

ROÑANZAS PEAT BOG

2 m deep record in the Roñanzas Peat Bog (Northern Spain)

With ca . 80.000 m² , the Roñanzas ombrotrophic mire is located in the Eastern part of the Asturias Province (Northern Spain) (Fig. 1). It is between 2.0 and 1.5 m in depth and lies on the Ordovician quartzites of the Oville Formation, at the top of one of the several flat surfaces called “rasas” (ancient marine abrasion platforms) that characterize this area. The climate is continental with an annual mean temperature of 13.1°C and annual mean precipitation of 1136 mm/year.



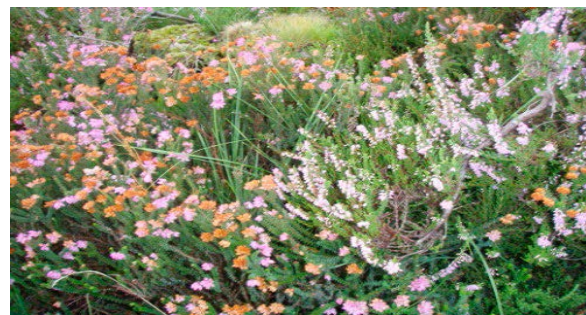
View of biomarker extracts obtained with organic solvents.



Roñanzas peat bog



Roñanzas record



Detail of heathers (Calluna and Erica) from the Roñanzas peat bog.



Detail of a Sphagnum moss from the Roñanzas peat bog.

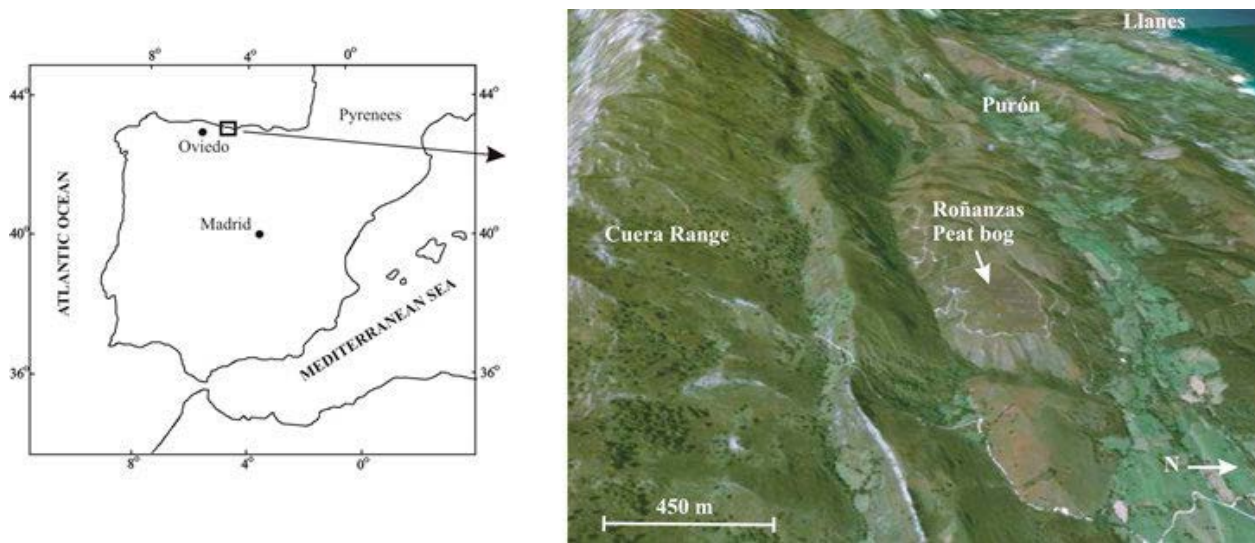
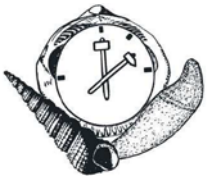


Figure 1. Geographical and geological setting of the Roñanzas peat bog.

Ombrotrophic bogs, characterised by the accumulation of peat in a raised mass over the groundwater table, receive water exclusively from direct precipitation (there is no input of minerogenic water from the surrounding environment). Therefore, these wetland areas are particularly sensitive to climatic oscillations (Barber, 1985; Barber et al, 1994, 2003).

Here, we applied the lipid content for reconstructing past climate evolution of Northern Spain over the last 8 ka cal BP. Moreover, the importance of the Roñanzas peat bog is due to it being one of the scarce bogs in Spain that hold *Sphagnum* species, typical of central and northern Europe bogs. In this kind of ombrotrophic mire, certain biomarker proxies are used to discriminate between *Sphagnum* (moss) vs. *Erica* (heather) predominance and, therefore, between more humid vs. drier conditions, respectively (Nott et al., 2000; Pancost et al., 2002; Avsejs et al., 2002; McClymont et al., 2005; Nichols et al., 2006).

We drilled a 2 m-thick manual-core in the central part of the Roñanzas peat bog (20x20 cm) (Fig. 2) and dated by AMS- ^{14}C at the “Centro Nacional de Aceleradores” (C.S.I.C., Seville, Spain).

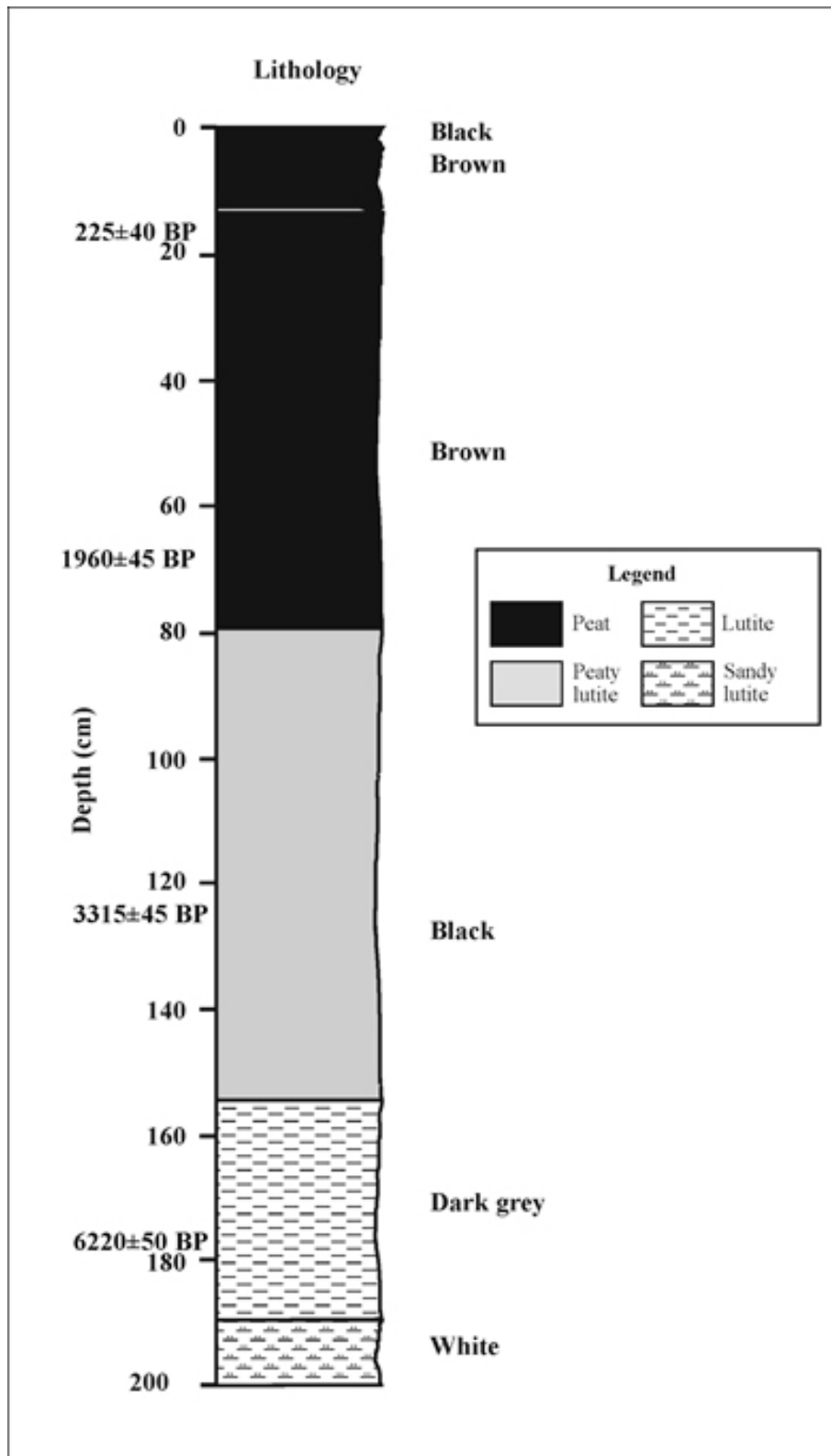
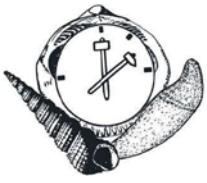


Figure 2. Stratigraphy and chronology of the Roñanzas stratigraphic section. Datings were obtained by the AMS radiocarbon method.



Results

In the 2.0 m-deep Sphagnum dominated ombrotrophic peat bog of Roñazas we determined the lipid distribution (n-alkanes, n-methyl-ketones, n-alkanoic acids, 5-n-alkyl-resorcinols and sterols) and total organic carbon. In ombrotrophic mires, the n-alkane content is used to discriminate between Sphagnum (moss) vs. Erica (heather) predominance, which has been related with humid or drier conditions, respectively, i.e., the dominant n-alkane in most Sphagnum species is C 23, whereas C 31 n-alkane is the most abundant in other plants. On the basis of our findings, we infer the plant distribution (Sphagnum vs. non-Sphagnum dominated), which was related to hydrological and palaeoenvironmental conditions, along the last 8,000 cal yr BP (Fig. 3) (Ortiz et al., 2009; Ortiz et al., in press).

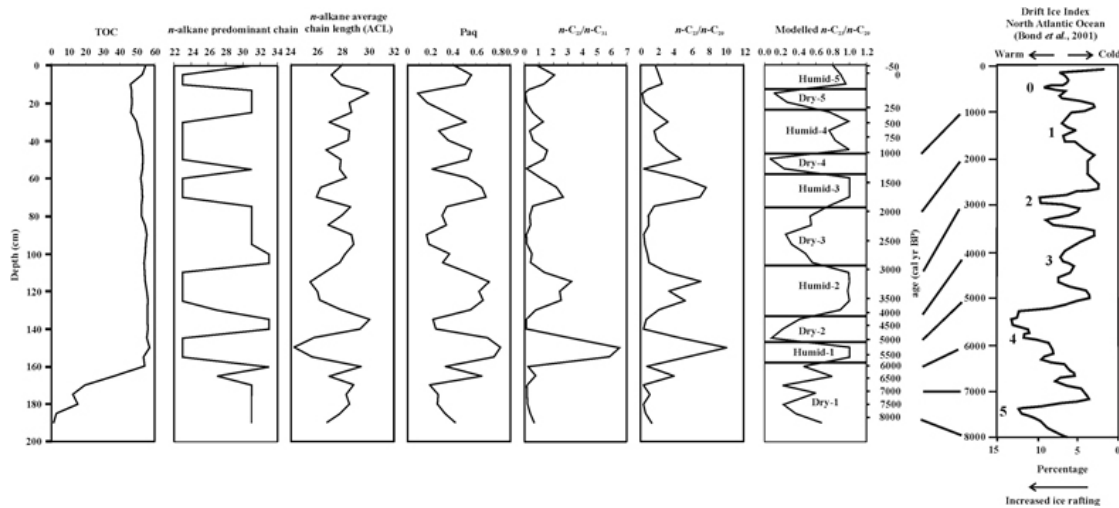


Figure 3. Profiles of TOC, n-alkane predominant chain, average chain length of n-alkanes (ACL), Paq index, n-alkane ...C 23 /C 31, n-alkane C 23 /C 29, modelled n-alkane C 23 /C 29 and n-alkane CPI ratio. The palaeoenvironmental interpretation is included.

Following most n-alkane proxies, ten dry/humid episodes were distinguished: 5 Dry Episodes alternating with 5 Humid Episodes, the transitions from dry to humid periods not necessarily being linked to changes in temperature. These transitions were found to correlate well with global environmental episodes and are consistent with other Spanish records. Our results suggest that the n-alkane CPI and the 5-n-alkyl-resorcinol/sterol ratio are related to variations in temperature rather to changes in the amount of precipitation.

References

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