

Deep Earth volatiles and the source of water on rocky terrestrial planets

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Did Earth form with a significant proportion of its current volatile element content, or were these elements largely delivered to Earth's surface after initial formation? Understanding how Earth gained its volatiles, including hydrogen, nitrogen and carbon, will help us determine the likelihood that other rocky planets around other stars host habitable environments. This project will explore the volatile element content of the Earth's deep mantle, via the chemical analysis of a suite of volcanic rocks from Paallavik Island, Canada. These rocks are known to be geochemically anomalous, indicating they have a primitive and un-degassed source region that has been undisturbed since the Earth was young. Therefore, volatile element measurements from these rocks, including hydrogen and nitrogen isotope ratios, could help determine how Earth became so rich in volatiles, and what the source materials were for this enrichment.

Analytical techniques to be employed within this project include scanning electron microscopy (SEM), electron microprobe analysis (EMPA), and secondary ion mass spectrometry (SIMS). Training in analytical techniques will be provided, but prior experience with one or more of these quantitative methods would be an advantage.

The results from this project will be communicated to the wider scientific community via student attendance at both national and international conferences, as well as scientific publications.

Application details: The entry requirement is a 2.1 Honours degree or equivalent in geology, Earth science, planetary science, materials science or a cognate discipline. The application deadline is Wednesday 31 January 2024. Interviews will be held in mid-late February 2023, and the studentship will start in October 2024.

Information on how to apply is [here](#):