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Variations in clastic input into Lake Chala, East Africa: understanding the 'source-to-sink' processes and changes

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The clastic fraction found in lacustrine sediments has proven to provide valuable information about sediment dynamics within lakes, and can be used to define distinct terrestrial source areas and transport mechanisms from source to sink. Along-core variations in the clastic fraction yield indications for changes in clastic sediment dynamics over time. However, to be able to apply mineralogenic proxies for palaeo-environmental interpretations, we first have to understand and quantify the modern conditions at the study site.
In this study we test if grain-size distributions and mineralogical data of clastic sediments extracted from lacustrine sediments of Lake Challa, can be used to infer source to sink processes into the lake. Lake Challa is a small freshwater lake of volcanic origin, located on the eastern slope of Mt. Kilimanjaro. The finely laminated lake sediments of Lake Challa are characterized by a fine-grained texture and are mainly composed of organic matter, biogenic silica and authigenic carbonate, but also detrital mineral components. The lake is situated close to the equator and provides one of the few locations worldwide, where inter-hemispheric dynamics can be studied. In order to identify the modern dynamics of terrigenous sediment input (i.e. aeolian vs. run-off) into Lake Challa, and to map out differences in sedimentological properties, core and surface sediment samples as well as on-shore samples from several locations around the lake and in the catchment were investigated.
Variations in grain-size distributions and mineralogy can be linked to distinct terrestrial source areas, whereas the downcore trends gives information about past changes in transport dynamics in the area during the last 25,000 years. In the future, the results from this study will be applied on the 215 m long ICDP DeepCHALLA record to describe changes in terrigenous sediment input into the lake further back in time.