



Annually laminated sediments at Ounianga Kebir, Chad, characterized using a micro-fluorescence core scanner

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Lake Yoa, a permanent hypersaline lake at Ounianga Kebir in northeastern Chad (19.03 °N; 20.31 °E), contains the first continuous paleoenvironmental record of the past 6000 years from the hyper-arid eastern Sahara. It shows a progressive drying of its terrestrial ecosystem in response to gradually weakening insolation forcing of the African monsoon, and more abrupt hydrological change in the local aquatic ecosystem controlled by site-specific thresholds. This paper focuses on the characterization of the annually laminated sediments using a new generation of micro-fluorescence core scanner. The 100-micron thick, 4-mm wide flat beam enables to discriminate each couplet using the variations of Ca, Sr and Fe, each couplet being identified by ~10 data points. Our study demonstrates the potential use of counting laminations using the very high-resolution chemical profiles. Microscopic observation revealed an alternation of wind-blown sand layers, organic layers and layers of calcite. The detailed micro-XRF analysis reveals an abrupt switch from carbonate rich layers dominated by neoformed calcite in the lower part, to carbonate rich dominated by detrital calcite in the upper part, pointing out for a change in the lake hydrology ~1100 years ago.