



## **Paleoclimatic and sedimentological interpretation of the Lake Montcortès varved sedimentary record of the last 1500 years**

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Lake Montcortès (42° 19' N, 0° 59' E, 1027 m a.s.l.) is a karstic lake located in the Pre-Pyrenean Range (NE Spain). Its relatively low surface/depth ratio (Surface = 0.093 km<sup>2</sup>; Z<sub>max</sub>=30 m) is conducive to permanent anoxic hypolimnetic conditions that favour the preservation of finely annually laminated sediments in central-distal areas of the lake basin. Thus, the sedimentary sequence of Montcortès Lake constitutes the first continuous, high-resolution record in northern Spain which extends back to the last 3500 cal yrs BP. This laminated sediments comprise biogenic varves composed of couplets of calcite and organic layers. Furthermore, deposition of grey detrital layers are punctuating the sedimentary record.

In this preliminary work the last 1500 varve years have been studied, covering the beginning of the human occupation of the area, which triggered an abrupt increase of the sedimentation rate. The robust age model is based on absolute varve chronology supported by 4 radiocarbon dates located in the upper, middle and lower part of the studied interval. Thus, detailed sedimentological analysis performed on the uppermost 528 cm of a Kullenberg core recovered from the deepest part of the lake, allows us to distinguish different periods according to the allochthonous detrital input into the lake. Lower clastic input occurred during the Iberian-Roman Humid Period, the Little Ice Age (LIA) and the 20th century, while there are two episodes of high clastic input during: i) the period 533 -1330 AD, coinciding with an increase of farming activity in the area and, ii) between 1837 and 1874 AD, coinciding with the end of the LIA and the maximum human occupancy of the mountain areas in the Pyrenees. The internal sub-layering in the calcite laminae also reflects colder conditions during the LIA.

The sedimentary record of Lake Montcortès suggests a clear hydrological impact of recent climate fluctuations (MWP, LIA, 20th century), in agreement with other records and a significant impact of farming activities in the area. Further research will clarify the interplay between climate and human factors affecting sedimentation in Montcortès Lake.