
**Gravity and seismic interpretations
for some Maritime Carboniferous basins:
implications for Upper Carboniferous basin development**

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A recent interpretation of a coincident gravity and seismic profile across the Carboniferous Moncton Sedimentary Basin has provided some insight into the nature of the Berry Mills Fault. A model of the gravity data shows that a triangle or wedge shaped block initially interpreted as salt on the basis of seismic reflection data, is actually composed of rock with a density contrast similar to that of the Horton Group. The rocks in question occur above reflections interpreted as basal Windsor Group, and yet below reflections interpreted as interbedded evaporite and clastic rocks at the top of the Windsor Group (Clover Hill Formation). The block may be depositional (alluvial fan) or structural (triangle zone/tectonic wedge); however, we favour a structural interpretation.

Similar geological structures are observed in the Antigonish-Mabou, Cumberland, and Sackville subbasins. In each of these areas, triangular-shaped bodies appear to be wedged between basal Windsor Group rocks (limestone and anhydrite) and younger Windsor evaporites. In the Mull River area, well data support a thrust fault or triangle zone interpretation. Similar relationships are observed in the Cumberland Subbasin at the northern edge of the Cobequid Highlands, although thrust faulting cannot be demonstrated. In the Sackville Subbasin, a seismic profile acquired in 1999 clearly shows Horton Group rocks thrust over the Windsor Group, and yet underlie a Windsor salt pillow at the same time, demonstrating a structural origin.

The observed structures occur at the margins of Upper Carboniferous basins and are associated with large vertical displacements across presumed strike-slip faults. Seismic and gravity data suggest that a significant component of dip slip movement occurred on these faults, in some cases up to several kilometres of shortening reminiscent of tectonic wedging or triangle zone development. Some Upper Carboniferous basins in eastern Canada may be examples of foreland basin style subsidence within a convergent wrench system.