

Tectonic Evolution of the Sackville Sub-basin: Problems and Possibilities

Lauren Eggleston, John W.F. Waldron, Holly Stewart

The Mississippian-Pennsylvanian Sackville sub-basin of New Brunswick lies within the Maritimes Basin in Atlantic Canada. It is a structurally complex basin bounded by: the Caledonia Uplift to the west; the Hastings Uplift, the Harvey-Hopewell and Wood Creek faults to the south; and the Westmorland Uplift and Dorchester fault to the north, which separate it from the Moncton sub-basin. Orogen-scale dextral motion and strike slip boundaries define movement of the region during the Carboniferous. Major movement in the Sackville sub-basin occurred along the Dorchester and Harvey-Hopewell Faults. Throughout the Carboniferous, the Sackville sub-basin experienced periods of subsidence, inversion, and extension.

Carboniferous sedimentary rocks within the sub-basin include Horton Group oil and gas bearing shales, Sussex Group conglomerates, Windsor Group evaporites, Mabou Group red mudstones and coarse conglomerates, and Cumberland Group sandstones.

Industry seismic profiles show an allochthonous thrust wedge of unknown origin dominating the geology in the subsurface. This thrust wedge appears to be inserted southeastward into Windsor Group evaporites low in the section. The wedge could represent subsurface equivalents of the nearby Caledonia Uplift, or of the adjacent Moncton subbasin. Clues to the nature of the wedge are provided by rock chip well samples and surface correlation.

The upper surface of the wedge is probably correlative with the Harvey-Hopewell Fault adjacent to the Caledonia uplift. However, it is unclear where the trace of the Harvey-Hopewell fault continues eastward after it passes into the Shepody Bay; it may connect with the Dorchester fault through the Memramcook Estuary, connect with the Wood Creek fault across the Bay of Fundy, or die out underneath the Sackville Syncline. Regardless, the wedge indicates an important and often overlooked episode of shortening late in the history of the Sackville subbasin, which has implications for the overall deformation history of the Maritimes Basin.