

Evolving Depocentres and Depositional Systems in the Late Albian (Joli Fou, Viking, Paddy, Westgate and Shaftesbury) Strata of Alberta and British Columbia: Responses to Cordilleran Tectonic Activity

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Abstract

The base of the Joli Fou-Viking-Paddy package is a beveling unconformity that truncates the Cadotte sandstone and Harmon shale from N to S and extends over ~ 500 km. In the south, this unconformity lies within nonmarine strata of the upper Blairmore, and at the Mannville-Joli Fou contact in subsurface. Marine Joli Fou shale grades northward in about Twp.60 into sandy 'lower' Viking facies which can be traced north into the upper part of the Paddy. Lower Paddy packages are strongly wedge-shaped, largely non-marine, and onlap the basal unconformity close to the BC border, whereas the upper Paddy is more tabular, more marine, and extends for ~ 300 km to the east. Early Paddy subsidence in the NW produced a flexural arch towards the south, across which the Cadotte and Harmon are beveled off and Viking/Paddy strata thin. Both 'lower' Viking and Paddy strata are truncated by the VE3 ravinement surface which formed after a basin-wide lowstand. Marine transgression above VE3 deposited a regional mud blanket. Another lowstand deposited 'upper' Viking sand and gravel across the basin, transgressively reworked at the VE4 surface. Overlying marine mudstones of the Westgate/Shaftesbury indicate renewed flexure that rotates anticlockwise (with brief reversals) from a NNE-SSW to a N-S trend, with a great increase in rate at the base of the Fish Scales Zone.

A subtle regional unconformity extending > 400 km is indicated by an abrupt change from the *Haplophragmoides gigas* to the *Miliammina manitobensis* faunas within the Shaftesbury shale; a thin coal and chert pebble beds indicate an emergence event.