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Climatic record of the Iberian peninsula from lake Moncortes' sediments

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The continuing buildup of industrial greenhouse gases in the atmosphere and concomitant increase in global temperatures has made much of the world's society aware that decades to centuries of environmental change lie ahead, and that these will have profound economic, political and societal impacts. The Iberian Peninsula lies in the boundary between tropical and subtropical climates and seems to amplify the climatic signals form the northern hemisphere through both atmospheric and water circulation feedbacks, making it an ideal site to monitor Northern hemisphere climate changes. This extreme sensitivity to climatic changes also makes the Iberian Peninsula extremely vulnerable to future climate changes. This is why understanding sensitivity to climate change and the consequences it will have on both climate and the hydrological cycle is key to implement preventive measures.
The aim of our study is to come up with a high resolution quantitative reconstruction of climate variability (temperature, production and precipitation) in the Iberian Peninsula from lake sediments. We also want to establish the relation between those changes and the ones observed in both ice cores from Greenland and paleotemperature records from marine sediments of the continental Iberian margin. For these reasons we sampled a core in Moncortes (42.3N, 0.99E), a lake of karstic origin with an average depth of 25m and an area of 0.19km2. Lake Moncortes is situated at 1065 m above sea level, has an average temperature of 10ºC (minimum 3 and maximum 16ºC) and a mean annual precipitation of 770mm.
We used the MBT/CBT (Weijers et al. 2007) proxy of pH and terrestrial temperature and the TEX86 temperature proxy (Schouten et al. 2002) to estimate changes in and around the lake. Both proxies are based on the glycerol dialkyl glycerol tetraethers (GDGTs) of archaea (isoprenoid GDGTs) and bacteria (branched GDGTs) origin. We also measured soils surrounding the lake (Menges et al. 2013) in order to establish end-members for the proxies as well as organic matter transport. Data on n-alkane isotopes will help establish hydrographic regime changes.
We observe changes in temperature and humidity consistent with those on teh northern hemisphere.

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