
**Palaeoenvironments and fabrics of fine-grained
sediments: the Lower Ordovician Beach Formation, Bell
Island, Newfoundland, Canada (poster presentation)**

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The Lower Ordovician Bell Island Group (Bell Island, Newfoundland), represents stacked shallow marine cycles deposited on a storm-dominated shelf. The lower part of the Tremadocian Beach Formation was developed in a lower shoreface environment with dark-grey to black clay-bearing, silt-rich mudstone interbedded with cross-stratified, fine-grained sandstone. The studied interval (5 m) is heavily bioturbated by trace fossils of the proximal Cruziana Ichnofacies. Previous studies of the Bell Island Group have outlined the importance of storm-wave reworking in a shallow shelfal setting by investigating the physical sedimentary structures and facies architecture of sandstone beds, including consideration of their lateral extent. Those studies, however, neglected the associated mudstone facies, and their implications for sedimentary facies interpretation. The approach we present in this study combines the outcrop study with hand specimen and low-power examination of thin sections. Our findings support the previous interpretation that the Beach Formation was deposited as a heterolithic lower shoreface succession, but also show that sedimentary processes operating through sandstone intervals also act to produce the interbedded mudstone layers. Scour marks, erosional surfaces, and other transport-related structures identified in thin section show that previous interpretations, which would conventionally place siderite-enriched intervals and a layer lacking bioturbation in a low-energy, low-oxygen environment, are erroneous. The process-sedimentological study of mudstone/siltstone presented herein demonstrates that the same strong wave/storm generated currents that deposited the sandstone also controlled rapid mudstone deposition. We suggest that study of mudstone fabric and ichnofabric is an essential component of rigorous facies analysis and the basis for fully integrated palaeoenvironmental reconstructions.