

## Towards fully paleo-informed climate projections

### Improving proxy-derived Global Mean Surface Temperature constraints of the Pliocene-Pleistocene using foraminifera clumped isotopes

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#### Project description

Projections of future climate are one of the strongest foundations of present-day climate policy. They define global emission targets, inform adaptation planning and risk assessments, and provide the scientific basis for climate diplomacy. Understandably, those future predictions are highly dependent on current human decision-making. However, an equally important consideration is the climate system itself, i.e. in what myriad ways is it going to react to the ongoing perturbation no matter our relative success at decarbonisation.

Currently, our best tools to investigate this question are Earth system models calibrated and validated with the instrumental record (data from thermometers, satellites, ocean buoys, and weather stations spanning the last 170 years). But, is the instrumental record enough to *fully* inform future projections? As we increasingly move beyond the climate stability of the past 12.000 years, the answer is a concerning: perhaps not! This is where the study of past climates comes into play. Paleoclimate states provide us with plenty of examples to better grasp how specific components of the Earth system (e.g. the warmest parts of the surface ocean, ice-sheets, sensitive high-latitude regions, etc) responded to previous climate changes.

In this assistantship you will generate paleo-data as part of the EU-funded 'Past to Future' consortium which aims to improve projections of future climate via the novel integration of climate information from the past 5 million years into Earth system model development efforts. In particular, you will be reconstructing ocean temperatures across a number of Plio-Pleistocene climatic transitions using a relatively new tool in Paleoclimatology called clumped isotope thermometry that exploits the temperature-dependent ordering of isotopologues within carbonate minerals.

Your tasks will involve water-filtering ocean floor sediment samples, picking out specific foraminifera species which you will first learn to identify, gently cleaning them under the microscope with pipettes and a steady pulse, weighting them in together with intercarb standards for microsample analysis, and running them on a gas isotope ratio mass spectrometer under our supervision.

#### Job requirements

No previous lab experience is required. A good background in statistics is a plus.