

Structural Analysis of the St-Jean River Anticline, eastern Gaspé, northern Appalachians

Mathieu Lavoie* and Donna Kirkwood
Université Laval, Sainte-Foy, Québec

The St-Jean River Anticline (SJRA), located 30 km southwest of Gaspé in the Gaspé Peninsula, is a 200 km² E-trending structure that exhumes the Upper Silurian Whitehead Formation and the Siluro-Devonian Chaleur Group. This favorable hydrocarbon structural trap has been poorly explored up until now: only one exploration well was drilled in 1981 and no geophysical data are available.

Recent field mapping and detailed structural analysis has determined that the anticlinorial structure is south verging and is truncated along its southern limb, by a major E-trending reverse fault. The south vergence of the anticline is peculiar for this area given that most folds of SE Gaspé are either upright or north verging. SW trending dextral strike-slip faults cut through and slightly displace both the anticline and the south limb reverse fault. These faults are parallel to the Troisième Lac strike-slip fault spatially associated with hydrocarbon seeps in Northeastern Gaspé. Five distinct fracture sets have been identified in the area and can be related either to regional folding or to the strike-slip faulting event.

Acadian deformation in the SJRA can be thus be separated into two distinct stages 1) early folding and reverse faulting and 2) dextral strike-slip faulting. Fractures related to the strike-slip faulting event locally enhance connectivity by connecting stratabound fold-related fractures thus rendering the fractured reservoir in this area more viable.