Abrupt changes in lake sediment properties are not always reflecting regional abrupt changes: example from varved Lake Yoa, Northern Chad.

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Some indicators reflecting the evolution of the aquatic environment of this groundwater-fed lake display two main abrupt changes. First, quantitative salinity inferences based on fossil chironomid assemblages indicate a fresh-to-saline transition that occurred fairly abruptly between 4100 and 3400 cal BP. However, the timing of the fresh-to-saline transition in Lake Yoa is strongly influenced by the progressive decrease of massive groundwater inputs, and increase in salinity is most probably reflecting the threshold from an hydrologically open lake to a close system. Second, neoformed calcite forming the summer component of the varves abruptly disappears after 1050 cal BP. However, geochemical model predicts that the dilute fossil groundwater springing at Lake Yoa, assuming stable groundwater geochemistry through time, should evolve into a hypersaline brine depleted in Ca and Mg following their precipitation caused by continuously strong evaporation. On the other hand, other aquatic indicators and all terrestrial indicators of the environment all point to a progressive drying of the Sahara since 6100 cal BP. The pollen record showed a more progressive decrease of tropical tree species between ~5600 and 4300 years ago, and further gradual desiccation of the landscape until today's desert environment was formed 2700 years ago. The gradual decrease of clay content over the entire core and changes in clay composition indicate the progressive exhaustion of clays formed in Early Holocene soils of the surrounding landscape, as well as the transition from a humid towards a hyperarid landscape. There is also a simultaneous and steady increase of indicators of aeolian input, i.e., fine sand, reacting to the progressive loss of vegetation cover and thus to increasing material availability.

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