

### **Stratigraphy of the western Maritimes Basin, Prince Edward Island, and adjacent Gulf of St. Lawrence**

P.S. Giles<sup>1</sup> and J. Utting<sup>2</sup>

<sup>1</sup>*Geological Survey of Canada - Atlantic, Box 1006, Dartmouth, Nova Scotia B2Y 4A2, Canada <giles@agcux.bio.ns.ca>*

<sup>2</sup>*Geological Survey of Canada - Calgary, 3303-33rd Street N.W., Calgary, Alberta T2L 2A7, Canada <Jutting@NRCan.gc.ca>*

Subsurface data from wells drilled for coal and hydrocarbons on Prince Edward Island provide critical insight into the stratigraphy of the western Maritimes Basin. With well-documented Permian strata at surface, Prince Edward Island provides a rare opportunity to assess the lithostratigraphic framework for the complete basin fill. A stratigraphic cross-section from western PEI to the East Point E-49 well which incorporates all available onshore subsurface information and four petroleum wells from the adjacent Gulf of St. Lawrence, reveals strata ranging in age from early Tournaisian to Permian. Several important unconformities can be identified, the lowest being the contact with crystalline basement rocks in western PEI, representing the post-Acadian unconformity and the base to the fill of the Maritimes Basin. The cross-section reveals a significant unconformity at the base of the middle Viséan Windsor Group, and a major stratigraphic break in the early Westphalian. The latter unconformity is represented in the Sydney Basin at the base of

the Morien Group and appears to be regionally significant. Of particular interest is the apparent scarcity of middle and late Namurian strata in the PEI cross-section. Rock units of that age are well known in onshore areas of northern Nova Scotia and western Cape Breton Island, where they reach thicknesses of several thousand metres. Their absence throughout much of the Gulf of St. Lawrence indicates the significance of the early Westphalian unconformity, and suggests that marked basin inversion occurred in latest Namurian time. A five-part subdivision of strata above the Westphalian unconformity is suggested by the cross-section, comprising three major sandstone-dominated intervals separated by fine-grained rocks which, in the lower parts of the succession, contain the well-known Westphalian B to early Stephanian coal measures of eastern Canada. Relationships of these Westphalian to Permian lithostratigraphic subdivisions to established, more formal rock units mapped in onshore areas, are not everywhere clear, and nomenclature issues have yet to be resolved.