Structure and Geochronology of the Alpine Schist, New Zealand

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ABSTRACT

The Alpine Schist is located on the eastern margin of the Alpine Fault, which accommodates oblique collision between the Pacific and Australian plates in New Zealand. Collision has been active since the Cenozoic and exhumation models predict that surface rocks were buried ~20km in the Pliocene. Despite this, fabrics of Mesozoic age are inferred to be preserved at the surface. In order to test the age of fabric formation, transects were conducted across the Alpine Schist to measure the foliation. Rock samples were collected to date the age of zircon and $^{40}Ar/^{39}Ar$ age of muscovite in order to constrain the age of metamorphism and fabric formation within the Alpine Schist. The structural data displayed two populations of foliations: a dominant foliation tracking towards the orientation of the Alpine Fault and a minor shallower orientation. The geochronological data highlighted ages for the formation and deposition of the Alpine Schist protolith and metamorphism associated with the Rangitata Orogeny. Muscovite $^{40}Ar/^{39}Ar$ data analysis yielded Pleistocene closure temperatures of the argon system. The heterogeneous foliation orientation and muscovite age suggested differential strain and fabric formation with the Alpine Schist during Plesitocene uplift along the Alpine Fault. The study of the active Southern Alps orogen and constraining the structural and geochronological features will enable more accurate interpretation of fossil orogens and their relationship with plate tectonics.

KEYWORDS

Geochronology, Structural, Alpine Schist, New Zealand, Southern Alps, Zircon, Muscovite

Contents

List of Figures and Tables