A new interpretation of the relationship between the Long Point Group and the Humber Arm Allochthon, western Newfoundland: implications for timing and magnitude of overthrusting

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The gross tectonic stratigraphy of the Humber Zone of western Newfoundland comprises two units. The upper unit, represented by the Humber Arm and Hare Bay allochthons, includes the Bay of Islands and Hare Bay ophiolites underlain by thrust sheets of sedimentary and volcanic rocks believed to represent rift, slope, and rise environments of the ancient Cambrian-Ordovician passive margin. The lower unit, traditionally considered to be autochthonous, is represented by a predominantly carbonate shelf sequence unconformably overlying Grenvillian age crystalline basement.

The Middle Ordovician time of arrival and "emplacement" of the Humber Arm allochthon is constrained by the age of "flysch" with obvious ophiolite-derived detritus overlying the foundered shelf sequence. An absolute position for the allochthon at this time has been traditionally constrained by an interpreted unconformable relationship between it and the overlying

Late Ordovician Long Point Group which outcrops on Port au Port Peninsula.

Industry reflection seismic data gathered immediately offshore in 1973 clearly image the Long Point Group and the overlying Silurian-Devonian Clam Bank Formation as a west-facing homoclinal package that flattens to the west. The shelf sequence is also clearly identifiable as a relatively continuous package, possibly interrupted by short-throw steep faults, which dips to the east, unaffected by the homoclinal fold above. The wedge-shaped region above the platform and below the Long Point is occupied by the Humber Arm allochthon and probably also by a transported slice of platform rocks. This geometry is interpreted to be a "triangle zone," a feature very familiar to workers in the Alberta foothills and other foreland thrust-fold belts, which is bounded above and below by thrusts of opposing vergence.

The significance of the structure is that the Long Point Group and Clam Bank Formation, in the hangingwall of the east-vergent roof thrust of the triangle zone, must pre-date the development of the zone. Therefore, the Humber Arm allochthon was emplaced in its present position during the Acadian orogeny. Furthermore, the probable inclusion of a slice of the platform within the triangle zone implies significant displacement (>30 km) at this time. The floor thrust of the triangle zone is suggested to extend eastward beneath not only the "autochthonous" platform, but also basement inliers to the north and south (Long Range, Indian Head Complex), implying that they, too, are allochthonous.