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Late Holocene paleoenvironmental changes in Equatorial Africa as reconstructed by a diatom-based study of Lac Divangui (Gabon) sediments

Daniel Ariztegui (1), Flavio Anselmetti (2), Anouk Zosso (1,3)

(1) Dept. of Earth Sciences, University of Geneva, Geneva, Switzerland (daniel.ariztegui@unige.ch), (2) Institute of Geological Sciences and Oeschger Centre for Climate Change Research, University of Bern, Bern, Switzerland (flavio.anselmetti@geo.unibe.ch), (3) Present address: Fondation suisse d'education pour l'environnement, Quai Charles Page 19, 1205 Geneva, Switzerland (anouk@noe21.org)

In recent years, an increasing number of studies have focused on the role of the tropics and the Equator as triggers of changes in the climate system at different time scales. There is, however, a remarkable paucity of continuous paleoenvironmental records in these areas preventing a better understanding of their role as climate forcing mechanisms.

Lac Divangui is located at 2° south of the Equator in the forest of Rabi-Kunga, Gabon. This 1-km diameter basin attains a maximum depth of 80 m and provides a unique site to obtain a continuous archive of environmental changes through time. Previous investigations have shown that these organic-rich sediments contains large amounts of gas that, from a seismic surveying perspective, has prevented penetration of the acoustic signal. A range-finding study of the total organic fraction using Rock-Eval pyrolysis in a sedimentary core from the center of the basin showed a stable total organic content that is very high in average (∼10%). A more detailed look into both the total organic fraction and certain biological remains, however, have shown substantial changes in both the quality of the total organic matter as well as the dominant diatom assemblages since 4.2 kyrs. BP. Although wet conditions appear to dominate the studied interval, several periods of dryness were identified around 2.4, 1.5 and 0.75 kyrs. BP. Since this last date the prevailing environmental conditions appear to be similar than today. These data are in agreement with observations in other African regions and are interpreted as related to the north-south movement of the Intertropical Convergence Zone (ITCZ).
Gabon has the highest biodiversity of tropical Africa and previous investigations have shown that the tropical rainforest has reacted to both climate and human-induced environmental changes throughout the Holocene. Our combined sedimentological and organic remains results allow reconstructing the tropical rainforest history through time, which can be in turn correlated with several well-preserved archaeological sites in the area showing variable intervals of human occupation since the middle Holocene.