

# Facies Associations and Depositional Environments of the Lower Charlie Lake Formation

*Simone Booker, J.P. Zonneveld*

The lower members of the Charlie Lake Formation in northeastern British Columbia, deposited during the Triassic period (Carnian), are a heterolithic succession consisting primarily of well-sorted sandstone, bioclastic sandstone, dolomitic siltstone, dolomite and anhydrite. It is unusual in that it records the only significant non-marine interval in the Triassic succession of the Western Canadian Sedimentary Basin. The lower members of the Charlie Lake Formation were deposited in a variety of shore-proximal marginal marine environments and were subjected to changes in the regional tectonic regime that greatly affected basin subsidence rates and therefore influenced facies distribution. The objective of this study was to determine the depositional environments that formed the lower members of the Charlie Lake Formation. Multiple cross sections were produced from well-logs, thin section analysis and all available core; the cross sections were used to establish the number of major fluctuations in relative sea level. These fluctuations in sea level were seen to be regional in nature and correspond to basin scale tectonic influences. Five major marine transgressions were identified in the western regions of the study area but only three transgressions were observed further to the east due to the distal nature of these deposits from the coast. The Charlie Lake Formation is a mixed siliciclastic-carbonate-evaporite succession consisting of 13 facies that record changes in the position of the shoreface and in the relative dominance of marginal marine and fully marine influences. The angular nature of several major unconformities within the Charlie Lake Formation (Coplin, Siphon and Boundary), suggest that regional tectonism was the driving force for changes in depositional environment and stratigraphic architecture.