

A revised tectonic history of the Clover Hill Fault system: implications for the distribution of Carboniferous basins in southern New Brunswick, Canada

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The Carboniferous strata of New Brunswick are affected by multiple phases of faulting that has affected the distribution and thickness of oil and gas basins in the southern part of the province. Determining the timing of fault movement with respect to the history of various sub-basins is critical to understanding overall evolution of this hydrocarbon-bearing province. The Clover Hill Fault system has been intermittently mapped from the Saint John to Weldon areas of southern New Brunswick. The fault has been interpreted to extend on an eastern-northeastern trend along the southern portion of the Carboniferous Maritimes Basin. Historically, the timing, nature of movement, and the amount of displacement of the Clover Hill Fault has been a matter of debate. New field mapping and seismic interpretation has led to the modification of the Clover Hill fault location and kinematics.

A problem area in the past has been the tracing of the Clover Hill system within the Carboniferous sedimentary rocks from the Cedar Camp to Prosser Brook areas. In seismic profiles, the Clover Hill Fault images as a vertical flower structure with several associated splay faults. From recent field work at Cedar Camp, the fault migrates eastwards from within the Carboniferous cover rocks into the exposed Precambrian crystalline basement. The fault displaces basement rock units until it re-enters the Carboniferous basin at Prosser Brook. The movement of the Clover Hill Fault can be constrained before latest Namurian-Westphalian, as the Cumberland Group sediments cover the fault and are not deformed. One of the most important results of the field work is the tracing of basement units across the fault to reveal an approximate seven kilometre dextral displacement in the Cedar Camp and Prosser Brook areas.