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Decadal to millennial hydrological change in Southern Equatorial Africa (Lake Masoko, Tanzania) during the last 45,000 years

Y. Garcin (1), D. Williamson (1), A. Majule (2), J. Guiot (1), M. Taieb (1) and A. Vincens (1)

(1) Centre Européen de Recherche et d'Enseignement des Géosciences de l'Environnement, Aix-en-Provence, France (garcin@cerege.fr / Fax: (+33) 04 42 97 15 95), (2) Institute of Resource Assessment, Dar-es-Salaam, Tanzania

The Masoko maar lake (840 m a.s.l.) in southern Tanzania provides one of the most detailed and continuous ∼45 kyr-long terrestrial sedimentary sequence from the south equatorial region in Africa. Based on a detailed chronostratigraphical framework coupled with sedimentological, magnetic and geochemical measurements, we present here the first high resolution (∼20 yr) and continuous sedimentary record of Lake Masoko across the last 45 kyr cal. BP, with the aim to further address the local and regional environment and climate variability in south equatorial Africa. Our results show that terrigeneous deposition in Masoko was highly constrained by rainfall and changes in water table, which controlled the input of clastic material originating from the soil and from the crater-wall.

We found that the Lake Masoko hydrological cycle was strongly controlled by a persistent decadal to centennial variability (∼60 to 200 yr). At millennial scale, the record exhibits synchronous changes with the Northern Hemisphere climate: dry Lake Masoko events could correspond to cold DO phases and Heinrich events. The Lake Masoko millennial variability (∼1000 to 4000 yr) is modulated by half-precessional cycles, showing the control of low-latitude insolation in this region. These results finally demonstrate the global teleconnections among regional climates. This is a contribution of the CLEHA-ECLIPSE (INSU, France) and the ACI-Ecologie Quantitative (RESOLVE) projects.