

## Alloccyclic and thermochronological constraints on the evolution of the Maritimes Basin of eastern Canada

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The Maritimes Basin is made up of up to 7 km of primarily continental clastic strata that presently cover a large area of onshore and offshore Atlantic Canada. This study integrates three separate, but interdependent components: (1) stratigraphy and tectonically induced sedimentary alloccycles, (2) a detailed thermochronological study including apatite fission track analysis, and (3) a study of the structure of the basin based primarily on the Cumberland Basin.

The stratigraphy of the Devonian–Carboniferous basin–fill units can be divided into three megasequences or alloccycles: (1) Late Devonian to Viséan, (2) Namurian to Earliest Westphalian, and (3) Early–mid Westphalian to Permian. Each alloccycle comprises a series of rocks which are gradational from basin–margin fan conglomerates and time equivalent basinal lacustrine deposits (with or without associated volcanics) at the base, to regionally extensive units which onlap older basin–fill and the basement rocks at the top of each alloccycle. It is interpreted that each of the alloccycles represents a shift from local rapid subsidence associated with net dip–slip movement along strike–slip faults to regional subsidence associated with flexure due to terrane convergence.

Quantitative thermochronological evidence from this

study suggests that an additional 1 to 3 km of strata were deposited throughout the Maritimes Basin and subsequently eroded. These sediments accumulated to a maximum thickness in the Permian (ca. 280 Ma), and were eroded during an exhumation that preceded the Triassic/Jurassic rifting of the Atlantic margin (ca. 200 Ma). The Maritimes Basin therefore represents only an erosional remnant of a much larger basin of deposition. Paleogeothermal gradients estimated from the thermochronological modelling were consistent with a continental origin for the basin.

The most significant structural components of the Maritimes Basin are the east–west strike–slip faults and the associated westerly directed thrusts. The Maritimes Basin lies at the northern edge of the Appalachian Orogen and the basin–fill is derived from the Mauritanides and Appalachians Mountains in the south. Detritus eroded from these mountains was transported longitudinally between the mountain ranges to the Maritimes Basin which acted as a receiving basin. The basin developed because of the gradient break created by the numerous strike–slip faults in the area. The basin can be classified as a continental wrench basin analogous to the more recent Malay Basin and related basins developed near the South China Sea.