

The Lower Silurian Val-Brillant Formation: Generation of Secondary Porosity and Hydrocarbon Migration Record

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The Lower Silurian Val-Brillant Formation outcrops along the northern edge of the Gaspé Belt. This unit consists predominantly of well-washed, cross-stratified nearshore quartzites. The Val-Brillant is locally deeply cut by the Salinian (Late Silurian) Unconformity in eastern Gaspé. Basinward (southward), the Val-Brillant is coeval with the deep marine shales of the Burnt Jam Brook Formation, the intervening facies are unknown. The Val-Brillant quartzites were laid down at the end of a second order regressive event that resulted from the infilling of the post-taconian successor Gaspé basin, it is overlain by the Sayabec carbonate platform which consists of a third order transgressive – regressive cycle ultimately followed by a second order transgressive event.

Even if dominated by silica-cemented quartzite, a significant number of outcrops of the Val-Brillant Formation are carbonate-cemented impure quartz-rich arenite facies which is locally highly porous. The porosity is of dissolution origin as corroded feldspar and silica cement remnants are present in the pore space. Bitumen locally coats secondary porosity and minor post-dissolution silica cements carry highly fluorescent hydrocarbon inclusions.

Up-dip migration of organic acids likely generated from the Burnt Jam Brook Formation is responsible for the secondary porosity and preceded an hydrocarbon migration event. It is noteworthy that impure clastic facies are expected in the subsurface between the clean Val-Brillant and the shales of the Burnt Jam Brook; interestingly, in this assumed transition zone, the recent MERQ seismic profile locates a “flat spot” in the interval assigned to the Val Brillant Formation.