

SUMMER RESEARCH 2021/22

PROJECT ABSTRACT



THE UNIVERSITY OF
WAIKATO
Te Whare Wānanga o Waikato

PROJECT # 62

SUPERVISOR/S:	Adrian Pittari and Oliver McLeod
PROJECT TITLE:	Lava geochemistry of Karioi Maunga
FIELD:	Geology/Earth Sciences
DIVISION/SCHOOL:	HECS - School of Science
PROJECT LOCATION:	Hamilton

PROJECT ABSTRACT:

Karioi Maunga is an extinct stratovolcano beside Raglan of profound geological and cultural significance to Aotearoa. This volcano is one of only three sites on Earth where arc lavas (similar in composition to Taranaki) and intraplate lavas (similar to the basalts of Auckland Volcanic Field) have erupted together from the same vent system.

In this study, you will utilise an extensive catalogue of rock samples collected during the recent Karioi Volcano Geological Map campaign. We aim to analyse all the collected samples to determine their major and trace element compositions, in order to build the most complete geochemical catalogue of rock geochemical data for Karioi to date.

You will learn how to prepare rock samples for analysis, from sample selection to crushing, milling and melting of fused disks. You will gain experience with running the actual analyses using XRF and LA-ICPMS, and then processing and evaluating the data. You will learn about precision and accuracy of data by preparing USGS rock standards for all analytical runs and comparing to the data.

The comprehensive new dataset you create will then be plotted using IOGAS. Your job will be to distinguish between arc and intraplate lavas using key, pre-defined grouping criteria such as titanium and niobium contents. You will plot major and trace element diagrams for all elements analysed, and learn about how geochemical data is grouped according to common compositional features.

The second part of the project involves preparation of thin sections for a selected group of Karioi lavas. You will gain first-hand experience in the description of basaltic rocks and get to see some rare rock types that do not occur elsewhere in Aotearoa.

STUDENT SKILLS:

- B grade or higher in EARTH211; may consider students with EARTH102 only if proficient laboratory skills are shown
- Competence in practical work
- Competence in data spreadsheets (e.g. Excel)

PROJECT TASKS:

- Rock sample photography
- Thin section preparation and supervised description
- Rock sample preparation (crushing, milling, drying, creating fused disks for XRF and LA-ICP-MS analysis)
- Loss on ignition measurements
- XRF data collection alongside technician
- Supervised data reduction and plotting

EXPECTED OUTCOMES:

- Student's Research Poster (as per clause 6 of the [Scholarship regulations](#))
- Rock sample photography catalogue
- Examples of petrographic descriptions with photographs
- Description of methods used
- Portfolio of data analysis plots
- Research poster highlighting key findings from outcomes 1-4.