The Cache Creek Terrane (British Columbia, Canada): the remnant of a Permian Triassic oceanic plateau

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The Canadian Cordillera is composed of lithospheric fragments, different in nature, age and origin. In British Colombia, the Stikinia and Quesnellia terranes represent two Permian-Triassic volcanic arcs which accreted to North America during the Late Jurassic. These two arc-terranes are divided by the Cache Creek terrane (CC) considered to be a far travelled oceanic terrane.

The most common exposures of the CC in the Cache Creek type locality is a melange composed of blocks of N-MORB type pillow basalts, gabbros, serpentinites, upper Triassic radiolarian cherts and mudstones caught in a schistosed clayey matrix.

In central British Colombia, near Fort St-James, CC consists of two assemblages: (1) thin massive basaltic flows and tuffs interbedded with Permian pelagic limestones and (2) pillow basalts, diabases and tuffs interbedded with Upper Triassic radiolarian cherts or graded bedded greywackes. The CC is divided from the Quesnellia arc-terrane by the Pinche strike-slip fault system. Tectonic slices are caught in the shear zone and are composed of cumulate gabbros intruded by basaltic dikelets, doleritic dykes, peridodites and Palaeozoic platform carbonates which are in fault contact with the CC Permian and Upper Triassic volcanic and sedimentary rocks.

The Permian basalts are composed of olivine, clinopyroxene (cpx) and plagioclase microphenocrysts in a groundmass which includes plagioclase microlites, oxides and calcite-filled vesicules. They are geochemically similar to oceanic island tholeiites (OIT): (1) flat rare earth (*REE*) patterns [$(La/Yb)_{cn}$ = 2], slightly depleted in Light *(L)REE* relative to Heavy *(H)REE*, (2) Th-, Ta-, Nb- and Ti-enriched relative to Primitive Mantle (PM), (3) $\varepsilon Nd_{(T=315\ Ma)}$ = +5.5

The Upper Triassic porphyritic basalts are composed of Ti-rich or not cpx, olivine altered in iddingsite and plagioclase replaced by sericite. They show alkaline to E-MORB affinities. The alkali basalts are *LREE* enriched relative to *HREE* [(La/Yb)cn = 10 to 14] and their PM nomalized abundance spidergrams exhibit the typical humped pattern of OIB. The E-MORB tholeiites differ from the alkali basalts by slightly *LREE* depleted patterns and are less enriched in Nb, Ta, Zr and Hf. Moreover, they

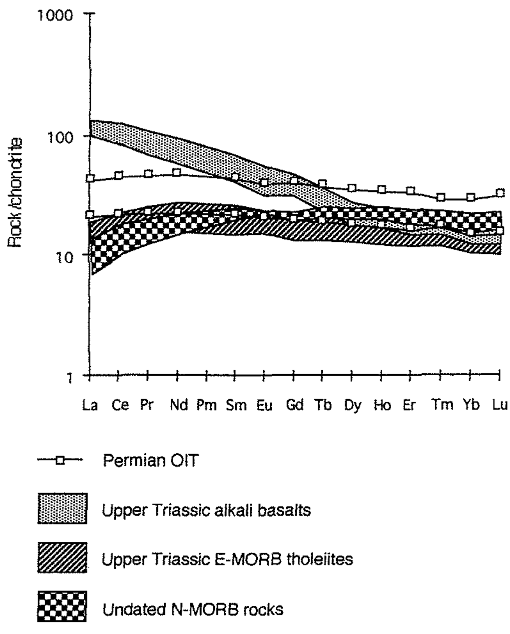

FIG. 1.

are significantly depleted in Th and their $\varepsilon Nd_{(T=220\ Ma)}$ = +5. However, both alkali and tholeiitic basalts have relative to PM, a depletion in *HREE* and Y (more marked in the alkali basalts) which suggest residual garnet in the source.

The undated basalts and diabases caught in the Pinchi Fault zone show intersertal textures with euhedral plagioclase laths cemented by cpx and igneous amphibole. They show N-MORB affinities because they are relative to PM, depleted in *LREE*, [$(La/Yb)_{cn}$ = 0.5 to 0.9], Nb and Ta. Moreover, these rocks do not show the *HREE* and Y depletion of the Upper Triassic lavas.

Thus, the CC Permian and Upper Triassic basalts likely derive from an enriched OIB source. The Permian E-MORB tholeiites probably represent an intraoceanic island volcanism followed by the building of an oceanic plateau the remnants of which are the Upper Triassic alkali and tholeiitic lavas. The lack of ages for the N-MORB rocks avoid us to precise their relation with the CC volcano-sedimentary assemblage.