2005, a ~22 m long composite sediment sequence was retrieved from the center of the lake. Unlike many other East African lakes, Lake Challa never dried out during this period and therefore provides one of the region’s few continuous and high-resolution sedimentary climate-proxy records from before the Last Glacial Maximum until the present.

Approach

This project focuses on a detailed analysis of the siliciclastic component in the sediment record from Lake Challa, as well as on monthly samples of settling particles collected by a sediment trap during the last years. Comprehensive examination of particle-size distributions will be determined by laser diffractometry at UGent (RCMG). The results will help identify specific sub-populations (end members) of detrital mineral material in the Lake Challa sediments, which are produced by a distinct transport and/or depositional mechanism (i.e. aeolian versus fluvial transport). This will be used to determine changes through time in the relative importance of long-range dust influx and local catchment erosion, aiding the reconstruction of palaeoclimate and -environmental conditions at the time of deposition. Additionally, the mineralogical composition of the samples will be investigated by X-ray diffraction (XRD), in order to help pinpoint potential source areas in the surrounding landscape.

Laboratory work

- Sediment sampling and sample preparation
- Grain-size measurements
- Preparation and XRD-analysis

Profile

- Interest in palaeoclimatology and sedimentology
- Interest in working with sediment cores
- Interest in using grain-size and mineralogical data for palaeoclimate research.

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