

Sequence Stratigraphy of the Viking Formation, Central Alberta – Integrated XRF, Sedimentological, and Micropaleontological Dataset

Sarah Schultz¹

¹Simon Fraser University, Stratigraphy, Burnaby, Canada
sarah_schultz@sfu.ca

ABSTRACT

This study focuses on creating a sequence stratigraphic framework for one of the lowstand paleoshoreline trends in the Viking extending from the Joarcam Field to the Judy Creek Field (250 km NW along strike). The Viking in these fields records deposition in a low-accommodation setting, with depositional thicknesses ranging from 15-25 m. Between these two fields, however, the formation is anomalously thick (40-60 m), complicating the recognition and correlation of key stratigraphic surfaces. Stratigraphic surfaces that are formed during the transition from forced to normal regression tend to be expressed as gradational contacts. In order to accurately identify gradational stratigraphic surfaces and trace them along strike through the over-thickened section, an x-ray fluorescence (XRF) study is proposed. The transition between systems tracts and sequences should be characterized by discrete changes in the geochemistry of the mudstones. The geochemistry associated with this transition has not been documented in shallow marine successions and the results from this study will be applicable to formations deposited under similar settings. As well, by using XRF to identify the gradational transitions and resolve systems tract geometries, it will be possible to understand the tectonic evolution of the over-thickened section in central Alberta. The increased accommodation is attributed to differential reactivation of Precambrian basement structures that flank the intervals of varying thickness in the Viking. These structures are interpreted to have become reactivated during renewed tectonic loading in the southern Canadian Cordillera during Aptian-Albian time, causing subtle movements along basement faults, leading to varying syndepositional subsidence.