

Lower Paleozoic Source Rocks in Southern Quebec Basins and in Outliers of the Southeastern Part of the Canadian Shield

Rudolf Bertrand* and Stéphanie Roy
INRS-Eau-Terre-Environnement, 880 chemin Sainte-Foy,
Québec, Québec G1V 4C7

rudolf_bertrand@inrs-ete.quebec.ca; stephanie_roy@inrs-ete.quebec.ca

Based on Rock Eval and Total Organic Carbon (TOC) analyses, hydrocarbon (HC) source rocks are present in the three Lower Paleozoic geologic provinces of southern Quebec: St. Lawrence Platform and its outliers on the Canadian shield, Appalachian Humber Zone belt and Siluro-Devonian successor basins.

The main source rock of the St. Lawrence Platform belong to the Utica Group (Late Ordovician). Those shales show TOC values up to 15% and mean value of 2.6%. Due to maturation, ranging from the oil window to dry gas zone, HC yield varies from 0.6 up to more than 100 kg HC/t rock.

In addition to slightly mature shale correlative to the Utica Group (TOC up to 5.4% and HC yield of 13 kg HC/t rock), the Humber zone successions of Gaspé Peninsula contains source rocks in the Rivière-du-Loup and Rivière Ouelle formations (Late Cambrian to Early Ordovician). Now overmatured and without any HC yield, those successions show locally TOC up to 2.5%.

The main potential HC source rocks in the successor basins of Gaspé Peninsula are found in the Early Devonian part of the succession (upper part of Chaleurs Group and basal part of the Upper Gaspé Limestones). Their quality is poor compared to that of Cambro-Ordovician successions. Maximum TOC and HC yield reach maximum values of 1.8% and 3.3 kg HC/t rock, respectively. The majority of oil shows and seeps occurs in areas where those maximum values are reported.