

Sedimentary responses to block faulting and regional forebulge uplift: Lower Kaskapau Formation, northern Alberta and British Columbia

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ABSTRACT

Shallow marine strata of the Late Cenomanian, Lower Kaskapau Formation form as many as 21 sandier-upward allomembers bounded by transgressive surfaces that can be traced across the NW Alberta Plains and into the Foothills. Allomembers are typically 5-20 m thick. The lower 13 allomembers contain patchy clean sandstone bodies ('Doe Creek Sandstones'), up to about 10 m thick that tend to be elongated in a NE-SW direction and grade laterally E and SE into muddier strata. Allomembers 1-5 include nonmarine deposits in the far W, N and NE. Marine sandstones pinch out towards the NW. Allomembers 6-9 include nonmarine strata only in the NE and marine sandbodies pinch out towards the SE. Allomembers 10-13 are entirely marine; contained sandbodies tend to backstep towards the NW. Allomembers 11-21 are progressively truncated from E to W by the 'K-1' unconformity that removes up to 160 m of strata over 200 km. Sandbodies ('Pouce Coupe Sandstones') in sequences 14-21 trend N-S. Their eastern margins are sharply defined by the K-1 unconformity whereas towards the west, the sandstones grade into mudstones.

Sandbody geometries, lateral facies changes and erosional relationships suggest that allomembers 1-13 were deposited as shallow-water deltas on a very low-gradient ramp facing SE. In contrast, allomembers 14-21 were deposited in westward-facing shorelines; much of the sandstone appears to have been reworked from allomembers 1-13 during their progressive uplift and erosion, possibly over a forebulge in the east. The K-1 unconformity is mantled with ooidal ironstone in the E, suggesting clastic starvation during subsequent transgression.