



The Livingstone Fault: a case study of faulting and slip dynamics in ultramafic rocks

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The Livingstone Fault is a >1000 km long trans-crustal terrane boundary that runs through the South and North Islands of New Zealand. The fault juxtaposes ultramafic rocks (primarily peridotite and serpentinite) of the Dun Mountain Ophiolite Belt against quartzofeldspathic lithologies (schist, volcanics, sandstone, siltstone and mudstone) of the continental Caples Terrane. The fault is very well exposed in many areas along strike, and thus it provides a prime opportunity to study how lithological variations and metasomatic reactions influence deformation style (e.g. localized vs. distributed).

Where exposed, the fault is characterized by a zone of sheared serpentinite *mélange* tens to several hundreds of meters wide containing a generally well-defined scaly fabric with entrained pods of massive serpentinite, volcanic rocks and Caples Terrane quartzofeldspathic rocks.

We present the results of an initial season of field work performed at a number of sites along a ~150 km section of the fault in the South Island, investigating:

- 1) the deformation style within the fault zone and how this varies with lithology,
- 2) the distribution of strain within the sheared serpentinite *mélange* and the geometric properties of the scaly fabric,
- 3) the physico-chemical nature and progress of the most important metasomatic reactions (e.g. talc- and tremolite-forming) and their effects on slip style and fault rheology.