

Salty stuff: integrating seismic, bathymetry, aeromagnetic, and field data to understand deformation in Bay St. George, southwest Newfoundland

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The late Paleozoic Bay St. George subbasin, part of the larger Maritimes Basin, formed as a successor basin in the Canadian Appalachians. The subbasin fill is dominantly terrestrial, but includes the Mississippian evaporite-rich Codroy Group, easily identified in seismic data. The subbasin shows significant folding, faulting, and salt tectonism. Geologic field mapping onshore and remotely sensed data (seismic, bathymetric, and aeromagnetic) offshore lead to non-unique deformation histories; data integration is necessary to produce a robust interpretation.

Seismic reflections can be related to bedrock structures visible on the bathymetric surface and to linear anomalies on aeromagnetic maps. The reflectors likely represent basal and middle anhydrite layers within the Codroy Group. Higher reflectors are likely upper Codroy and younger Barachois Group. Two large diapirs parallel the NE-SW subbasin axis trend and strata minibasins are developed adjacent to the diapirs. Minibasin trough points migrate with time; in the extremities of the subbasin the trough points migrate south whereas in a central region they migrate north. Onshore at Capelin Cove a potential secondary salt weld crops out between Codroy Group and Barachois Group. To the NW, the Snakes Bight Fault represents a large inverted fault. Offshore, duplication of the basal anhydrite reflector records a tectonic wedge, probably developed during inversion of this fault.

These observations suggest that salt moved during or after deposition of the Barachois Group. Minibasin migration indicates the direction of salt movement. In the offshore at the northeast and southwest extremities of the subbasin the locus of salt expulsion migrated south over time. In the central offshore, where the subbasin was affected by the inversion process, the locus of expulsion migrated north. Salt expulsion in the central Bay St. George subbasin may therefore have been initiated by inversion along the Snakes Bight Fault.