

The Stratigraphic Setting and Evolution of the Maritimes Basin in Eastern Canada: Implications for Hydrocarbon Exploration

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The 400,000 km² Devonian-Permian basin (12 km of sediment) has proven oil and gas potential. However, stratigraphic, structural and thermal maturity complexities, and a small geological database, hinder exploration.

Early basinal rifting resulted in deposition of terrestrial redbeds and volcanic rocks. By the mid-Tournaisian, lacustrine/estuarine environments were widespread, and oil-rich mudrocks occur in the Horton Group, and equivalents. By the Late Tournaisian, deposition was mainly fluvial. The latest Tournaisian to Early Viséan, generally, is an hiatus. In the Middle to Late Viséan (Windsor/Codroy groups) marine evaporite-dominated rocks provided seals. Lacustrine/fluvial deposition continued into the mid-Namurian Mabou Group.

The Mississippian/Pennsylvanian unconformity at the base of the Port Hood Group, and equivalents, heralds a sedimentological change. Multistoried fluvial sandstones are widespread. Black carbonaceous shales with coals (gas generators), increase in abundance upwards until the earliest Westphalian. Their distribution is limited to the onshore Maritimes Basin in Nova Scotia, southeastern New Brunswick and southwestern Newfoundland, and to the southern part of the Gulf of St. Lawrence by a second major unconformity at the level of the early Westphalian B (Duckmantian). Duckmantian to early Westphalian D times were dominated by large fluvial systems, with thick multi-storied sands separated by grey carbonaceous mudrocks with coals (gas generators). These pass upwards into redbed-dominated fluvial successions of the lower Permian.