

Distribution of Horton Group subbasins in the Gulf of St. Lawrence from seismic reflection data; Implications for the early tectonic development of the Magdalen Basin

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The Late Devonian-Early Carboniferous Horton Group includes some of the oldest sediments in the mainly Carboniferous Maritimes Basin and records the earliest geologic history of this post-Acadian successor basin. To better understand the early development of the basin, we have interpreted an extensive amount of industry seismic reflection data in the

Gulf of St. Lawrence. Time structure and isopach maps show that the Horton Group was deposited both locally in many small subbasins and regionally as a widespread veneer overlying basement. The subbasins, many of which are half grabens, can be as deep as 7 km. Regionally flat lying strata are 0 to 1 km thick. The Horton Group subbasins occur along

two main trends parallel to basement structures (NW-SE and NE-SW), and their distribution forms an X-pattern reminiscent of a system of synthetic and antithetic faults occurring in strike-slip environments.

These observations, which indicate a Late Devonian-

Early Carboniferous crustal extension phase, can be interpreted in terms of both an orthogonal or a transtensional rift. Although we do not observe mid-crustal detachments on the seismic reflection data, as predicted in a post-orogenic collapse model, we cannot totally discount this possibility.