

Calcretes on an Arid Ancient Wadi, Comrey Mbr (Oldman Fm)

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The Comrey Mbr is a cliff forming, 18-30 m thick, channelized sandstone and conglomeratic unit with numerous calcrete paleosols which outcrops along the Milk River in southern Alberta, Canada. Bipolar cross stratification including sigmoidal cross stratification with clay drapes are interpreted as deposition in a tidally influenced system. Calcretes, ranging from centimetres to two metres thick, are found within interfluvial areas, rimming channel profiles (wetted perimeter) and as caps on channelized sandstones. In some locales, channels may erode into the calcretes whereas in other places, calcretes terminate further channel down cutting. Where calcretes are eroded, conglomeratic clasts which range from sand sized particles to clasts up to one metre in size are found within channel bases. Calcrete distribution indicates long periods of channel abandonment followed by periods of violent discharge capable of dislodging and moving calcrete clasts up to one metre.

Calcrete rimmed channels and channel caps and calcretized interfluvial areas are interpreted as due to an arid climate. Flash floods would have produced the shear stress necessary to rip up bedded calcretes similar to modern wadi deposits.

The implications of this outcrop study for developing petroleum reservoirs in similar strata are significant. Calcretes form an effective seal rock, around and on top of reservoir sandstones, limiting lateral and vertical hydrocarbon migration and productivity.