Tectonostratigraphic development of the northeastern extremity of the Dunnage Zone in Newfoundland

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The type area of the Dunnage Zone is bisected by the Dog Bay Line. East of the Dog Bay Line, structural elements predate a sub-Llandovery unconformity, except for a single period of upright folding. West of the line, structures are mainly post-Llandovery, and northwest-verging. Stratigraphy of thrust slices emplaced east of the line in post-Caradoc time can be directly correlated to formations west of the line. These relations require eastward obduction in Arenig time followed by arc-rifting with initial melange formation and subsequent volcanism and sedimentation from the late Arenig to Caradoc time. Closure of the rifted basin, with renewed eastward thrusting, trench-filling and structural inversion began in Ashgill time, but the basin was sufficiently wide in the Llandovery that contrasting Silurian successions formed on opposite sides. Final basin-closing along the Dog Bay Line in late Silurian time, coincided with the onset of major metamorphism and granitoid plutonism. Late warping of the line may indicate closure by collision with a promontory of North America. The data suggest consumption of this part of the Iapetus Ocean entirely by westward subduction. Post-Caradoc magmatism was of non-arc type, resulting from some combination of delamination, rifting and tectonic overthickening. These conclusions apply to the Exploits Subzone only, but the Notre Dame-Exploits subzone boundary exhibits no obvious tectonostratigraphic consequences.

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