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From Tail to Trunk: Revealing along-strike basin-wide high-resolution stratigraphic architecture of the Montney Formation

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Time: Doors open at 11:30am, Talk begins at 12:00pm (MST)

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ABSTRACT

The Montney Formation has been extensively studied for decades and it is well established that this sedimentary wedge is composed of three 3rd-order stratigraphic sequences. Numerous published dip- oriented cross-sections and sedimentological evidence from core descriptions clearly illustrate sub- aqueous clinoform geometries and the overall ENE-WSW prograding trend of this mixed siliciclastic/carbonate shelf depositional system. However, despite a large body of literature, and due to the huge geographic extension of the Montney Formation, a basin-wide high-resolution stratigraphic framework remains to be defined. For such a model to be built, along-strike geometries and variations in accommodation space, influenced by the structural framework and autocyclic depositional processes, such as lateral compensation, need to be better understood. High-resolution internal stratigraphic units (4th order or higher) that have been defined in a specific area may be very thin or not even exist in another part of the basin. This results in common regional inconsistencies of the current high-resolution stratigraphic nomenclature of Montney tops between various published studies.

In this presentation, we illustrate how a 550-km long regional seismic-like, along-strike, cross-section with a high density of well control (300 wells) across British Columbia and Alberta, highlights inconsistencies in the existing regional stratigraphic framework and help define a more reliable basin- wide, high-resolution depositional architecture of the Montney Formation. This correlation is supported by numerous sedimentological core descriptions and publicly available conodont biostratigraphic data. It is also consistent with available stratigraphically controlled variations of isotopic composition of oil extracted from cores and cuttings.

Our interpretation reveals along-strike onlap of Smithian stratigraphic units in the Peace River Arch area, influenced by the structural framework and by the top-Dienerian Stoddart paleo-high to the north.

Depositional compensation is also suggested by lateral shifts of depocenters between successive stratigraphic sub-units of the Smithian and Spathian Triassic sequences. Our analysis also suggests that some of the turbidites from La Glace and Valhalla areas were deposited during the Smithian highstand systems tract and are therefore younger than lowstand deposits associated with the Fort St John Graben further to the north. Remnants of the early Smithian lowstand wedge deposits may be present further south in the Gold Creek and Karr areas of Alberta. The large-scale depositional architecture also highlights the influence of major structural elements on Montney deposition, including the Fort St John Graben, the Hay River Fault Zone and the northern boundary fault of the Laurier Embayment.



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This basin-wide high-resolution stratigraphic correlation provides a robust framework to better understand the influence of regional depositional geometries on facies distribution and reservoir properties, and ultimately enhance the predictability of horizontal well performance based on an accurate determination of stratigraphic landing zones.

BIOGRAPHY

Tristan Euzen holds a PhD in Earth Science from the University of Rennes (France) and is a Petroleum Geologist with over 25 years of research and consulting experience. His technical interests encompass sedimentology, sequence stratigraphy, reservoir characterization, basin analysis, as well as organic and inorganic geochemistry. As Geoscience Manager of IFP-Canada, most of his activity over the past decade has been focused on understanding geological controls on the productivity of unconventional plays. Tristan is the author and co-author of over 80 scientific journal and conference papers, with more than 30 publications on the Montney play of Western Canada. He received technical awards from SEPM, AAPG, SPE and the GeoConvention.

Tom is President of Moslow Geoscience Consulting Ltd. and an Adjunct Professor in the Department of Geoscience at the University of Calgary. He is the co-author of over 100 publications and was awarded the 2021 Stanley Slipper gold medal by the CSPG. His consulting work is focused on the Lower Triassic of Western Canada and unconventional reservoir geology in general.