Tectonic History of the Appalachian Margin of Laurentia After Break-up of Rodinia

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The Appalachian margin of Laurentia has experienced punctuated accretion of oceanic and continental slivers during during Late Cambrian-Carboniferous closure of the Iapetus and Rheiic oceans, which opened after latest Neoproterozoic break-out of Laurentia from the Rodinia supercontinent. The rift-drift transition along the Appalachian margin may have started as early as c. 555 Ma but was facing an open ocean (Iapetus) along its whole length by at least Early Cambrian times (540-530 Ma). Rift magmatism along the Appalachian margin appears to have lasted a long time (~700-550 Ma) and may be related to break-off of several microcontinental slivers that remained within the faunal realm of Laurentia and were returned to Laurentia during the Early Ordovician.

Obduction of suprasubduction oceanic crust onto the northern Appalachian margin started during the latest Cambrian (c. 500-490 Ma). A reversal in subduction polarity was established everywhere by the Llanvirn such that the northern and southern Appalachian margins became an active continental margin. The Laurentian magmatic arc was shut-off during the Late Ordovician (455-445Ma) as a result of accretion of the Carolina terrane in the southern Appalachians and the Popelogan-Victoria arc in the northern Appalachians. Final closure of Iapetus was achieved in the northern Appalachians during the Early Silurian by docking of the Gander margin and associated Avalonian terranes. Closure of the Rheiic Ocean first resulted in the docking of Meguma Terrane during the earliest Devonian. Meguma may have formed part of a larger microcontinent together with Armorica. Final closure of the Rheiic Ocean took place in the Carboniferous.