

**GEOCHEMISTRY OF THE TLIKAKILA COMPLEX, LAKE CLARK NATIONAL PARK, ALASKA: EVIDENCE OF ORIGIN IN A SUPRA-SUBDUCTION ZONE SETTING INBOARD OF THE PENINSULAR TERRANE**

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The Tlikakila complex is a northeast-striking linear belt of variably metamorphosed and highly deformed mafic, ultramafic, and associated clastic sedimentary rocks exposed near the northern margin of the Peninsular terrane in Lake Clark National Park, Alaska. The Tlikakila complex has been postulated to be either part of the Talkeetna arc in the Peninsular terrane or part of an ophiolite complex that formed between the Talkeetna arc and the previously accreted terranes in southern Alaska. We used trace, rare earth element, and isotope geochemistry to address the origins of ultramafic, gabbroic and metavolcanic rocks interpreted to have basaltic or gabbroic protoliths. Nd isotope ratios calculated at 215 Ma yielded  $\epsilon_{Nd}$  of +2.5 to +8.3, with one sample at +9.3.

Trace element compositions were normalized to N-MORB compositions and show the following characteristics: 1) elevated Rb, Ba, K, Sr, and Pb; 2) depleted Nb; and 3) values of REE and high field strength (HFS) elements such as Zr, Hf, Ti that are nearly equal to or less than MORB values. A chondrite-normalized REE plot shows extremely flat patterns for most samples, with most elements between 5-15 times chondrite values. Some of the volcanic rocks have a negative Eu anomaly and a few have a positive Eu anomaly, including both of the gabbros that were analyzed. One of the gabbros has a depletion in the light REE and heavy REE that are 15-20 times average chondrite values. None of the samples have any significant enrichment in the light REE.

The lithology and geochemistry are similar to ophiolites associated with subduction zones. We interpret the Tlikakila complex as a dismembered suprasubduction zone ophiolite that originated between the Talkeetna arc and the southern Alaska continental margin. Metamorphism and deformation of the Tlikakila complex occurred at ~177 Ma based on our  $^{40}\text{Ar}/^{39}\text{Ar}$  dates of metamorphism of Tlikakila complex sedimentary rocks, coeval with shallowing of subduction under the Talkeetna arc. Metamorphism may have been caused by deformation and heating caused by interaction of the shallowly dipping slab and the overlying lithosphere.