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# Petrological and geochemistry of sediments from the Dibi Lake (Central Cameroon): Insights into provenance inputs and basin evolution

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## Résumé

Dibi Lake, a subsiding basin located in central Cameroon, constitutes a valuable sedimentary archive for studying the recent evolution of tropical environments in Central Africa. A 2-meter sediment core (DLC) was collected and analyzed using a multiproxy approach to reconstruct sediment provenance, basin development, and to explore potential paleoenvironmental changes.

Mineralogical analyses identify four distinct sedimentary units, designated U1 to U4, from bottom to top. These are primarily composed of kaolinite, quartz, rutile, and goethite/hematite, and a few amounts of gibbsite, feldspars, zircon, and monazite. Infrared spectroscopy reveals localized absorption bands (2145, 1997, 1418, and 862 cm<sup>-1</sup>), reflecting varied chemical environments and complex organic matter inputs. The mineralogical assemblage supports a hypothesis of detrital contributions lateritic in origin deriving from the crystalline basement, alternating between mantle and granitic/gneissic derived sources.

Major oxide concentrations show strong vertical heterogeneity. FeO content (9.7–32 wt.%) likely reflects variable contribution from oxides/hydroxides formed through lateritic weathering. TiO (2.7–5.7 wt.%) and AlO (14.4–25.2 wt.%) increase with depth suggesting enhanced input of terrigenous lateritic materials. Conversely, CaO drops from 2.3 to 0.5 wt.%, indicating carbonate depletion. Trace elements such as Zr (551–219 ppm), Y (49–26 ppm), and Th (15–6 ppm) decrease upward, suggesting a depletion of zircon and monazite amount. The La/Yb ratio (12.6–5.1) shows a significant LREE enrichment at the base of the core, consistent with greater contributions from altered crustal sources.

Isotopic ratios ( $^{87}\text{Sr}/^{86}\text{Sr}$ : 0.705–0.710;  $\epsilon\text{Nd}$ : -0.55 to +2.37) reflect strong vertical variability, indicating multiple sediment sources. High  $^{87}\text{Sr}/^{86}\text{Sr}$  values (upper than 0.709) in upper and middle layers suggest contributions from weathered felsic crust, while lower values and positive  $\epsilon\text{Nd}$  in units U2–U3 units indicate more juvenile, mantle-derived volcanic inputs. Combined with La/Yb and Th/Nd ratios, these results point to shifting contributions from chemically weathered mantle and crustal sources.

Estimated sedimentation rate based on ( $^{210}\text{Pb}$ )<sub>ex</sub> data (~0.3 cm/yr) allows a preliminary

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chronology for the last 700 years. This suggests that the variations in sedimentation described above might result from an alternance of humid/dry climatic cycles associated with African monsoon variability. Dibi Lake reflects more local dynamics, shaped by differential basement erosion and regionally variable sediment supply.

**Mots-Clés:** Sediment geochemistry, Sr, Nd isotopes, Subsiding basin, Central Africa, Sediment provenance,  $^{210}\text{Pb}$ .