Geochronological and Geochemical Transects of the Western Alaska Range Batholith

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Two geochronological and geochemical transects in the Western Alaska Range (NW-SE, E-W) highlight a spectrum of magmatic features that suggest the influence of various source regions during formation of the batholith. New SHRIMP U-Pb ages from 21 zircon separates of granitic plutons that intruded the Kahiltna retroarc basin and the Peninsular terrane (to the south) range mostly from 68.8 ±0.6 to 55.4 ±0.8 Ma (one older pluton has an age of 104.2 ±1.0 Ma). No systematic trends relating age of intrusion to location along either transect were recognized for these plutons. A subset of younger plutons (33.6 ±0.6 to 45 ±1.0 Ma) appears to be concentrated in the E-W transect. The new ages overlap the magmatic peak (~70-55 Ma) of the batholith [1, 2]. Zircons lack evidence for inheritance from older rocks.

Most granitic rocks are magnesian and metaluminous; near the boundary between the Kahiltna basin and the Farewell terrane (to the north), peraluminous, near-minimum melt plutons predominate (Cathedral Mts.). The subset of younger plutons includes gabbro and peralkaline granite. Most granitic rocks postdate the closing of the basin (100-80 Ma) and thus are post-collisional; some granitic rocks were emplaced during the final stage of basin closure and are coeval with the intrusion of a swarm of basalt to basaltic andesite dikes (southern half of NW-SE transect; 58.3±1.0 to 51.0±1.0 Ma) [1]. The dikes (relatively light REE-rich/N-MORB, negative Nb-Ta anomalies) resemble calc-alkali and continental basalts compositionally. Granitic rocks in the southern Jurassic belt (Peninsular terrane) have strongly positive εNd (up to +6.3) and low initial Pb isotope ratios. Granites in the northern Cathedral Mts. have the lowest εNd values (as low as +1.6) and highest Pb isotope ratios. Most granitic rocks have initial $^{87}Sr/^{86}Sr$ <0.70504. Nd-Sr-Pb isotopic compositions of granitic rocks indicate mantle-dominated sources and negligible contributions from older crustal rocks.

[1] Haeussler *et al* (2013) *GSA*, 23-3 Denver, CO [2] Box *et al* (2012) *Alaska Miners Assoc.,* Anchorage, AK