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Early to Middle Ordovician organized and disorganized supra-subduction zone spreading along the Laurentian margin of Iapetus, Newfoundland Appalachians

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The Annieopsquotch accretionary tract (AAT) comprises a thrust stack of Lower to Middle Ordovician arc and backarc terranes that were accreted to the Laurentian margin of Iapetus during Middle to Upper Ordovician. Geological relationships suggest that the constituent terranes of the AAT initially formed outboard of composite Laurentian margin in an extensional arc that underwent multiple rifting episodes prior to its accretion. The initiation of AAT magmatism led to the development of Tremadocian to Floian supra-subduction zone ophiolites with organized ridges indicated by well developed sheeted dyke complexes. This spreading centre propagated through a fragment of Laurentian crust and separated it from the composite Laurentian margin. This crustal block formed the basement to subsequent Floian to Darriwilian AAT arc magmatism. The Floian arc rifted leading to organized spreading in the Lloyds River backarc basin which was floored by juvenile backarc ophiolitic crust. The latest Floian to earliest Dapingian arc magmatism occurred above thickened crust, locally leading to eruption of andesitic rocks. The establishment of the Darriwilian arc was in part coeval with and followed yet another stage of rifting. Darriwilian magmatism is characterised by great along-strike variability, ranging from continental to intraoceanic calc-alkaline arc to tholeiitic back-arc magmatism, and lack of sheeted dyke complexes. The diversity of the magmatism can be attributed to fragmentation and magmatic reworking of the Laurenia-derived basement along strike in the same arc that is undergoing disorganized spreading. The constituent terranes of AAT were underplated beneath the composite Laurentian margin within $\sim$5 Ma following their formation, coeval with extensional arc magmatism. This and other constraints suggest that the AAT thrust stack formed following subduction initiation in the backarc. AAT magmatism was terminated by the closure of the main tract of Iapetus and arrival of the peri-Gondwanan Victoria arc at the Laurentian margin.