Sedimentology, Biostratigraphy, and Petrology of Marine Firm/Hardgrounds: Middle Triassic Halfway Formation, West-Central, Alberta

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Abstract
A multidisciplinary study was conducted utilizing sedimentology, petrology, and conodont biostratigraphy in order to determine whether there is temporal significance to marine hardgrounds and their adjacent deposits observed in core from west-central Alberta. Preliminary results suggest that these hardgrounds may be fault controlled, having implications for the tectonic evolution of the Triassic of the Western Canada Sedimentary Basin, and reservoir architecture within the Halfway Formation.

This study is designed to determine if these observed surfaces are regional in extent and consequently have sequence stratigraphic significance, or local in extent demanding specific focus on localized chemical processes and bathymetry. Hardgrounds commonly represent longer periods of elapsed geological time than their bounding sediments, and are useful marker beds. One such surface, in the middle Halfway Formation of the Elmworth region, displayed a visible Trypanities ichnofossil assemblage, as well as an abrupt change in sedimentary facies across the surface, inferring a period of non-deposition or erosion. The sub-regional/localized origin and distribution of these surfaces in several diverse geographic locals may lead to the erroneous conclusion that these surfaces are unconformities of basin-wide extent.

The Middle Triassic Halfway Formation of the Western Canada Sedimentary Basin, including the Elmworth region, has been a major gas producer in recent years. Sedimentological interpretation of available core throughout the Elmworth region reveals that the Halfway Formation includes a broad range of shoreface siliciclastic and bioclastic deposits, including upper/lower shoreface and tidal channels deposits.