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Coastal depositional environments along eastern Montney coast, implications for dispersal processes to the basinal Montney

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Summary

The Lower Triassic Montney Formation is commonly referred to as the monotonous Montney, since a vast majority of the 350 m thick formation consists of fine- to coarse-grained siltstone with planar laminae. Although this lithology is observable basin wide, little detailed research has been done on coastal environments along the eastern basin margin to understand coastal dynamics and processes that delivered sediment basinward (e.g. Markhasin, 1998; Kendall, 1999). Based on paleogeographic reconstruction, an arid coastal margin is classically suggested for the Lower Triassic for western Canada, with wind playing an important role in sediment transportation into coast-proximal environments. A few perennial deltas have been identified within the Ring-Boarder area and the Dixonville field based on their localized high clay content, which would have also supplied silt and sand sized sediment to the basin (Zonneveld and Moslow, 2014). Additionally, ephemeral deltas have been suggested to form when infrequent, catastrophic rainfall occurred supplying pulses of sediment to the shoreline (Zonneveld and Moslow, 2014). Although these types of deposits have been identified, detailed investigation of the distribution of coastal deposits is necessary to understand the full complex mosaic of depositional environments along the eastern Montney coast.

In this study, facies analysis was conducted on drill cores located within Alberta, townships 77-86 and ranges 7W6-22W5, to better understand the depositional environments along the eastern subcrop edge of the Montney Formation. Depositional environments observed in core include a 5-20 m thick succession of fluvial dominated delta in the south, and 5-10 m thick wave dominated delta and strand plain to the north. Within the deltaic environments, fining upward beds (10-50 cm in thickness) are made up of fine to medium sand at the base and are capped by organic and clay-rich beds. Additionally, deposits associated with barrier island (coquina), lagoon, tidal flats and sabkha are also observed, suggesting a more complex coastline than previously thought. Through facies mapping, an evolution and extent of these depositional environments can be constructed to show the dynamic nature of the eastern Montney coast through time and their potential contribution of sediment delivery to the offshore environments.

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