

Proposals for work in Matienzo Caves

P. Wynn (Lancaster University)

High resolution isotope analysis of Iberian speleothem deposits

Palaeoclimate records from the Iberian Peninsula and its ocean margin provide detailed insight into teleconnections between North Atlantic circulation and prevailing climatic conditions. However, despite speleothem deposits providing well dated, high resolution archives, such repositories of climate history have yet to be investigated in detail in this location. The Matienzo depression is a closed karstic depression in Northern Spain containing active speleothem deposits and providing opportunities for climate reconstruction on a range of timescales from the last interglacial. Oxygen isotopes within speleothems are typically used to reflect changes in cave air temperature; source moisture variability; and precipitation amount. At this site, precipitation amount is strongly linked to the North Atlantic Oscillation, and associated changes in precipitation $\delta^{18}\text{O}$ should be manifest in the speleothem calcite. The primary aim of using oxygen isotopes to reconstruct a high resolution record of North Atlantic circulation would address a critical gap in understanding of multi-year climate modes. However, climate interpretation is frequently confounded through additional processes of isotopic fractionation which complicate the archived palaeoclimate signal. There is now potential to overcome this complication through the use of ‘clumped isotopes’ (isotopologues), forming an independent indicator of palaeotemperature. This forms a pioneering secondary aim to this research and will be facilitated through a CASE studentship with the NERC Isotope Geosciences laboratory. Ultimately, we propose to use high resolution records of oxygen isotopes in speleothem carbonate from the Iberian Peninsula to reconstruct variability in North Atlantic circulation, independent of confounding in-cave changes to signal modification.