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Depositional processes and paleoenvironmental reconstruction of the laminated intervals from Zoñar lake (South of Spain) during the last 4000 years B.P.

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Mediterranean areas in the Iberian Peninsula are sensitive to high frequency climate fluctuations (NAO and ENSO variability) and rapid environmental changes because of their geographic setting. Current global changes are a threat to these areas because of the projected water resources decrease and the general desertification trend, which affects both ecosystem and human activities (tourism, farming)

The rapid response of lake systems to environmental forcing has allowed us to reconstruct in detail the climate history. The 4000 year B.P lake sediments record from Zoñar Lake (South of Spain) is composed of intercalated massive and laminated sedimentary units. Three laminated intervals are distinguished along the core, LI1 (2728-2109 cal. yrs B.P), LI2 (1302-1115 cal. yrs B.P) and LI3 (697-100 cal. yrs B.P). The lamination show different features in every interval, which has allowed us to infer different sedimentary process and environmental conditions and therefore, the paleohydrological conditions for the lake on the three intervals.

LI1 is located at the bottom of the core. The sediments are finely laminated and the preservation conditions are good. A gypsum layer divides the interval in two different zones: at the base, a parallel varved deposit composed of authigenic calcite, organic matter and detrital layers, which coincides with the radiocarbon age dates. At top, finely laminated sediments intercalated with faintly laminated sediments, which have been interpolated.

LI2 is located in the middle of the core and is composed of finely laminated sediments

with high gypsum content.

LI3 is at the top of the core. The preservation conditions of the lamination are good although is intercalated with a massive layer. The laminated sediments are composed of algae mats mainly and several calcite layers.

Sedimentological and geochemical proxies show different depositional process and environmental conditions for every laminated interval. The good preservation, nature and microfacies association, in the varved deposit LI1 indicate a high lake level during the deposition, while the gypsum content, algae mats presences and massive deposits intercalated in LI2 and LI3 show a lower lake level for these periods and a possible heavy influence of human settlements (Roman Epoch and Modern Age, respectively).

It can be concluded that LI2 and LI3 laminated intervals record environmental changes owing to regional climate changes and human impact, while LI1 can reveals more amplitude changes when it compares with other Mediterranean and European lakes.