



## **Understanding the NAO from Iberian and UK paleoclimate records. The NAOSIPUK project**

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The main goal of the NAOSIPUK project was to understand the North Atlantic Oscillation (NAO) during the Holocene, because the NAO is one major climate mode influencing climate patterns across Europe, and therefore, economy and society (Hurrell, 1995). We analysed several sedimentary records in two regions with opposing NAO responses. Our sedimentary surface survey from numerous lakes and bogs, led to further investigation of four records in the southern Iberian Peninsula and three in the central/northern UK. Past environments of the different sites were analysed using pollen and charcoal analysis, organic and inorganic geochemistry analyses, and sedimentary and geophysical surveys were performed. This work compares general environmental trends in both regions as deduced from the organic matter from bulk sediment to get an idea of the organic matter source, as well as specific organic compounds extracted from the sediment, such as leaf waxes (n-alkanes), algae-related compounds (diols and alkenones), and bacteria-related compounds (hopanes), to specify the sources of the organic matter, environmental temperature ranges, as well as hydrological changes.

Our preliminary results show that the palaeoenvironmental indices developed from n-alkanes agree with the variations deduced from the carbon and nitrogen atomic ratios, as well as the carbon isotopic composition from bulk sediments in southern Iberia records. Interestingly, these indices show that some locations display opposite trends from one another, and are used to distinguish regional versus local effects of climate change, human impacts, and aeolian dust inputs. During the late Holocene solar forcing and NAO fluctuations are the main drivers of the environmental evolution in most of the Iberian and UK sites. However, we do detect the influence of the NAO in the temperatures oscillations of the studied sites in southern Iberia. This influence is much more important in the north/central UK sites.

The regional comparison between north/central UK and southern Iberia shows a more stable middle Holocene (from ~7.0 to ~5.0 cal ky BP) at higher latitudes. On the other hand, the environmental and climatic changes in southern Spain are abrupt during this period. This might be related to the beginning or increasing influence of the NAO during the middle Holocene, which is coeval with a change in the precipitation source in this area. The UK records mainly show abrupt environmental changes between 4.5 and 4.0 cal ky BP and during the last millennia. These environmental changes are especially abrupt in both areas during the last one-hundred years, agreeing with the regional and global industrial development.

### References

- Hurrell, J.W., 1995. Decadal Trends in the North Atlantic Oscillation: Regional Temperatures and Precipitation. *Science* 269, 676-679.  
NAOSIPUK. <http://www.naosipuk.org>. Last access: 9th January 2017.