

Regional Stratal Geometries Within the Medicine Hat Formation, Southern Alberta and Saskatchewan

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The Santonian Medicine Hat Formation lies near the top of the Colorado Group in southern Alberta and Saskatchewan. Low permeability Medicine Hat sands contain estimated gas reserves of 5 tcf. Areally this is the largest field in Canada (28,000 km²), although there are several regions within the field that contain little or no Medicine Hat sand.

The Medicine Hat interval is a predominantly marine shale section that contains a number of sandy progradational cycles. There are two distinct types of coarsening-upward cycle. (1) Shaly shelfal successions that pass upwards from shales into thin heterolithic sand-shale intervals and silty sands. (2) Sandy shoreface successions that pass upwards from shales into sands with relatively high energy shoreface characteristics.

An allostratigraphic framework has been constructed for the Medicine Hat interval. Individual allomembers represent regressive sedimentation events, each capped by a transgressive marine flooding surface. The correlation of these units and their bounding surfaces allows the determination of large scale stratal geometries.

Within the Medicine Hat there are three broadly progradational packages, each forming a highstand systems tract. These progradational packages each comprise a series of minor transgressive-regressive cycles that are of type 1 character and have consistent ENE-WSW shoreline trends. There are three lowstand systems tracts, each consisting of a single type 2 cycle with a NE-SW shoreline trend. The oldest lowstand sand unit, at the base of the Medicine Hat, is the most easterly; the middle lowstand is the most westerly; and the youngest lowstand sand, which is near the top of the Medicine Hat, straddles the Alberta/Saskatchewan border.