

Source Rock and Oil Analysis, Thermal Maturation and Hydrocarbon Generation Histories in the Siluro-Devonian Rocks of the Gaspé Belt Basin, Canada

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The north-eastern part of Gaspé Belt is investigated for its hydrocarbons potential. This area is dissected by major NW-trending faults delimiting three tectonic domains: the North, Central and South Blocks. The faults were active as syn-sedimentary normal faults during the Late Silurian - Early Devonian Salinic Disturbance, before being reactivated as dextral strike-slip faults during the Middle Devonian Acadian Orogeny.

According to their total organic carbon content, the now overmatured Cambro-Ordovician rocks, were presumably better source rocks than those of the Siluro-Devonian Gaspé Belt prior to maturation.

Good marginally mature source rocks intervals of limited extent are present in the York River Formation of all blocks. The Indian Point and Forillon formations show significant thicknesses of fair source rocks in some wells of the Central Block, where the majority of oil indices and seeps occur, but had generated the major part of their hydrocarbon potential.

Reflectance analysis indicates that thermal maturation in Gaspé Belt succession is primarily related to burial and occurred during the deposition of the Gaspé Sandstones. The maximum burial is contemporaneous with Acadian ENE- to E-trending folding and predates strike-slip faulting. Oil and condensate in Indian Point and Forillon formations were mostly produced before the Acadian deformation but after the Salinic Disturbance. Potential source rocks at the York River Formation generated some oil during and after the Acadian deformation. Rock extract and crude oil analyses do not allow to confirm that oil indices origin from Ordovician or from Devonian source rocks.