STRUCTURE AND STRATIGRAPHY OF THE EUREKA PEAK AREA, CARIBOO MTNS., BRITISH COLUMBIA. № 69290

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The Eureka Peak map area is located in the southwestern Cariboo Mtns., 60 miles east of Williams Lake, B.C.. The map area is located along the tectonic boundary between Quesnellia and the Omineca Crystalline belt, and is underlain by an uninverted sequence of Triassic sediments and Upper Triassic- Lower Jurassic volcanics.

Three phases of deformation have been recognized in the area. Earliest structures outline the regional geometry and are synchronous with the development of decollement surfaces parallel to major lithostratigraphic contacts. These decollement surfaces define structural breaks across which a transition is observed from transposed to very open fold forms. Structural transition observed across the surfaces of decollement is attributed to extreme viscosity contrasts across the surfaces, and also due to the degree of shear strain accomodated along the surfaces. Second phase structures tighten the first and are rarely manifested as megascopic folds. The latest structures are northeasterly verging crenulations of bedding and the earlier foliation.

STRUCTURAL ANALYSIS OF POLYPHASE FABRICS IN EASTERN WRANGELLIA: EVIDENCE FOR AN EARLY CRETACEOUS INITIATION OF THE SHAKWAK SEGMENT OF THE DENALI FAULT SYSTEM? № 74073

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Several workers have suggested that the Denali fault system (DFS) has undergone dextral displacements of 300-400 km since early Tertiary time. However, at least some parts of the fault system show evidence for earlier offsets. The Hines Creek strand of the DFS shows evidence of strike-slip displacement prior to 95 m.y.a. (Wahrhaftig and others, 1975). Likewise, deformations in eastern Wrangellia suggest pre-Cenozoic movement on the Shakwak segment of the DFS, SW Yukon.

Rocks of Wrangellia terrane in the Kluane Ranges, SW Yukon, have undergone a strong deformation (D_1) of early Cretaceous age (Read and Monger, 1976). This deformation has formed symmetric, northwesterly-trending, tight to isoclinal folds accompanied by an axial planar penetrative foliation. This foliation is deformed by a system of steeply dipping kink bands (D_2) which indicate NW-SE compression. A younger system of shallowly dipping meso- and macroscopic kinks (D_3) has rotated older structures throughout the area studied.

Inferred stresses for the D_2 deformation are coaxial with a local perturbation in the late Oligocene-early Miocene stress field, as determined from fractured cobbles in Tertiary conglomerates (Eisbacher, 1977). The oldest deformation (D_1) is the result of an early Cretaceous collisional or transpressional event. The lack of post D_1-pre Oligocene penetrative deformation in highly incompetent basement rocks near the fault zone suggests that the crustal rupture which formed the Shakwak fault occurred during the D_1 deformation. Oblique convergence between Pacific oceanic plates and the North American plate could have caused strike-slip movement on the Shakwak fault prior to Tertiary time. If so, such movement would date the beginning of offset between Wrangellia and Taku terrane as proposed by Campbell and Dodds (1984).

REGIONAL CHEMICAL VARIATION AMONG COEVAL MID-TERTIARY VOLCANIC ROCKS ACROSS THE STATE OF CHIHUAHUA, MEXICO № 70124

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Approximately 30 m.y. ago voluminous ash-flow tuffs erupted from caldera sources across a broad area of northwestern Mexico and adjacent West Texas. The region thus provides a rare opportunity to examine chemical trends among evolved igneous rocks emplaced across a long continental transect from margin toward craton during a brief interval of anomalously rapid magma production. The tuffs and associated lavas are dominantly silicic, with mafic andesite as a common, though subordinate, rock type. Systematic major-element study of these rocks has shown a regular increase in alkalinity toward the northeast, culminating in a zone of alkalic rocks in Trans-Pecos Texas. This first-order regional variation is supported by limited trace-element data (Rb, Sr, Zr, Y, Nb). In silicic and interlayered mafic rocks, concentrations of both large-ion lithophile (LIL) and high field-strength (HFS) elements increase eastward with alkalinity. Ratios of LIL/HFS elements decrease eastward. These relationships are compatible with a model of magma generation involving scavenging of trace-elements during partial melting within a laterally heterogeneous and eastward-thickening wedge of subcontinental lithosphere. Progressive dehydration of a subducting slab with depth produced northeastward decreasing ratios of LIL/HFS within the overlying wedge. Some of this "ground preparation" of the source region for catastrophic mid-Tertiary magmatism may have occurred during Late Cretaceous and early Tertiary subduction beneath the region.

PACIFIC RIM COMPLEX OF WESTERN VANCOUVER ISLAND: TECTONIC EVOLUTION OF A LATE MESOZOIC ACTIVE MARGIN № 70893

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The Pacific Rim Complex (PRC), exposed in a narrow fault-bounded slice along the west coast of Vancouver Island, is composed of a sequence of Lower Cretaceous melanges which depositionally overlie an older igneous basement. This basement unit, herein called the Ucluth volcanics, is an Upper Triassic calc-alkaline arc sequence composed of fragmental volcanic rocks with subordinate diorite intrusions and interbedded limestone. Based on age and composition, the Ucluth volcanics are clearly not correlative with rocks of the Wrangellia terrane which underlie Vancouver Island to the east.

Melange deformation is restricted to Lower Cretaceous sedimentary rocks overlying this basement unit. The melanges are pervasively deformed and are characterized by a heterogeneous structural style, including pinch-and-swell, disharmonic folds and thick overturned sequences of turbidite. Sediments in the melanges were unlithified during deformation because large ductive strains were accommodated without the development of a penetrative cleavage or pervasive cataclasic. Melange resting above the basal contact with the Ucluth volcanics commonly contains large slab-shaped igneous blocks identical to parts of the Ucluth unit. Field relationships indicate that these are slide blocks derived from fault scarps of Ucluth volcanics.

Previous interpretations considered the PRC to be a late Mesozoic accretionary wedge constructed west of Wrangellia. A number of factors argue against a subduction-melange interpretation: 1) the PRC melanges are underlain by an older, arc-related basement and <u>not</u> by oceanic crust, 2) exotic blocks are submarine slide blocks and not fault slices, and 3) the melanges show no evidence of imbricate thrust faults, a structural style commonly described in other accretionary complexes. More likely, the PRC melanges represent a variety of mass-movement deposits formed at a seismically active continental margin.

THE LATE CRETACEOUS SAN JUAN ISLANDS — NORTHWESTERN CASCADES THRUST SYSTEM № 73680

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Nappes in the San Juan Islands and northwestern Cascades constitute a single Late Cretaceous thrust system in the sense of Boyer and Elliott (1982). Key elements include: (1) The footwall block, or foreland, consisting of the Wrangellia terrane on Vancouver Island unconformably overlain by foreland-basin deposits of the U. Cretaceous Nanaimo Group, and (2) The nappes themselves, including rocks ranging in age from Precambrian to late Albian-early Cenomanian (ca. 96 m.y.). The geometry of the thrusts and the shape of the foreland basin dictate that the thickening wedge of thrust sheets advanced generally westward and overrode foreland-basin sediments in the youngest, external part of the system.

The thrust sheets in the system must be restorable to a "homeland" or "root zone" somewhere east of the footwall block. Our analysis shows that at the time of thrusting, the footwall block included the Skagit gneiss and units on strike to the northwest and southeast. The thrust sheets were rooted east of the Skagit crystalline core of the North Cascades but west of the supracrustal sediments of the Methow-Tyaughton basin — perhaps in the vicinity of the Ross Lake fault zone.

Late Cretaceous thrusting was driven by the collision of the footwall block against North America. Both the footwall block and the homeland of the nappes already consisted of diverse amalgamated terranes by the mid-Cretaceous. Collision basically was responsible for reworking displaced fragments of these terranes into a younger thrust system.

OLIGOCENE AND MIOCENE VOLCANIC-TECTONIC HISTORY OF THE SOUTHERN TOIYABE AND SHOSHONE MOUNTAINS, NEVADA № 61252

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The southern Toiyabe and Shoshone Mountains of west-central Nevada contain a well-exposed record of Oligocene and Miocene volcanism and penecontemporaneous tectonism. The oldest volcanic rocks, upper Oligocene or lower Miocene silicic tuffs, are tentatively correlated with units and source areas located in adjacent ranges. These tuffs are truncated by an early Miocene, approximately 30-km-wide, northwest-trending volcano-tectonic trough. The trough, containing low density tuff fill approximately 3.5 km thick, developed as a result of large volume volcanic eruptions and contemporaneous extensional faulting. The Peavine caldera complex and a newly recognized center that erupted the Toiyabe Quartz Latite are the principal volcanic structures within the trough; however, smaller silicic to mafic centers are known or suspected. The center related to the Toiyabe Quartz Latite is inferred from the presence of a broad 25-mGal gravity low, rhyolite domes, and vents plugged with intrusive rocks that grade into ash-flow tuff. A well-defined caldera did not form, probably because collapse associated with tuff eruption was broadly distributed within the trough.

Three periods and orientations of faulting are recognized. The oldest faults are north- to northwest-trending normal faults which occur north of the volcano-tectonic trough. To the southwest, within the trough, closely spaced and steeply dipping normal faults have a dominant northwest trend that is consistent with northeast-southwest-oriented extension. The youngest faults are north-trending normal faults related to present-day basin-range structures and they cut across all older faults and lithologic units.