Isotope fractionation of cadmium during continental weathering

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Project background
The burial of organic matter in the ocean is a major component of the global carbon cycle, which impacts on global climate. Recent work has indicated that the isotopic composition of the trace element cadmium may be capable of recording variations in marine organic matter burial in the past. However, for these signals to be accurately interpreted we must first understand how continental weathering processes control the composition of cadmium entering the oceans. This is a major challenge and requires the study of rivers and hydrothermal fluids draining a range of host lithologies from around the globe.

Research methodology
This fully funded studentship is part of the UKRI Frontier Research Project ‘Disentangling the role of organic feedbacks on the global carbon cycle (DISTILL),’ which aims to use inorganic isotope geochemistry to trace Earth’s ancient organic carbon cycle. In this PhD project you will undertake a major assessment of the cadmium isotope composition of river and hydrothermal waters from around the world. You will use these data to model the isotopic composition of cadmium entering the oceans, and to predict how changes in weathering activity might alter this composition. Your findings will impact on the use of cadmium isotopes as a paleo-oceanographic tracer.

Training
You will receive training in water and sediment sampling, the preparation of isotopic samples in ultra-clean laboratory conditions, the measurement of isotope samples using Multi-Collector Inductively Coupled Mass Spectrometry (MC-ICP-MS), as well as advanced data processing and modelling techniques. You will also benefit from the advanced research skills training courses offered by Royal Holloway. You will be embedded in the new Royal Holloway Centre of Climate, Ocean and Atmosphere with the chance to interact and learn from researchers studying in related fields. The studentship covers home (UK) fees, 3.5 years stipend at UKRI rates, and research expenses.

Person specification
You should have a background in Earth Sciences, Physical Geography or Chemistry and be interested in isotope geochemistry and environmental change.

Applications should be made via the Royal Holloway Direct website. This should include: a cover letter stating your motivation to apply for this particular project, your C.V., academic transcript(s) and the names of two academic references. The closing date for applications is the 10th March 2023. The studentship is available to start from September 2023.

We encourage enquiries and applications from all sections of the community regardless of gender, ethnicity, disability, age, sexual orientation and transgender status.

For an informal discussion about the project, please contact alex.dickson@rhul.ac.uk.