

Analogues for lunar and martian sample return missions – What does Scotland have to offer?

Dr. Lydia Hallis (lydia.hallis@glasgow.ac.uk), Dr. Iain Neill
School of Geographical and Earth Sciences, University of Glasgow

Scottish geology is internationally renowned for its diversity and complexity, ranging from the northwest highlands with some of the oldest and most highly metamorphosed rocks in Europe, to the relatively young Hebridean Igneous Province. The diversity of Scottish rock types presents an opportunity in the current hunt for analogue materials to support sample return missions from the Moon and Mars. For example, lunar material is being collected by the Chinese lunar sample return missions Chang'e 5 and 6, in addition to previous Apollo and Luna sample return missions. Martian material is currently being sampled by the NASA Perseverance rover at Jezero Crater on Mars, as part of the NASA/ESA Mars sample return mission. Identifying terrestrial rocks that are similar to those on the Moon and Mars allows scientists and engineers to perform analytical and mechanical testing, and perfect their techniques, before moving on to analyse the rare and precious returned samples.

This PhD project will aim to identify lunar and martian analogue sites within Scotland, specifically focused on analogues for the lunar highlands and the igneous rocks of Jezero crater on Mars. Potential analogue materials will be compared mineralogically and chemically with lunar and martian meteorites as well as previously returned/collected rocks. The project will involve some fieldwork within Scotland. Analytical techniques to be employed include scanning electron microscopy (SEM), electron microprobe analysis (EMPA), laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) as well as bulk rock chemical analyses (ICP-MS). Training in analytical techniques will be provided, but prior experience with one or more of the 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](#):