
275-3: TEMPORAL AND SPATIAL VARIATIONS IN MAGMATISM AND TRANSPRESSIONAL DEFORMATION IN THE MIDDLE TO LOWER-CRUST OF A CRETACEOUS ARC, MEDIAN BATHOLITH, FIORDLAND, NEW ZEALAND

Tuesday, 24 October 2017

09:00 AM - 06:30 PM

 Washington State Convention Center - Halls 4EF

We present forty-six new LASS-ICP-MS and SHRIMP-RG zircon and titanite dates and temperatures in order to document the spatial and temporal correlation of lithospheric-scale transpressional shear zones within the context of an arc flare-up event in the Fiordland sector of the Median Batholith, New Zealand. The thermochronologic data were collected from the lower-crustal Indecision Creek Shear zone (ICSZ), located in northern Fiordland, and the mid-crustal Grebe Mylonite zone (GMZ), located in central Fiordland. New $^{206}\text{Pb}/^{238}\text{U}$ zircon dates document the timing of Separation Point Suite magmatism in central Fiordland. We find that Separation Point Suite plutonism initiated with emplacement of the Refrigerator Orthogneiss at ~129 Ma and was followed by emplacement of the Takahe granodiorite at 125-123 Ma, the Puteketekite pluton at ~122 Ma and the West Arm Leucogranite from 122-110 Ma. Sub-solidus deformation in the Refrigerator Orthogneiss is bracketed by post-kinematic dikes between ~129 and ~122 Ma, but is absent in younger plutons. Titanite thermochronology reveals that localized, amphibolite-facies mylonitic deformation in the GMZ in Lake Manapouri is hosted in Carboniferous rocks and is dated at ~121 to ~117 Ma. Coeval deformation during the 125-117 Ma interval is recorded in a number of diffuse shear zones in Jurassic and Carboniferous plutons located 30 km to the north in South Fiord, Lake Te Anau. In the lower crustal ICSZ, titanite dates in high-and-low-strain domains record upper-amphibolite-facies transpression at 119-110 Ma.

Our data document a series of temporally related high-grade transpressional shear zones that were active during widespread arc plutonism. New geochronology results suggest that Separation Point Suite plutonism in central Fiordland lasted from ~129 Ma to ~110 Ma, and overlapped with transpressional deformation in both the middle and lower crust of the Median Batholith. The data show that mylonitic shear zones exposed at Lake Manapouri and Lake Te Anau were coeval, and that highly-localized strain at Lake Manapouri became more diffuse to the north. Transpression in the lower crust (119-111 Ma) appears to have outlasted deformation in the middle crust by ca. 6 Ma (129-117 Ma), thus both precede extensional orogenic collapse at ca. 108-106 Ma.

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