Cordilleran Geoscience: A 2020 perspective

October 5, 2020
9:00 - 3:00 (PST)

Program with abstracts

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Program

Keynote perspectives

9:00 - 9:05	Opening remarks
	(*speaker)
9:05 - 9:45	***Jim Monger,** Geological Survey of Canada, Emeritus Canadian Cordilleran geoscience: Past, present, and (?) future
9:45 - 10:25	***JoAnne Nelson,** British Columbia Geological Survey, Emeritus Playing the Great Game of Cordilleran terrane tectonics: A personal account 1970-2020
10:25 - 10:45	Questions and answers

Ongoing research 1

11:00 - 11:20	***David Moynihan,** Yukon Geological Survey Advances in understanding the geology of eastern Yukon
11:20 - 11:40	***Jim Ryan,** Geological Survey of Canada Architecture of the Yukon-Tanana terrane and its relationship to the North American craton
11:40 - 12:00	***Alex Zagorevski,** Geological Survey of Canada Overview of Cordilleran oceanic terranes and their significance for the tectonic evolution of the northern Cordillera
12:00 - 12:20	***Bram van Straaten,** British Columbia Geological Survey Triassic to Jurassic evolution of the Stikine terrane: Implications for Cordilleran tectonics and metallogeny
12:20 - 12:45	Questions and answers

Ongoing research 2

1:00 - 1:20	***Paul Schiarizza,** British Columbia Geological Survey The Triassic-Early Jurassic arc of Quesnel terrane: Stratigraphic and plutonic framework for copper, gold, and molybdenum
1:20 - 1:40	***Patrick Sack,** Yukon Geological Survey Late Triassic to Jurassic plutonism in the Intermontane terranes of Yukon: Where are all the porphyries?
1:40 - 2:00	***Dawn Kellett,** Geological Survey of Canada Latest Cretaceous to Paleogene faulting, magmatism, and fluid flow in the northern Cordillera
2:00 - 2:20	***Luke Ootes,** British Columbia Geological Survey Evolution of the Cordilleran orogen during the Eocene
2:20 - 2:40	Questions and answers
2:40 - 2:45	Closing remarks

Abstracts

Keynote perspectives

Cordilleran Geoscience 2020: Past, present and (?) future
Jim Monger, Geological Survey of Canada, emeritus

Establishing the distribution of rocks in space and time in the Canadian Cordillera began in 1871 when British Columbia entered Canadian Confederation. By 1906, a generalized geological map of the entire continent shows blank spaces in western Canada only in northern Yukon and North West Territories. Mapping is on-going and aided by increasingly refined tools for locating, dating and analysing rocks.

Mapping led to attempts to understand the evolution of the mountain belts. By ~1875, Appalachian studies led to the "Geosynclinal Cycle" concept, in which strata deposited in long-lived troughs called geosynclines were buried, deformed, metamorphosed, intruded and uplifted, a hypothesis that dominated North American tectonics for ~90 years. During the 1950s-60s, geophysical mapping and sea-floor drilling of the ~70% of Earth's surface beneath the oceans led by 1963 to formulation of the New Global Tectonics, aka Plate Tectonics. A GSA Penrose Conference on "The meaning of the New Global Tectonics for Geologists" was held in Asilomar, California in November 1969. In January 1970 its content was conveyed to Vancouver's geological community at the first meeting of GAC's Cordilleran Section. Some 200 participants were expected; ~800 attended, mostly from the mineral industry.

The plate tectonic paradigm had an immediate influence. Geosynclinal rocks in the western Cordillera comprising associated volcanic and sedimentary strata were reinterpreted as magmatic arc and ocean floor deposits, and sedimentary successions in the eastern Cordillera as former continental margin deposits. The greatest challenge, readily apparent from global maps of ocean floor ages, was the potential within a region such as western Canada where the record of nearly 400 million years of plate convergence creates enormous paleogeographic uncertainty. That this is so was supported in the early 1970s by recognition of anomalous (w.r.t. the North American craton) paleomagnetic results and fossils, and led to the concept of "terranes", which are regions with internally consistent geology whose original relations to one another and the continental margin are paleographically "suspect".

Today, we recognize that most terranes are defined by their youngest assemblage; e.g. Quesnellia in southern British Columbia is defined by early Mesozoic arc-dominated rocks that overlie late Paleozoic arc, ocean floor and possibly older craton margin strata. Re-examination of linkages between terranes suggests that all major terranes probably were assembled along the former continental margin of North America by the Middle Jurassic (≥174 Ma).

There are two current "end-member" models of the principal controls on Cordilleran mountain-building. In one, plates are moved by "classic" ridge-push, trench-pull plate forces, and orogenesis is caused by arc-continent collision resulting from subduction dipping away from the continent. An alternative model proposes that plates containing cratons, like the North American Plate, are driven mainly by coupling between mantle and deep lithospheric continental roots and driven by mantle flow which results in deformation of weak, warm lithosphere of the leading plate margin. Resolution of these models calls for careful re-evaluation of the evidence for arc-facing directions and paleogeography.

Playing the Great Game of Cordilleran terrane tectonics: A personal account 1970-2020
JoAnne Nelson, British Columbia Geological Survey, emeritus

A half a century ago, plate tectonics grabbed the microphone in Cordilleran tectonic discussions and has never dropped it since. A key marker of the oncoming revolution was Tanya Atwater's 1970 paper, which invoked oceanic plate motion as the major driver of the on-land tectonic evolution of western North America, notably motion on the San Andreas fault, but by implication, everything. I am a child of that revolution. I inhaled the Atwater paper as a third year undergraduate and have been part of the "Great Game" – as observer and participant – ever since. The early 1970's very a period of lively intellectual foment, heated discussions, and mental gymnastics, as the leading practitioners of the day attempted to rectify the new mobilist theory with existing concepts like geosynclines and morphotectonic belts. The new terrane paradigm arose out of this riotous, highly fertile period. In 1977, Davy Jones and colleagues named and outlined the first terrane, Wrangellia. Three years later, Peter Coney, Jones and Jim Monger, who had been separately and collectively wrestling with different parts of the Cordillera, published their seminal paper, Cordilleran Suspect Terranes (1980). In this paper, for the first time, we see the Cordillera carved up into these new entities, which are defined as internally coherent but mutually discrete; possibly all of vastly different origins. The terrane map changed our world and has formed the basis of our thought ever since.

Of course, once established, every mental construct is subject to immediate and ongoing challenge. My colleagues and contemporaries have engaged in testing the terrane framework from its inception to the present day; and the current generation of students are continuing the work. A key theme of revision has been the recognition of linkages between terranes that significantly predate their accretion. In the original model, each terrane was considered an independent entity until it joined the Cordilleran collage in late Mesozoic – Cenozoic time. In an important early modification of this, Jim Monger and colleagues (1982) showed that the Intermontane terranes amalgamated prior to accretion to North America along the Omineca tectonic welt and the Insular terranes joined and accreted together along the Coast tectonic welt. This was followed by a series of studies that showed: 1) Yukon-Tanana terrane was a fragment of the continent margin that rifted away in the Devonian (Mortensen, 1992); 2) Slide Mountain terrane was a late Paleozoic marginal basin joined to the continent and to Yukon-Tanana terrane/Quesnellia (Nelson and Bradford, 1993; 3) Intermontane terranes (and North America) shared stratigraphic and intrusive linkages that allow their reconstruction as a SW Pacific-style system of arcs and microplates from Devonian through Jurassic time (Colpron et al., 2007), later referred to as the “western peri-Laurentian realm” (Colpron and Nelson 2009); 4) Alexander terrane and Wrangellia are linked by Pennsylvanian plutons (Gardner et al., 1988; Beranek et al., 2014); and 5) Insular and Arctic terranes shared common history and evolved a path that led from the eastern Arctic region in Silurian time into northern Panthalassa (NW Passage model, Colpron and Nelson 2009).

The terrane model, modified by these synthetic observations, has formed the basis for robust tectonic – metallogenetic models such as the interrelated Mesozoic arcs of Stikinia and Quesnellia and their remarkable porphyry and porphyry-related mineral endowment; and the Devonian-Mississippian co-development of volcanogenic massive sulphide deposits of Yukon-Tanana terrane with sediment-hosted syngenetic and early diagenetic deposits on the continent margin. The talks in this session carry on in the same tradition of increasing elucidation of just what these darn terranes are and were, what were their interactions through time, and how knowledge of this can aid in mineral exploration.

Ongoing research 1

Formation and reactivation of the margins of Selwyn basin: tectonics, magmatism and mineralization

David Moynihan, Yukon Geological Survey

The northwestern Laurentian margin comprised three Lower Paleozoic paleogeographic domains: from southwest to northeast, these are the McEvoy platform, Selwyn basin and the Mackenzie/Ogilvie platform. The boundaries of Selwyn basin are zones that experienced multiple episodes of deformation, magmatism and mineralization; this presentation will review recent advances in understanding the nature, geometry and significance of these boundaries

The northeastern boundary of Selwyn basin is marked by the Dawson thrust, a steeply dipping Mesozoic fault that approximates the position of an ancestral, basin bounding structure. The Dawson thrust is approximately collinear with a belt of 500 Ma alkaline mafic volcanic rocks (Dempster volcanics and Old Cabin Formation), and coincides with a sharp change in lithospheric thickness, from approximately 50 km under Selwyn basin, to 2-3 times this under the Yukon block to its north (Ogilvie platform). Carlin-type gold and other mineralisation styles are concentrated along this lithospheric boundary. Continuity of Ediacaran-Cambrian strata across the Dawson thrust suggests the ancestral Dawson fault formed as a result of Cryogenian or earlier rifting; however, widespread middle Cambrian tectonism and magmatism indicates that a stable basin margin was not established until late in the Cambrian. The Dawson thrust accommodated relatively little horizontal shortening during Cordilleran deformation, and displacement dies out towards its eastern tip, where stratigraphic relationships are well preserved.

The southwestern limit of Selwyn basin is its boundary with the McEvoy platform, a region that formed a high standing block during much of the Silurian-Devonian. The McEvoy platform, which represents the northern continuation of Cassiar platform, is characterised by abundant late Cambrian-Early Ordovician alkaline volcanic rocks and hosts the Faro deposit, which is of broadly similar age. Late Devonian-Mississippian intermediate arc-related volcanic rocks are also prominent on Cassiar platform and adjacent to the McEvoy platform-Selwyn basin boundary; this volcanism overlapped with sedex and VMS mineralisation in Selwyn basin. The Selwyn basin-McEvoy platform boundary was heavily overprinted by Cordilleran deformation. In Southeastern Yukon, the McEvoy platform was tectonically buried from two directions. Jura-Cretaceous burial beneath the NE-vergent Inconnu thrust was followed by burial beneath rocks of Selwyn basin by an early Cretaceous (110-106 Ma) SW-vergent thrust that accompanied formation of high amplitude fold nappes. In central Yukon, this SW-vergent belt was subsequently overprinted (pre-96 Ma) by NE-vergent thrusts that developed as the Selwyn fold-thrust belt propagated towards the craton. Polyphase deformation has thus obscured stratigraphic relationships between these two regions.

Architecture of the Yukon-Tanana terrane and its relationship to the North American craton

Jim Ryan[1*], Nathan Cleven[1], Alex Zagorevski[1], Andy Parsons[2] and Cees van Staal[1],
[1]Geological Survey of Canada, [2]Department of Earth Sciences, University of Oxford. *speaker

Regional geological relationships indicate Yukon-Tanana terrane (YTT) is a thin klippe on structurally underlying parautochthonous North American margin (PNA) rocks, commonly with vestiges of Slide Mountain terrane lying at or near their boundary. Structural windows through the thinned allochthonous upper plate expose PNA in west-central

Yukon and eastern Alaska as mid-Cretaceous extensional core complexes. YTT basement detrital zircon ages are consistent with an origin from Late Devonian and older PNA stratigraphy. However, distinct post-Devonian magmatic and metamorphic histories discriminate YTT from PNA. The YTT is characterized by voluminous Mississippian to middle Permian magmatism and records Mississippian to Middle Jurassic metamorphism and tectonism, all characteristics that are absent in PNA. The timing of accretion of YTT to PNA is contested amongst researchers, however, the main bounding structure between them was likely a Jurassic to Cretaceous thrust that was locally reactivated during mid-Cretaceous extension. YTT deformation is very complex, but it locally preserves middle Permian extensional history indicated by tectonic exhumation of orogenic peridotites into the Snowcap basement. These peridotites must have been bound by crust-transecting extensional faults, which may have formed conduits for magmatism and mineralizing fluids. These faults were likely reactivated during Late Triassic to Early Jurassic compressional deformation. Questions remain about location, setting and timing of contractional structures within YTT, and with other terranes, prior to final accretion to North America.

Overview of Cordilleran oceanic terranes and their significance for the tectonic evolution of the northern Cordillera

Alex Zagorevski, Geological Survey of Canada

Ophiolite complexes are an important component of oceanic terranes in the northern Cordillera and constitute a significant amount of juvenile crust added to the Mesozoic Laurentian continental margin during Cordilleran orogenesis. Despite their tectonic importance, few systematic studies of these complexes have been conducted. Detailed studies of the pseudostratigraphy, age, geochemistry and structural setting of ophiolitic rocks in the northern Cordillera indicate that ophiolites formed in Permian to Middle Triassic supra-subduction zone settings and were obducted onto passive margin sequences. Re-evaluation of ophiolite complexes highlights fundamental gaps in our understanding of the tectonic framework of the northern Cordillera. The previous inclusion of ophiolite complexes into generic 'oceanic' terranes resulted in significant challenges for stratigraphic nomenclature, led to incorrect terrane definitions, and resulted in flawed tectonic reconstructions. This presentation will explore implications oceanic terrane definitions beyond the traditionally drawn terrane boundaries.

Triassic to Jurassic evolution of the Stikine terrane: Implications for Cordilleran tectonics and metallogeny

Bram van Straaten, British Columbia Geological Survey

The Stikine terrane of the Canadian Cordillera is a multi-episodic island arc terrane that accreted onto the Laurentian margin in the mid-Jurassic.

Basement rocks are Paleozoic in age (Takhini and Stikine assemblages, Asitka and Zymoetz groups) and are sporadically exposed in the central and northern part of the terrane. The nature of basement rocks in southern Stikinia is unknown.

Late Triassic mafic volcanic arc strata (Lewes River, Stuhini and Takla groups) are coincident with a belt of coeval plutons (Stikine plutonic suite) along the northeastern and eastern margin of Stikinia, as far south as Endako. Arc magmatism is synchronous with early porphyry Cu-Au (Sheslay) and late porphyry Cu systems (Schaft Creek), and was likely generated by subduction below Stikinia. Late Triassic sedimentary rocks dominate in the Stewart area (south of the lower Iskut River), in the central and eastern Skeena arch (Smithers-Terrace area), and in limited exposures in south-central Stikinia. These exposures likely reflect back-arc sedimentation, and host rare VMS deposits (Granduc).

A major tectonic reorganization in the latest Triassic resulted in the termination of subduction below the (north) eastern margin of Stikinia. Localized silica-undersaturated alkalic intrusions, volcanic rocks and porphyry Cu-Au deposits (Galore Creek) were generated during the latest Triassic. Latest Triassic to Early Jurassic volcanic rocks of the lower Hazelton Group (Betty Creek, Klastline, Cold Fish, Toodoggone and Telkwa formations) form two belts from Kitsault-Stewart-Iskut-Spatsizi and Toodoggone-McConnell Creek-Skeena arch-Whitesail Lake. Notably, lower Hazelton Group rocks are absent along the northeastern margin of Stikinia, which was the site of significant uplift and erosion at this time. Significant mineral deposits are limited to the western belt (e.g. KSM, Brucejack, Red Chris) and the northern end of the eastern belt (e.g. Kemess, Lawyers). We suggest that post-subduction arc-like volcanism (remelting of previously subduction-metasomatised lithosphere) generated these two mineralized volcanic belts, whereas the apparently unmineralized McConnell Creek-Skeena arch-Whitesail Lake belt may have resulted from normal subduction. A post-subduction model for the mineralized volcanic belts is supported by: 1) thinner volcano-sedimentary successions with high structural control, 2) coeval uplift along the adjacent northeastern margin of Stikinia, and 3) the Au-rich nature of mineralization, and association with the onset of volcanism (both common features of post-subduction mineralized systems world-wide).

The late Early to Middle Jurassic upper Hazelton Group is largely sedimentary in nature (Spatsizi, Nilkitkwa, Smithers and Quock formations). Extensive occurrences of upper Hazelton Group volcanic rocks are limited to strata within the Eskay rift (Iskut River Fm) and arc-like successions (Horn Mountain, Mount Brock, Saddle Hill, Entiako, Naglico formations). However, recognition of upper Hazelton Group arc-like successions is hampered by their similarity to other volcanic successions and a general lack of age constraints for many volcanic successions within Stikinia. Thus far, significant mineral deposits of this era are limited to VMS deposits within and near the Eskay rift (Eskay Creek, Anyox, Dolly Varden). The volcano-sedimentary successions and mineral deposits are formed in a syn-collisional setting, during amalgamation of the Intermontane terranes with Laurentia.

Ongoing research 2

The Triassic-Early Jurassic arc of Quesnel terrane: Stratigraphic and plutonic framework for copper, gold and molybdenum

Paul Schiarizza, British Columbia Geological Survey

The defining feature of Quesnel terrane is a Triassic-Early Jurassic arc complex that extends continuously for most of the length of British Columbia and hosts a significant proportion of the province's major porphyry Cu ±Au-Mo-Ag deposits. This arc complex is represented mainly by Middle and Upper Triassic volcanic and volcaniclastic rocks of the Nicola (southern BC) and Takla (northern BC) groups, but also includes Early Jurassic volcanic and sedimentary rocks that locally overlie the Triassic rocks, and several suites of Late Triassic to Early Jurassic calcalkaline and alkaline intrusions.

The Nicola and Takla groups typically include a lower unit of Middle to Upper Triassic siltstone, chert, volcanic sandstone and basalt; a middle unit of Upper Triassic (Carnian to middle Norian) volcanic sandstone intercalated with pyroxene-phyric basalt and breccia; and an upper unit, disconformably above underlying rocks, consisting of Upper Triassic to Lower Jurassic polymictic conglomerate and red feldspathic sandstone, intercalated with a heterogeneous assemblage of volcanic rocks. Triassic volcanic rocks are mainly pyroxene-phyric basalts with high-K calcalkaline to shoshonitic characteristics, but felsic volcanic rocks, including a distinct marker unit of 224 Ma rhyolite intercalated with limestone, occur in the western part of the Nicola Group in southern BC.

Late Triassic intrusions include Alaskan-type ultramafic-mafic complexes and stocks of clinopyroxenite-gabbro-diorite (224-208 Ma); calcalkaline granodiorites and tonalites (230 – 208 Ma) that are co-spatial with the rhyolite-bearing western Nicola belt of southern BC; and a belt of latest Triassic (205-202 Ma) monzodiorites that extends from southern to northern BC within the main part of the Nicola-Takla belt. Intrusions of the southwestern calcalkaline suite host major porphyry Cu-Mo deposits at Highland Valley and Gibraltar, and those of the monzodiorite belt to the east host the Copper Mountain, New Afton, and Mt. Polley porphyry Cu-Au deposits.

Early Jurassic intrusions include a belt of large calcalkaline plutons (200-193 Ma) that includes the Bromley, Pennask, Wild Horse, Thuya and Takomkane batholiths in the south and the main part of the Hogem batholith in the north. Significant porphyry Cu (±Mo±Au) deposits within this belt include Brenda (Pennask batholith), Woodjam (Takomkane batholith) and Kwanika (Hogem batholith). Other, mainly smaller, Early Jurassic intrusions include Alaskan-type ultramafic-mafic bodies (195-184 Ma), and stocks of monzonite, diorite and syenite (200-174 Ma). In northern BC significant porphyry Cu-Au deposits associated with these rocks include Mt. Milligan (187-182 Ma Heidi Lake monzonites), and Lorraine (182-177 Ma Duckling Creek syenites).

Late Triassic to Jurassic plutonism in the Intermontane terranes of Yukon: Where are all the porphyries?

Patrick Sack* and Maurice Colpron, Yukon Geological Survey *Speaker

A series of Late Triassic to Early Jurassic granitoid plutons intrude the Intermontane terranes (Stikinia, Quesnellia, Yukon-Tanana) in southern Yukon. These plutons are the northern continuation of two magmatic belts in BC that include the causative plutons to prolific Cu-Au porphyry deposits in Stikinia and Quesnellia. In Yukon, latest Triassic to Early Jurassic plutons host metamorphosed Late Triassic Cu-Au porphyry deposits (Minto and Carmacks) but Jurassic porphyry systems remain elusive. This talk will review Late Triassic to Jurassic plutonism in the Intermontane terranes of Yukon focussing on metallogenic and tectonic implications of recent work.

Latest Cretaceous to Paleogene faulting, magmatism and fluid flow in the northern Cordillera

Dawn Kellett, Geological Survey of Canada

By latest Cretaceous, many of the elements of the northern Canadian Cordillera orogen interior (Intermontane of southern Yukon and northern BC) were in place. However, the latest Cretaceous to Paleogene involved emplacement of several regional post-accretionary magmatic suites (e.g. Casino, Prospector Mountain, Carmacks, Sloko-Hyder suites), significant dextral translation and lithospheric-scale segmentation of the orogen interior along the major Denali and Tintina faults, as well as several smaller strike-slip faults (e.g. Llewellyn, Big Creek, Teslin), and a range of associated mineralization. While the magmatic history is relatively straightforward to reconstruct through conventional geochronological, petrological and geochemical methods, timing and conditions of fault slip (and reactivations), thermal pulses, and fluids associated with mineralization within the upper crust are more challenging to characterize. This presentation will review new and emerging petrochronological datasets showing that latest Cretaceous and Paleocene-Eocene were periods of (mineralized) fluid flux through the upper crust. For example, during Paleocene-Eocene, the Big Creek fault, controlling structure for the Revenue-Nucleus Au-Ag-Cu-Mo porphyry deposits, reactivated and hydrothermal fluids injected along pre-existing latest Cretaceous mineralized veins. New low-temperature thermochronology datasets show that the Paleocene-Eocene was also a period of rapid cooling for a significant portion of the orogen, potentially signifying a preceding regional heating event. Data on the temporal-spatial extent, structural control of and drivers for these post-accretionary fluid events, and the coeval thermal evolution of the upper crust and evolution of the underlying lithosphere during this period are yet quite limited. They each merit further investigation as they are required inputs for defining the tectonic context for mineralizing events during this period of the northern Canadian Cordillera's history.

Evolution of the Cordilleran orogen during the Eocene

Luke Ootes, British Columbia Geological Survey

The Paleogene was a time of fundamental change in the Cordilleran orogen when Cretaceous shortening and arc construction transitioned to Eocene extension and strike-slip deformation. The change is recorded by four Cordilleran-scale features, the main components of which developed during the Ypresian and earliest Lutetian (56 to 47 Ma). First, voluminous magmatic rocks formed in the central and eastern Coast Plutonic complex, genetically related to crustal extension. Second, in the Intermontane belt, orogen-parallel volcanic complexes (that overly thin basal sedimentary horizons), were deposited in grabens formed due to rapidly thinned lithosphere. Third, high-grade metamorphic core complexes were exhumed in the Intermontane belt and cratonic North America and preserved in the footwalls of shallow west-dipping extensional shear zones. Fourth, orogen-parallel dextral strike-slip faults dissected the orogen. Although these faults were long-lived (Cretaceous through Oligocene), most of the dextral offset is interpreted as Ypresian. The change from shortening to extension also resulted in mineral deposits such as the Juneau orogenic gold camp and epithermal gold and porphyry-style copper-molybdenum throughout southern Yukon, British Columbia, Washington, and Idaho. The Siletzia ocean plateau, potentially related to the modern Yellowstone hotspot, formed contemporaneously but on the Pacific plate and was not accreted to North America until the later stages of the Ypresian.

These Eocene magmatic-metamorphic features are all related to extension. However, the dextral strike-slip faults indicate the orogen was in transtension. The first-order control was at the Pacific plate-North American plate scale and controlled by plate vector and speed. Deformation on the North American plate was also controlled by the rheology of the Cordilleran terranes. The temporal and geographic migration of the Intermontane volcanic belts and metamorphic core complexes are particularly instructive. The volcanic belts sweep from ca. 56 Ma in southern Yukon to ca. 47 Ma in Idaho. Exhumation of the core complexes in southern British Columbia was ongoing between 56 to <50 Ma and continued in a sweeping pattern southward through the US. While multiple plate processes continued during this sweep (e.g., Farallon flat-slab subduction, Siletzia accretion), the time-space relationships appear to indicate initiation began in the northern Cordillera at ca. 56 Ma. We attribute this sweep to a simple counter-clockwise twist of the Pacific plate relative to North America. It remains ambiguous if subduction was ongoing or ceased. This hypothesis can be tested with refined Pacific plate vector models and evolving geochronological tools to decipher the precise timing of low-temperature deformation.

Cordilleran Geoscience: A 2020 perspective is being organized and sponsored by the Pacific Section of the Geological Association of Canada, the Geological Survey of Canada, the British Columbia Geological Survey, and the Yukon Geological Survey.

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