

The Lower Silurian Sayabec Formation in Northern Gaspé: Hydrothermal Dolomite and Reservoir Potential

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The Lower Silurian Sayabec Formation represents a peritidal-dominated carbonate ramp that developed at the northern edge of the post-taconian Gaspé successor basin. The Sayabec ramp was, in Late Silurian time, locally subaerially exposed during the Salinic Disturbance, possibly leading to the formation of economically significant dissolution secondary porosity. A detailed diagenetic study of the Sayabec Formation was carried out at selected localities along the Northern Outcrop Belt in the Gaspé Peninsula where the Salinic Unconformity is documented and also where a hydrothermal alteration of the carbonate facies is known.

The diagenetic history consists of initial minor marine diagenesis (marine cements in boundstones and Neptunian dikes) followed by a dominant burial diagenetic system recorded in various pore- and fracture-filling calcite cements, locally recording mixing of basinal brines and hydrothermal fluids. The Late Silurian tectonic exhumation of the already lithified carbonate ramp is locally recorded in post early burial, dissolution-enhanced fracture event filled by meteoric cements. The significance of this event for porosity generation was relatively minor.

Preserved porosity is observed where limestone facies and calcite cements were completely replaced by hydrothermal saddle dolomite. However, the porous dolostone is of geographically limited extent; for the most, part the hydrothermal event is recorded in high temperature calcite cements tightly occluding burial fractures.