EXTERNAL ORGANISATION: Ballance

SUPERVISOR/S: Sheree Balvert and Terry Isson (UoW)

PROJECT TITLE: Testing the efficacy of enhanced rock weathering for CO2 capture and sequestration within Aotearoa and its impact on soil microbiota

FIELD: Earth / Climate Science

PROJECT LOCATION: Bay of Plenty & Tauranga Campus

PROJECT AIM:
Capture CO2 and save the world.

PROJECT ABSTRACT:
Atmospheric carbon dioxide removal (CDR) is required, to avoid devastating climate impacts. Recent modelling work indicate that enhanced rock weathering (ERW) of silicates is a viable strategy for carbon capture and sequestration (CCS) on a global scale. Here, CO2 is captured as bicarbonate and eventually a carbonate mineral - the main natural method of Earth carbon sequestration. Additional potential benefits of ERW include:

1. increased pH buffering (soil/seawater);
2. offsetting marine and terrestrial acidification;
3. offsetting lime application to cropland - a large carbon production footprint;
4. reducing N2O fluxes (via more quantitative denitrification);
5. release of essential nutrients (Ca, Mg, K, Si, Fe, Zn, other micronutrients) for plant, plankton and porifera.

While this application is rapidly gaining interest on the global scale, field implementation remains limited. The aim of this summer project is to determine the potential for CO2 capture in New Zealand and to constrain its impact (if any) of enhanced rock weathering on soil microbiota. The student will perform a background study to estimate the carbon footprint associated with the production of basalt, and conduct a pilot field study to constrain rates ERW in cropland. Analytical methods will include major and trace element analysis, XRD and PCR amplified DNA sequencing.

STUDENT SKILLS:
- The ideal candidate would be comfortable with both quantitative, laboratory and field work.
- Basic chemistry lab skills

PROJECT TASKS:
- Background research
- Field set up
- Field data collection
- Analysis
- Processing data

EXPECTED OUTCOMES:
- Student’s Research Poster (as per clause 6 of the Scholarship regulations)
- Determine rates of enhanced rock weathering possible in NZ cropland
- Estimate the potential for CO2 capture in New Zealand