

Correlation chart for Late Devonian to Permian stratified rocks of the Maritimes Basin, Atlantic Canada

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A new stratigraphic chart of the Maritimes Basin has been prepared in connection with an atlas of onshore sedimentary basins in Nova Scotia. The chart has been extended into Newfoundland (NL), New Brunswick (NB), and Prince Edward Island (PEI), where Nova Scotian units have close regional correlatives. The available stratigraphic information is simplified into 22 representative columns.

Correlation in the Maritimes Basin is challenging, both because of a lack of isotopically datable rocks and because biostratigraphically useful fossil groups tend to lack key species, due to unusual environments. Based on a review of recent International Commission on Stratigraphy timescales, together with more recent published isotopic ages, we have developed a working numerical timescale, tied to chronostratigraphy. Then, we have adopted a standard correlation of biostratigraphic zones to this chronostratigraphic scale.

The stratigraphic chart shows well-known major subdivisions, including the volcanic-dominated Fountain Lake and Piskahegan groups in the Late Devonian, and Late Devonian through Early Mississippian mainly clastic successions of the Horton and (in NB) Sussex groups. Some rocks assigned to the Horton Group in NS (and the equivalent Anguille Group in NL) are time-equivalent to the Sussex Group in NB. In addition, the age of organic-rich shales in the Horton Group varies from place to place. Overlying rocks of the Visean Windsor Group include carbonates, evaporites, and clastic sedimentary rocks. Four competing options for the age of the basal Windsor Group are presented. Estimates of the duration of the time-gap at the base-Windsor unconformity range from ~3–11 Myr. Overlying Mabou Group is dominated by clastic rocks but also includes significant evaporites. Its boundary with the Windsor is strongly diachronous where higher Windsor Group marine bands reach their depositional limits. Correlative rocks of the Barachois Group in Newfoundland contain significant coal seams.

A major unconformity separates the Mabou from overlying Cumberland Group, representing a gap of 3–4 Myr straddling the Mississippian–Pennsylvanian boundary. The Joggins section appears highly condensed when plotted against geologic time. An unconformity in the Duckmantian is widespread but represents a shorter break in sedimentation than previously inferred. Post-Duckmantian coal-bearing units in the Pennsylvanian are assigned to the Morien Group in Cape Breton Island, although this designation has been inconsistently applied. The highest, Pictou Group is also strongly diachronous. Its base has been inconsistently correlated by

the Nova Scotia and New Brunswick surveys. It is hoped that the new stratigraphic chart will encourage resolution of some of these controversies.