

Negative accommodation and its influence on reservoir geometry and quality: The Lower Cretaceous Cadomin Formation of the Deep Basin Area, Alberta

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ABSTRACT

In the Deep-Basin area, the Cadomin Formation consists of conglomeratic braided-fluvial deposits, usually only 10-15 m thick, with rare, preserved remnants of overbank fines. The formation is capped in most places by a 2 m-thick, clay-enriched siltstone interpreted to represent final floodplain aggradation. Detailed cross-sections show that the top of the Cadomin consists of a series of horizontal terraces, separated by abrupt steps. Higher terraces generally show intense paleosol development associated with the unconformity separating the Cadomin and Gething formations. By contrast, the lowest terraces lack intense paleosols and display a more gradational change into the overlying Gething Formation. We interpret these observations to indicate that the rivers incised progressively deeper during a time of falling base level, with abandonment of older deposits to form terraces on the sides of the valleys. This terraced model, which implies that the Cadomin consists of a nested series of incised valleys, explains better the long time span represented by this thin stratigraphic unit than the more conventional interpretation of the Cadomin as a broad braidplain with slow but continuous deposition.

Terracing and its related pedogenic alteration have important implications for reservoir development. In the older, more altered terraces, clay enrichment from the overlying unconformity often extends downward into the conglomerate for several metres. This clay may pervasively plug pore spaces, decreasing permeability, or alternatively may line sand grains, preventing the development of quartz overgrowths, thereby preserving permeability. Also of significance is that terracing produces structurally high conglomerates that can form stratigraphic traps.