

Contrasting Taconian and Acadian Structural Styles Along the New Geophysical Seismic Reflection Profiles in Western Gaspé Appalachians, Matapédia Valley

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During falls 2000 and 2001, 13 geophysical seismic reflection profiles totalling 215 km were acquired by the Energy Sector of the Québec Department of Natural Resources in western Gaspé Peninsula. From north to south, these profiles cut across the Cambrian-Ordovician rocks of the external Humber Zone and the northern part of the Silurian-Devonian rocks of the Gaspé Belt.

At the surface, two contrasting structural styles are noted on both sides of the Shickshock-Sud fault. To the north, NW-verging folds and SE-dipping thrusts in Cambrian-Ordovician rocks are associated with Taconian thrust sheets. To the south, the Acadian deformation is characterized by NE-trending, open, and upright folds, and ENE-trending and SE-dipping, high-angle reverse and dextral strike-slip faults. At depth, these two general structural styles are well-depicted on seismic profiles. Furthermore, the geophysical data reveal new information particularly on the Acadian structural style. Near the surface (above 2 km), the geometry of Acadian folding is similar to what is expected with construction of balanced cross-section from surface data. However, the fault style is different below 2 km. The dip of Causapsal and Sainte-Florence faults is less-inclined than expected and several reflectors exhibit a features typical of thin-skin thrust-faulting, such as SE-dipping and flat-lying décollements, blind thrusts, duplex, and a triangle zone. Finally, the Acadian dextral strike-slip Shickshock-Sud fault is not well-imaged on seismic profiles. This subvertical fault is interpreted to merge at depth on a major SE-dipping reflector which emerges at surface in Cambrian-Ordovician rocks of the Humber Zone, to the north.