

## Fijian Tonalites: Enriched mantle to continental crust in an oceanic arc setting

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Seismic cross sections of some island arcs, such as the Izu arc, have shown a 6-6.5 km/s middle crust consistent with a tonalitic composition and mineralogy. While seismic data do not exist for the remnant arc of Fiji, Viti Levu has one of the largest exposures of Tertiary tonalite plutons in the world. This study uses major and trace elements, Sr-Nd-Pb-Hf isotopes, and zircon data for four tonalite plutons and adjacent dacitic volcanics to decipher potential sources and processes for production of middle crust in island arcs. The data show geochemical variability between and within plutons.  $K_2O$  ranges from <0.5 to 2% at >70%  $SiO_2$ . REE patterns vary from LREE enriched like that of continental crust, to LREE depleted. Each pluton is isotopically unique, but all overlap the Fijian basement and local mantle. No subducted or even crustal-level sediment is required. However, both crust and mantle are enriched relative to MORB sources, and FOZO-like isotopically. Trace element modeling shows that the tonalites can be explained by simple melting models using Fijian basement as source material. This suggests that the production of middle crust could be the result of reworking arc-type crust while preserving enriched mantle features.