Trends and Architecture of the Bluestone Formation Turbidites in Point Pleasant Park, Halifax, Nova Scotia

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Abstract

In the Meguma Supergroup, a series of sandy and clayey intervals formed in a range of depositional environments from shallow to deep-water. The Lower Bluestone Member from the Point Pleasant Park on the Halifax Peninsula is part of the Halibut Formation. Prior studies examined the regional geology, stratigraphy, and geomorphology but paid little attention to the sedimenology of these sediments, in part due to the metamorphic overprint that obscures primary physical sedimentary structures. The goal of this project was to interpret the depositional environment of these sediments and understand their distribution and architecture. Data were collected in the study area, including Scintillometer, Gamma Ray, Lithofacies, Petrography, Scanning electron microscope, and laboratory density measurements. These data were integrated with a geological map and supported by logging sections. The study area consists of Lower Ordovician sediments (Meguma Group) with a complete section from the Bluestone Formation. The study area is characterized by intense structural deformation and metamorphism. The sediments are characterized by the presence of turbidites, which are typically characterized by the presence of fine-grained sediments, and by the presence of overbank sediments, which are typically characterized by the presence of coarse-grained sediments. The sediments are also characterized by the presence of rippled sandstones, which are typically characterized by the presence of ripples, and by the presence of cross-stratified sandstones, which are typically characterized by the presence of cross-bedding. The sediments are also characterized by the presence of mudstones, which are typically characterized by the presence of mud, and by the presence of siltstones, which are typically characterized by the presence of silt.

Conclusions

Analysis of the Bluestone Formation outcrops at Point Pleasant Park demonstrated these outcrops contain turbidites that are characteristic of the deposition of the Bluestone sequence. The turbidites are characterized by the presence of fine-grained sediments, which are typically characterized by the presence of fine-grained sandstones, and by the presence of overbank sediments, which are typically characterized by the presence of coarse-grained sediments. The study area is characterized by intense structural deformation and metamorphism. The sediments are characterized by the presence of turbidites, which are typically characterized by the presence of fine-grained sediments, and by the presence of overbank sediments, which are typically characterized by the presence of coarse-grained sediments. The sediments are also characterized by the presence of rippled sandstones, which are typically characterized by the presence of ripples, and by the presence of cross-stratified sandstones, which are typically characterized by the presence of cross-bedding. The sediments are also characterized by the presence of mudstones, which are typically characterized by the presence of mud, and by the presence of siltstones, which are typically characterized by the presence of silt.

References


Figure 1: Study area, (maps retrieved from Google Maps, March 2010).

Figure 2: Bedrock geology map of study area (modified from Janivson, 2008).

Figure 3: Stratigraphic column of Meguma Supergroup (modified from Schew, 1997).

Figure 4: Sedimentological type section along the NW arm.

Figure 5: An Idealized Bouma-stratigraphic columns (modified from Bouma, 1962).

Figure 6: Fine grained turbidite model.

Figure 7: Scintillometer/ Gamma Ray analysis.

Figure 8: LIDAR Analytic, Sections

Figure 9: LIDAR analysis of sedimentary structure within outcrop.

Figure 10: Thin sections used in petrographic analysis.

Figure 11: Palaeocurrent orientation as determined from the evaluation of current ripples (130° NW - 137°).

Figure 12: Paleocurrent analysis.

Figure 13: The Meguma terrain deposition.

Figure 14: Graphical representation of data analysis.