PROJECT TITLE: Establishing sponges as deep-sea temperature and water mass loggers for the common era

Project Science Theme: Science for Environmental Solutions
Project keywords: Temperature loggers, climate monitors

Lead Institution: University Bristol
Lead Supervisor: Dr Michael Henehan, Bristol, School of Earth Sciences
Co-Supervisor: Kate Hendry, British Antarctic Survey, Polar Oceans
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Project description:

Recent instrumental data has revealed alarming fluctuations in AMOC/Gulf Stream strength, but with little context for how unusual modern trends are, and whether we are approaching a disastrous tipping point. If we are to build early warning systems for Gulf Stream shutdown, we will need more spatial and temporal data coverage. Siliceous sponges could be ideal recorders of water mass temperature and age, importantly recording conditions in the abyssal realm, beyond the reach of carbonate archives. This project will explore the potential of coupled sponge B and Si isotopes as abyssal 'temperature loggers' to supplement high-cost direct instrumental networks. Preliminary data shows promising correlations in sponge skeletons between boron partitioning and isotopes with deep sea temperature and nutrient content (i.e. water mass age), and by combining abiotic silica synthesis experiments with in situ B and Si isotope measurements, this project will detangle these two factors. The student will be supported in shaping the balance between abiotic experimental ground-truthing and open-ocean sampling according to interest and emerging results, but we expect them at minimum to receive training in experimental abiotic silica synthesis, laser ablation multicollector mass spectrometry, sponge taxonomy and manipulating big marine hydrographic datasets. This is in addition to continual coaching in transferable skills in data analysis, report writing, and scientific communication. A strength of our collaboration with Kate Hendry (BAS) is the access to both existing curated collections of deep-sea sponges and world-leading expertise in Si isotopes. There may possibly be an opportunity for the student to participate in a research cruise, but the project is not dependent on the collection of new fieldwork. Coupled with Bristol Isotope Group's wealth of analytical facilities – the only laboratory in the UK analysing B isotopes in biogenic silica – this project provides an ideal environment for the candidate's development.

Useful recruitment links:

For information relating to the research project please contact the lead Supervisor via: michael.henehan@bristol.ac.uk

Bristol NERC GW4+ DTP Prospectus:
https://www.bristol.ac.uk/study/postgraduate/research/great-western-four-doctoral-training-partnership-nerc/

How to apply to the University of Bristol:
http://www.bristol.ac.uk/study/postgraduate/apply/

The application deadline is Thursday 7 January 2027 at 2359 GMT