Mineralogical Society bursary report: NAC+ conference fieldtrip 2016

George Guice – awarded £375

Currently a first year PhD student, my research focuses on Archaean ultramafic-mafic complexes in the North Atlantic and Kaapvaal cratons. Such complexes, which are relatively minor components of Archaean cratons, have been scarcely studied and their origin, geodynamic significance and mineralisation potential are poorly understood. The Lewisian Complex, which crops out on the Outer Hebrides and as a coastal strip on the Scottish mainland, west of the Moine Thrust, contains a significant number of these complexes. Due to its relative inaccessibility, the Lewisian Complex of the Outer Hebrides has been subject to considerably less research than the mainland, despite being its most voluminous portion. The NAC+ conference fieldtrip to the Outer Hebrides therefore provided an excellent opportunity to develop a comprehensive understanding of a large part of my research area, alongside facilitating reconnaissance fieldwork.

Led by Kathryn Goodenough (BGS) and Hannah Hughes (University of the Witwatersrand), the fieldtrip focused on a broad geology, ranging from the Archaean TTG gneisses that constitute the bulk of the Lewisian Complex to the Palaeogene Loch Roag dyke. Much of the fieldtrip focused on South Harris, which is composed of: metasedimentary rocks of the Leverburgh Belt; metaigneous rocks of the South Harris Igneous Complex; metasedimentary and metaigneous rocks of the Langavat Shear Zone; TTG gneisses, which contains sporadically distributed ultramafic-mafic complexes; and ~1.7Ga quartz-feldspar pegmatites, which are younger than all of the previously outlined units. Highlights from this region include: garnet-anorthosites within the South Harris Igneous Complex; interbedded calc-silicate and garnet-bearing pelitic metasediments in the Leverburgh Belt; the 25m thick, rare-metal, 'Chaipaval' pegmatite; and metre-scale mica within a pegmatite that cross-cuts the South Harris Igneous Complex.

The remainder of the fieldtrip focused on west Lewis, where the proportion of younger pegmatitic and granitic material is significantly greater than South Harris. As a result, TTG gneisses commonly form decimetre scale 'lenses' within the more abundant pegmatites and granites, which were derived during the 'Laxfordian' (~1.7Ga) deformation. This region also contains evidence of Eocene magmatism in the form of the lamprophyre Loch Roag dyke, which is hosted by Archaean TTG gneisses that display the distinctive, low-angle, 'Badcallian' (~2.7Ga) foliation.

Additional to the interesting range of geology, the trip provided the unique opportunity to utilise the expert knowledge of our leaders to highlight prospective areas for PhD research sampling. After successfully locating and sampling an ultramafic-mafic body in the northwest of the Langavat Shear Zone, future research will study the plethora of ultramafic-mafic complexes within the shear zone, which may have significant implications for the assembly of the Lewisian Complex. I would like to express my gratitude to the Mineralogical Society for providing financial support for this superb experience.

Back row (left to right): Brian Upton, David Corrigan, Anne Klith, Svend Joensen, Richard Lord, Jonas Petersen, Sebastian Fisher, Jochen Kolb, George Guice, James Davies.
Front Row (left to right): Kathryn Goodenough, Hannah Hughes, Paul Armitage, Peter Cawood, Deanne Van Rooyen, Helene Heide-Jorgensen, Mike Hamilton.