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NATURE OF THE COAST BATHOLITH, SOUTHEASTERN
ALASKA: ARE THERE ARCHEAN ANALOGS??

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Two geochemical and geochronological traverses across the
1,760-km-long and 50-150 km-wide continental margin Coast batho-
lith (Coast Plutonic Complex in Canadian nomenclature), of south-
eastern Alaska and British Columbia at Skagway and Ketchikan-to-
Hyder show:

- (a) episodic intrusion at ca. 127Ma, 57-55Ma, 54-52Ma, 48
Ma and 32-19Ma (a minor, postsubduction event) of
- (b) transversely localized and longitudinally extensive
rock suites,
- (c) each of which consists of part of the calcalkaline
trend hornblende-biotite diorite-quartz diorite-tonal-
ite-quartz monzodiorite-granodiorite-granite (IUGS
terminology): gneissic diorite to tonalite at 127Ma,
quartz diorite and tonalite at 57-55Ma, tonalite and
granodiorite at 54Ma, granodiorite and granite at 54-52
Ma, granite at 48Ma and gabbro and granite at 32-19Ma;
distributed so that
- (d) the western part of the batholith is largely diorite
to tonalite and the eastern part tonalite to granite.

All rocks show high concentrations of Sr and Ba, medium to
high K and moderate light REE enrichment with small or no Eu
anomalies. $^{87}\text{Sr}/^{86}\text{Sr}_i$ ratios of 0.7047-0.7066 show mild decrease
with age and a larger range at higher SiO_2 contents. Five $^{143}\text{Nd}/$
 $^{144}\text{Nd}_i$ ratios are 0.51229-0.51264 and are of island-arc or
immature-crustal values. Compositions at SiO_2 of ca. 55-63% are
like those of Gill's average medium-K and high-K orogenic ande-
sites. Pillowform inclusions of high-Al basalt are found in sev-
eral suites and represent coeval magma derived from the under-
lying subduction zone.

Just west of Coast batholith, as in the region east and
north of Ketchikan, intrusives of quartz diorite and tonalite
are found. These are 93-89Ma old, chemically resemble Coast
batholithic rocks, but show lower $^{87}\text{Sr}/^{86}\text{Sr}_i$ ratios (0.7041-
0.7049), generally higher $^{143}\text{Nd}/^{144}\text{Nd}_i$ ratios (0.51246-0.51265)
and lower K. These plutons may not have been emplaced in their
present positions (relative to Coast batholith), but their chem-
ical character indicates origin above a subduction zone.

Coast batholith not only formed in direct response to sub-
duction of Pacific plates, but it is wholly bounded by accreted
terranes of oceanic or slope origin. Unlike Sierra Nevada, Idaho
and Peninsula Ranges batholiths, Coast batholith formed hundreds
of kilometers from Precambrian crustal rocks. Its compositional
trend is probably in large part a result of damp fractionation
of gabbroic or dioritic magmas, with the exception that the
granites may contain large crustal components.

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Are analogs of Coast batholith found in the Archean? Like many Archean plutonic suites, Coast batholith formed in relatively young volcanic and sedimentary rocks. However, the abundant rocks of intermediate SiO_2 content of the western half of the batholith are not common in the Archean, whereas the abundant trondhjemitic plutons of the Archean are rare to absent in Coast batholith (except as seams formed by in-place melting of metabasalt inliers). The granites and granodiorites of Coast batholith tend to be less radiogenic than its quartz diorite and tonalite, in opposition to typical Archean occurrences. The answer, perhaps, is "no". Archean plate-tectonic processes, in producing evolved magmas different from those of Phanerozoic subduction zones, probably were unique.