INTRODUCTION

Our aim is to investigate the hydrological and geochemical response of La Parra karstic lake to anthropogenic and climate forcings for the last 4000 years.

To achieve these goals we use a multidisciplinary approach to study the modern and past depositional processes at water body and lake sediments, and to evaluate their interactions with various environmental controls (climate and human impact) at different time scales.

XRF core scanner analyses on lake sediments have provided high resolution reconstructions of past global and climate changes (Richter et al., 2005; Barreiro et al., 2009). Several examples of Spanish karstic lakes have been recently published: Lagunas Tardera (Morellón et al., 2006), Lagunas Estanyos (Morellón et al., 2008) Lago Montcortes (Condea et al., in press).

In this contribution we show the preliminary results of La Parra Lake sedimentology, and use the XRF core scanner dataset to better understand a number of sedimentological processes:

- **Clastic input:** Human impact in the watershed during the last millennia has provided an increase in sediment delivery to many lakes in Spain. Increase in run-off caused by climate factors can also be identified as short-term flooding events. Detailed XRF data may serve to differentiate both scenarios.

- **Carbonate deposition in karstic lakes:** The carbonate bedrock makes more difficult to evaluate carbonate formation within the lakes. We use Si/Al ratios in order to distinguish between exogenic and allochthonous carbonates. We suggest the presence of dolomite in the sedimentary facies may pose a problem to this approach.

- **Evolution of exogenic stages at the lake bottom:** Fe/Mn, Fe/S and Fe/Ti ratios can be used to evaluate the redox conditions during the sedimentation and early diagenetic stages.

- **Primary productivity:** Some XRF scanners provide the elemental (carbonate) composition that can be used as an indicator of the organic matter, when the organic content of the sediments is high (Esker et al., 2000). Since those values are not available and the phosphorous only is, we have tried the Si/Al ratio to distinguish biogenic from the siliciclastic of the lake. The approach has to be tested with biogeochemical analyses.

RESULTS

The La Parra lake sediments are mainly composed of biogenic (calcite and dolomite), organic clay minerals, Fe oxides, and organic matter arranged in light greybrown 1.5-2mm bands and ≥0.5mm laminae. Some macro-plants remains have been found (Pistacia lentiscus in progress). Other compositional (total carbon and total nitrogen and carbonates) analyses are in progress.

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