

Holocene environmental evolution of alpine wetlands from Sierra Nevada (S. Spain). An overview

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Alpine regions are among the most climate-sensitive areas in the world, being excellent sentinels of climate change. In this regard, high-elevation wetlands in Sierra Nevada (S Spain) preserve a unique geochemical archive registering both natural environmental change and indirect human impact. Over the last 10 years our research group has studied the Holocene environmental evolution of the region from sediment cores. Among all the geochemical data we have obtained so far, organic compounds, including both bulk sediment and biomarker proxies (mainly *n*-alkanes and long chain alkyl diols) have allowed us to specify the Holocene environmental responses of these wetlands. Different strategies were developed to understand the meaning of past biomarker records in this extreme region. In the case of the *n*-alkanes, a vegetation and soil survey was carried out that evidenced the relationship between water availability and the *n*-alkane chain length. Regarding the diol record, even though it follows the same trend as low elevation temperature series during the last century, the development of an in situ diol-temperature calibration is more problematic because of the lack of high-elevation long temperature series. So, a monitoring lake programme and seasonal samplings will be carried out during next years to obtain a proper calibration.

Each of the study wetlands followed the same evolution during the early and middle Holocene, gradually changing from lakes of moderate depth to either shallower lakes or peat bogs. Some of these peat bogs developed opposite local environmental responses to the same regional climate forcings during the last 5000 years. These trends have been amplified during the last century, probably boosted by human impact and the regional temperature increase, locally evidenced by the diol record.