Late Carboniferous contractional deformation and foreland-basin-style subsidence in the Maritimes Basin, Canada

PAUL DURLING[1], JOHN W.F. WALDRON[2], AND MORGAN SNYDER[2]

1. Geological Survey of Canada (Atlantic), Dartmouth, Nova Scotia B2Y 4A2, Canada <paul.durling@canada.ca>

2. Department of Earth and Atmospheric Sciences, University of Alberta, Edmonton, Alberta T6G 2E3, Canada

The Maritimes Basin comprises a number of structural sub-basins, which share similar stratigraphic and structural relationships, suggesting a common tectonic history. For example, initial sedimentation in many of the structural sub-basins began with clastic sedimentation in a rift-like setting (i.e. Horton Group), followed by marine and evaporite sedimentation (i.e. Windsor Group), which was in turn followed by deposition of clastic and coal bearing strata (i.e. Mabou, Cumberland, and Pictou/Morien groups). Similarly, structures mapped in one structural sub-basin may affect adjacent structural sub-basins (e.g., Belleisle, Hollow, and Long Range faults). Many of these structures exhibit a significant contractional component (e.g., thrusting and/ or tectonic wedging) in addition to strike-slip relationships observed through surface geological mapping. In several places, this contractional component has inverted previous normal faults. A compilation map encompassing onshore structural sub-basins and the offshore Magdalen and Sydney sub-basins highlights that Carboniferous deformation, including tectonic wedging, is greatest adjacent to the Cobequid-Chedebuto Fault (CCF) and decreases northeasterly away from this fault; the exception being the Hollow-Aspy-Long Range fault system. Furthermore, both the Magdalen and Sydney sub-basins have similar cross-sectional profiles, showing that each basin is deepest in the south and shallows obliquely to the north away from the CCF. In addition to the plethora of tectonic models that have been proposed for the Maritimes basin, a model involving predominantly tectonic wedging and crustal shortening in the Late Carboniferous should be considered. In this model, Late Devonian to Early Carboniferous regional extension and thermal subsidence (Horton, Windsor and Mabou groups and equivalents) are followed by foreland basin-style subsidence associated with tectonic wedging and transpression during the Late Carboniferous (Cumberland and Pictou/Morien groups).

Atlantic Geology, 2019, Volume 55
Atlantic Geoscience Society Abstracts – 45th Colloquium & Annual General Meeting 2019
https://doi.org/10.4138/atlgeol.2019.005