
**Monazite as a provenance indicator for the Lower
Cretaceous reservoir sandstones, Scotian Basin**

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Electron microprobe geochronology on detrital monazite grains was determined to understand the provenance of sediment supplied to the Lower Cretaceous deltas of the Scotian Basin, to interpret distribution of river mouth facies and to understand variability in diagenesis and hence reservoir quality. Previous work demonstrated the use of detrital monazite in the fluvial facies of the Lower Cretaceous (Chaswood Formation).

197 detrital monazite grains from 13 wells and different stratigraphic levels of the Lower Cretaceous of the Scotian Basin have been dated by electron microprobe and groups of monazites of similar age have been characterised by backscattered electron imagery and REE chemistry. After removing analyses showing errors greater than 20% (resulting from interference of Y and Th in Pb peaks, and Th in U peaks) and single analyses that were extreme outliers, ages from 651 analyses

were interpreted. Based on their REE abundance, monazites were classified into 4 types (A–D). Moreover, X-ray maps were made from selected grains and histograms and cumulative probability plots were produced for each well.

Detrital monazite from western Scotian Basin (Naskapi N-30) yielded Carboniferous ages. In the central Scotian Basin (Alma K-85, Thebaud C-74, I-93 and 3, Glenelg E58 and E58A, Venture 1, 3 and 4) Devonian and Silurian–Devonian ages are the dominant populations in both the Logan Canyon and Missisauga formations, and a small peak at 500 Ma is found at Venture. Proterozoic ages, present throughout the central part of the basin, are the second largest population. In the eastern Scotian Basin, Mesoproterozoic ages dominate in the Peskowsk A-99 well, whereas in the Tantallon M-41 the majority of the ages are Silurian–Devonian. Based on REE patterns, there is a clear discrimination between the western Scotian Basin (Naskapi N-30), where types C and D predominate, and the central and eastern part of the Basin where type A and B type patterns are more abundant.

Variation in detrital monazite age and composition suggest that several rivers transported sediment from multiple bedrock sources. At least one river supplied material to the western part of the Scotian Basin, as indicated by the Carboniferous ages and the distinctive dominant REE patterns. In the eastern part of the basin (Peskowsk A-99) the dominant ages are Proterozoic and type C REE patterns are absent, indicating that this part of the Scotian Basin was fed by a different river relative to the one(s) that supplied material to the central part of the basin.