



New insights into the North American Cordillera forearc: Cretaceous to Eocene tectonic evolution of the Leech River Schist, Southern Vancouver Island, Canada

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The Leech River Complex on southern Vancouver Island is a part of the Pacific Rim Terrane of the North American Cordillera and comprises a series of fault-bounded slices of mainly meta-sedimentary and meta-igneous rocks of Triassic to Cretaceous age. The tectono-metamorphic history of this unit provides important constraints on the history of terrane accretion and the paleogeographic and tectonic evolution of the western North American forearc region.

Our focus is on the structures and tectonic fabrics that developed within the western most part of the Leech River Schist from ~88 Ma through ~37 Ma. Similar syn- and post-intrusive structures that developed during emplacement of the ~88 Ma Jordan River meta-granodiorite and the ~51 Ma Walker Creek Intrusions respectively, indicate a consistent stress field during >35 m.y. of northward translation of the outboard Cordilleran terranes. A regional high temperature, Staurolite-Andalusite-grade metamorphic event is recorded in the meta-sedimentary rocks. Subcretion of the Crescent terrane beneath the Leech River Schist at ~51 Ma caused folding of the metamorphic rocks, the development of a system of dextral and sinistral brittle shears, and normal faulting. Related extension to the northwest resulted in the opening of Barkley Sound and the more westerly marine Tofino basin.

These multi-faceted deformational structures are most likely a direct consequence of the subcretion of the Crescent terrane and the linked development of the Southern Vancouver Island Orocline. The deposition of sandstones and conglomerates of the Sooke Formation began at ca. 37 Ma. This siliciclastic sequence unconformably overlies the Leech River Schist, records rapid subsidence of the forearc following a preceding uplift and exhumation event, and may be a record of a younger subcretion event.