

# **Structural evolution of Saint-Dominique and Philipsburg carbonate slices along the southern Quebec Appalachians structural front**

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The only significant hydrocarbon discoveries made in southern Quebec were located in the carbonate slices imbricated along the structural front of the Appalachians during the Late Ordovician Taconian orogeny. These potential reservoirs are highly compartmentalised and a better understanding of the structural controls exerted on their geometry is critical for renewal of exploration in this fold and thrust belt. In this study, detailed mapping of the Saint-Dominique and Philipsburg tectonic slices helps to characterise the structural style and to unravel the structural evolution of those carbonate slices.

The Philipsburg slice is gently folded in a north-north-east trending syncline. Deformation essentially concentrates near the basal and roof thrusts, with development of tectonic breccia and decollements in the hanging walls and small-scale normal faulting in the footwalls. The Saint-Dominique slice is folded in a north-north-east trending anticline. Deformation is widespread within the slice and characterised by decollements. The structural style varies with the lithology, involving kink folds, fault bend folds and fault propagation folds.

A common structural evolution is recognised for both slices: 1) early growth faulting event (Saint-Dominique only), prior to Taconian inversion, 2) layer parallel shortening, 3) imbrication and folding, 4) collapse and normal faulting, 5) renewal of imbrication (Philipsburg only).