

Deposition and hiatus in the lower Paleozoic epicratonic basin of NWT

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Summary

Cambrian (Stage 4 to Drumian) strata that accumulated in the epicratonic basin that extends across the northern mainland of NWT have limited regional exposure and consist of the sandstone-dominated Mount Clark Formation, the mixed carbonate-clastic Mount Cap Formation, and the evaporitic Saline River Formation, in ascending order. With the exception of trilobite biostratigraphic evidence documented at few locations in the Mount Cap Formation, the depositional time-spans of these formations, and of any hiatuses separating them, are poorly known. An outcrop-based study using lithostratigraphy from both margins (southwestern margin = Mackenzie arch separating epicratonic basin from coeval passive margin; northeastern margin = cratonic feather-edge) and the central part of the basin, together with carbon isotopic evidence from the epicratonic and passive-margin successions, was used to reconstruct the depositional history of the two carbonate-bearing formations (Mount Cap and Saline River formations). Terrigenous detritus delivered westward to the passive margin during the middle part of the *Bonnia-Olenellus* Zone may be correlatable with the Mount Clark Formation. The lowest part of the Mount Cap Formation is biostratigraphically constrained to the upper *Bonnia-Olenellus* Zone (upper Stage 4) in the southwest, and in the northeast to the equivalent part of the established passive-margin carbon-isotope curve (based on Sekwi Formation), indicating a roughly coeval onset of Mount Cap Formation deposition across the basin, and limited to no depositional hiatus between the Mount Clark and Mount Cap formations. In the southwest, the Mount Cap Formation accumulated until the late Wuliuan (*Glossopleura* Zone), partly in a local deep-water trough adjacent to the Mackenzie arch, whereas in the northeast, chemostratigraphy shows that the youngest preserved strata are early Wuliuan; the difference is almost certainly attributable to a depositional hiatus that was longer, or erosion that denuded the stratigraphic pile more deeply, in the northeast. The depositional hiatus between strata with a normal-marine biota and markedly evaporitic strata with no conspicuous biological component was probably brief (~1 m.y.), as indicated by the carbon isotope evidence. Accumulation of the Saline River Formation began in the late Wuliuan in the northeast, but in the earliest Drumian in the southwest, possibly owing to the topography of the Mackenzie arch, and extended to the conformable contact with the overlying Franklin Mountain Formation (earliest Guzhangian). This study shows that carbon isotope stratigraphy can helpfully augment biostratigraphic evidence in the dating and correlation of lower Paleozoic strata.