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Evidence Of First Order Tectonic Control and Point Load Migration in the Upper Cretaceous Milk River - Basal Belly River Interval in the Alberta Foreland Basin

A change in direction of loading in a foreland setting can be interpreted by means of a migrating 'point load', which averages thrust propagation. The loading direction is reflected by a change in (1) the geometry of major clastic wedges, and (2) the transgression direction following such regressions. A change of point load direction is interpreted to have occurred during deposition of the Santonian/Campanian Upper Colorado, Milk River, Pakowki and the Basal Belly River strata in southern Alberta and southwestern Saskatchewan. A southwesterly 'point load' is inferred by the thickening of the Milk River Formation towards the southwest. Thickening in the northeast can be related to subsidence associated with the paleoposition of the Williston Basin, which reached southeastern Alberta prior to the onset of Laramide-style deformation. Localization of minor clastic wedges suggests that the Sweetgrass Arch, traditionally believed to have remained largely inactive during the Upper Cretaceous, was at least partially active in Santonian and Campanian time. Migration of the 'point load' to the north during the deposition of the younger Pakowki Formation, results in a shift of downwarping direction of the relatively rigid Alberta basement, as indicated by the greater extent of preserved Pakowki shale to the west-central and north-western area of the basin, and lack of shale to the southwest.