Geochemistry and tectonic significance of pluton successions in the western Alaska Range.

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New geochemistry and U/Pb zircon geochronology data, together with existing datasets, contribute to a refined model of the petrogenetic history of magmatism in the western Alaska Range. More than 40 mapped plutons within the study area were emplaced into Mesozoic turbiditic strata of the Kahiltna basin. Residual magnetic anomalies suggest the Kahiltna sequence overlies largely Mesozoic Peninsular terrane rocks in the SE half of the basin and Proterozoic to Paleozoic Farewell terrane rocks to the NW. This study focuses on successive intrusions, all of which are interpreted to have intruded through Farewell terrane rocks (Lime Hills and McGrath quadrangles). The chemically diverse sequence records magmatism associated with major tectonic reorganization events on the southern Alaska circum-Pacific subduction margin. The oldest (Late Cretaceous) plutons are thought to be part of a suite coinciding with final closure of the retroarc Kahiltna basin and a regional transition to transpression-dominated tectonics. Paleocene plutons were broadly synchronous with an inferred ridge subduction event, and include magnesian peraluminous to ferroan peralkaline granites. Preliminary results indicate less-radiogenic Hf isotope ratios in zircons from ca. 60 Ma granites emplaced in Farewell terrane rocks compared with granites of the same age emplaced in Peninsular terrane rocks to the SE. Dominantly subalkaline Eocene magmatism, at around the same time as the initiation of Meshik/Aleutian Arc subduction, includes emplacement of the elongate N-S Merrill Pass pluton and large volumes of associated dacitic to andesitic flows, tuffs, and lahar deposits. An Oligocene magmatic pulse, which included the emplacement of a suite of plutons ranging from gabbro to peralkaline granite, continued until after ca. 25 Ma, coinciding with initiation of Yakutat slab subduction. Plutons in the Western Alaska Range demonstrate the diversity of compositional types and tectonic events that can account for significant juvenile crustal accretion at an evolving continental margin.