Hydrothermal Dolomitization: A Potential Diagenetic Process in Ordovician Carbonates of the St. Lawrence Lowlands, Quebec

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Recent drilling in New York State and Anticosti Island has encountered widespread hydrothermal dolomitization in Ordovician carbonate platform rocks. Large fracture systems and platform collapses are associated with dolomitization and reservoir developed in this manner can now be mapped seismically.

The St. Lawrence Lowlands are localized between these two regions. They have the same geological history of sedimentation, Ordovician carbonates, because they are part of the margin of Laurentia that extends from Newfoundland to Texas. Prolific hydrocarbon fields and MVT deposits have been discovered along this former Ordovician coastline.

Surface geological observations in the St. Lawrence Lowlands basin indicate a SEDEX deposit in the allochthonous domain, several Pb-Zn showing (MVT) with saddle dolostone in the autochthonous domain and some normal major faults with sulphur content that can support the passage of hydrothermal paleofluids on the Ordovician carbonates. In addition, from previous oil and gas exploration wells, very few encountered sulphur and saddle dolostone, especially in the St. Wenceslas well. However, all previous wells drilled were located only on conventional play-type concepts (horst block, anticline thrust-fault).

Therefore, the St. Lawrence Lowlands basin becomes a new hot area to look for play-type as the Albion-Scipio (Michigan) or Dover (Ontario) mainly for hydrothermal dolomitization reservoir facies units in the Black River and Trenton formations. In northern Alberta and British Columbia similarities are also recognizable with hydrothermal dolomite plays (Ladyfern).