The Altona Formation represents the oldest Cambrian unit in northern New York, recording cyclic deposition in shallow marine and fluvial environments under both fair-weather and storm conditions. Five outcrops and one well log were measured and described at the centimeter scale and the top and bottom contacts of the Altona were identified. Based on the recognition of sedimentary structures such as hummocky cross stratification, oscillatory ripples, graded bedding, trough and tabular cross stratification, and bioturbation, as well as subtle lithologic changes, six lithofacies representing non-marine, middle to upper shoreface, offshore, and carbonate ramp environments were identified. The top contact with the overlying Ausable Formation is characterized by inter-tonguing marine to non-marine siltstones and cross stratified medium sandstones with the cross stratified non-marine Ausable Formation. The lowermost Altona is found to lie only one meter above Precambrian basement and is interpreted to be the only non-marine facies in this unit. Throughout the 84-meter thick section, stratigraphy records a transition from non-marine/marginal marine deposits and carbonate ramp deposition to upper/middle shoreface, carbonate ramp, and offshore mud depositions before grading into the non-marine Ausable Formation.

Thin section analysis from each lithofacies quantified grain size and composition and identified a possible source. Modal analysis data from clastic lithofacies identified subarkose to arkose sandstones with an accessory mineral suite including ilmenite, apatite, rutile, and zircon. Integrating the compositional data, particularly the accessory mineral suite, with detrital zircon dates of 1000-1300 Ma (Chiarenzelli et al., 2010) suggests that the Lyon Mountain Granite, a nearby perthitic granite with perthitic feldspar, quartz, magnetite, and minor zircon, hematite-ilmenite intergrowths, titanite and apatite (Valley et al., 2011) is a likely local source rock. Ongoing research includes refining relative sea level change within the Altona and comparing the unit to the partially coeval Monkton Formation in western VT.