

Geometry of the western Newfoundland Appalachian foreland basin and thrust front: interpretation of industry seismic profiles

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Offshore Western Newfoundland has been extensively explored by petroleum companies within the past ten years, resulting in the release of an extensive set of seismic reflection profiles that show the geometry of the Palaeozoic deformed continental margin, the Appalachian thrust front, and a thick foreland basin succession.

A lower series of reflections is identified as representing the Late Proterozoic to Early Ordovician shelf succession. Middle Ordovician extension associated with the Taconian orogeny produced numerous normal faults, extending the foundered platformal succession. Later reactivation of some of these faults, associated with the Acadian orogeny, led to basin inversion.

The platform succession is overlain by widespread coherent reflectors representing Late Ordovician to Devonian foreland basin sediments. A well-defined magnetic anomaly offshore has now been located on land. This provides a marker within the foreland basin succession at the level of the Late Ordovician Misty Point Formation, and shows that a

significant thickness of the foreland basin stratigraphy is in fact Late Ordovician.

The foreland basin succession is deformed at its eastern margin by the Appalachian thrust front. A broad syncline is developed, with its eastern limb deformed by a tectonic wedge thrust into position in the Acadian orogeny. Strong short reflectors are evident within the otherwise incoherent tectonic wedge, a possible indication of tectonically eroded pieces of the earlier platform succession now present within the allochthonous wedge. To the south the tectonic wedge is intersected by the Round Head Thrust; structures in the footwall of the thrust were the target for recent drilling on and around Port au Port Peninsula.

South of the Port au Port Peninsula, the northern margin of the Carboniferous western Maritimes Basin is imaged on numerous profiles. Carboniferous salt-cored anticlines trend SW-NE, roughly parallel to the faulted south coast of the Peninsula.