

# TRACING THE MOVEMENT OF METALS THROUGH THE MANTLE AND CRUST USING CU ISOTOPES

## MINEX CRC PROGRAM 3

### National Drilling Initiative

#### PHD PROJECT

University of Adelaide

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#### RESEARCH PROJECT

The source of metals in mineral deposits is still under active debate, and new tools have been developed to investigate significant questions such as how important magmatic drivers are to supplying metals from the mantle and lower crust to the subsurface. Stable Cu isotopes have the potential to elucidate copper-concentrating processes as their ratios are fractionated through the movement of fluids, and signatures vary depending on whether the environment is magmatic or one of secondary fluid movement. Recent advances in precision of measurements means that more subtle differences can now be investigated as these may be significant to understanding how Cu is mobilised through the Earth system.

This PhD project will look at Cu movement from mantle to crust over 4 planned chapters, using Cu isotopes as the main tool:

1. Mantle to crust: Cu isotopes at the start of subduction (using drill core samples from the Izu-Bonin Mariana forearc sequence)
2. Through the crust: transport from mafic enclaves into crustal plutons using a case study from South Australia (Delamerian age)
3. Metal release from active volcanoes: using recently erupted lavas with sulphide coatings from fumaroles, Tolbachik volcano, Russia (samples available through the SA Museum)
4. At a site of mineralisation: using samples from legacy core and NDI drilling at Cobar, NSW