

Late Archean turbidites in the southern Slave Province: very like the Meguma

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Submarine fans are characterized by turbidity current deposits; thin bedded units frequently show Bouma sequences, but thick bedded sandstone beds (>50 cm) are more difficult to interpret because they typically show different suites of sedimentary structures. In the Cambro-Ordovician Meguma Supergroup of Nova Scotia, the Goldenville Group is an example of a submarine fan deposit dominated by thick-bedded sandstones. Until recently, recovery of thick-bedded sandstones from modern fans was very poor, adding to the difficulty of their study.

Successions strikingly similar to the Meguma Supergroup are found in the upper Archean Burwash Formation in the Slave province. The Slave province is unusual among the Archean cratons in containing a large proportion of supracrustal material. The succession may be as thick as 10 km. The Burwash Formation is spectacularly exposed on lake shorelines; groups of beds can be traced for kilometres using air photographs. Volcanic ash beds (one of which is dated at 2661 ± 2 Ma) provide additional opportunities for stratigraphic correlation.

In outcrop, Bouma sequence structures in thinly bedded, laterally continuous, graded sands indicate that most of the formation was deposited by turbidity currents. Thick bedded (>50 cm) sandstones generally do not show Bouma

sequences; they closely resemble thick sandstones in the Meguma Supergroup that contain multiple, dune-like scour and fill structures, traction carpets, and downward-branching water-escape sheets. The scour and fill structures locally mimic hummocky cross-stratification, especially where paleocurrents are raked steeply in near-vertical bedding surfaces. However they differ in showing clearly unidirectional character in down-current sections. The thick-bedded sandstones are interpreted as deposits of high-concentration turbidity currents.

Careful examination of air photos reveals low-angle discordances within the Burwash turbidite package, comparable in scale and proportions with channel-levee complexes on modern fans. Thick bedded sandstones, which make up the majority of the formation by volume, are interpreted as levee complexes several kilometres in width. Channels were filled by massive sandstones and granule to pebble conglomerates.

These features are closely comparable with Phanerozoic sandy fans such as the Goldenville Group, and with modern sandy fans such as the Amazon fan. They indicate that submarine fan environments have persisted essentially unchanged since the Archean, and suggest a sizeable cratonic or arc-related source for the Burwash Formation.