The Dog Bay-Liberty Line and its significance for Silurian tectonics of the northern Appalachian orogen

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The Dog Bay Line, a Silurian suture key to deciphering Appalachian accretionary history, was first recognized in Newfoundland. It marks where the Ordovician Tetagouche-Exploits ensimatic back-arc basin (TEB), which opened within the leading peri-Gondwanan Gander terrane, finally closed. This suture can be extrapolated into New England, placing it between the Liberty-Orrington-Miramichi inliers (LOM) and the Merrimack-Fredericton trough (MFT). Southeastward, marine strata of the MFT overlie the TEB passive margin, exposed in the Ganderian St.Croix block, and display southeast-vergent structures transected by Acadian cleavage. They structurally underlie southeast-vergent thrusts at the base of the LOM. Northwestward, the LOM, Central Maine-Matapedia trough (CMMT), and Lower Silurian igneous rocks record elements of the upper plate trench-arc system, respectively a subduction complex, forearc basin, and arc. The CMMT forearc received detritus both from the northwesterly arc region, and also from the Early Silurian-exhumed subduction complex. Minimal contrast in Silurian turbidites near the line may be due to sediment bypassing the subduction complex, and/or a common provenance when the complex emerged above sea level. Salinic unconformities in the upper plate (arc-trench) reflect episodes of shortening, within an overall extensional setting that resulted in thinned, weakened lithosphere, and final uplift accompanying latest Silurian slab breakoff. Silurian strata of the Coastal Volcanic Belt document a separate arc system built on Ganderia's trailing edge, where northwest-directed subduction of a narrow seaway led to latest Silurian collision with buoyant, strong lithosphere of Avalonia's passive margin, and the onset of kinematically distinct dextral-oblique, northwest-vergent, Acadian deformation.

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