Mercury behaviour in contact aureoles around igneous intrusions

Hourly rate of pay: £19.19- £24.91

Casual contract, fixed term 8 weeks.

This is an exciting experience for students experienced in or keen to build experience in Geofacilities and Geochemistry labs to further explore the effects of thermal alteration around igneous intrusions by examining the relationship between mercury concentrations, mercury speciation and potentially the host phases of mercury around an igneous intrusion into relatively soft, wet sediments recovered during IODP Expedition 385 to the Guaymas Basin (Mexico). The project will use analytical equipment in the laboratories and a recently developed approach (Frieling et al. 2024) to analyse and interpret the generated data in context of previous work.

The concentration of mercury (Hg) in marine sediments has been proposed as a proxy for large igneous province (LIP) volcanism, which can potentially drive climate change, carbon cycle perturbations and extinctions. LIPs can perturb the carbon cycle and climate through effusive and explosive eruptions and emissions but notably also through large-scale intrusions into sedimentary basins. The sedimentary basins hold previously deposited rocks with Hg, organic matter, sulfur and other compounds that may be volatilized, and release, for example, large amounts of methane. Whether these thermogenic emissions can be tracked using sedimentary mercury depends on Hg behavior in and around the contact aureoles of igneous sills in sedimentary basins.

Two recent studies explored the potential for Hg release from these thermal aureoles and revealed that some Hg was indeed lost but also that a significant proportion of the volatilized Hg fraction likely reprecipitated near the intrusion itself (Svensen et al. 2023, Frieling et al. 2025). As both these studies were based on the same core material from the Karoo LIP (South Africa) the influence of potential key variables such as the host rock type, porosity and water content on Hg behavior in thermal aureoles remains entirely unconstrained.

Svensen, H. H., et al. (2023). Release of mercury during contact metamorphism of shale : Implications for understanding the impacts of large igneous province volcanism. *EPSL*, *619*, 118306.

Frieling, J. et al. (2024). Assessment of Hg Speciation Changes in the Sedimentary Rock Record From Thermal Desorption Characteristics. *G-cubed*, *25*(4).

Frieling, J., Svensen, H. H., & Mather, T. A. (2025). Mercury efficiently volatilized but not completely removed from sediments around igneous intrusions. *Geology*, *53*(2), 176–180.

About you

You will have experience in lab procedures such as weighing and careful notetaking and you will be able to manage and organize your own work. You must have experience plotting and analysing data. You will be able to work independently and will show enthusiasm to learn. You will be compliant with the Lumex Risk Assessment and will complete an Occupational Health Questionnaire prior to starting. Familiarity with field work and logging of stratigraphic sections would be desirable, but not essential.

You will be required to send a CV and a cover letter (maximum of two pages long, explaining your interest in the project, specific skills and period available for) directly to the HR Team, personnel@earth.ox.ac.uk

The deadline for applications is the **25 April 2025.**