Depositional environment and provenance of sedimentary rocks at MacIsaacs Point, Nova Scotia

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The Appalachian-Caledonide orogen was formed by the accretion of peri-Gondwanan terranes to Laurentia-Baltica at various times during the Ordovician–Devonian, followed by collision with Gondwana and the formation of Pangea in the Carboniferous–Permian. The t wo m ost outboard peri-Gondwanan terranes in Atlantic Canada are the Neoproterozoic Avalon terrane and the Cambrian-Early Devonian Meguma terrane. As the Rheic Ocean closed and Gondwana collided with the Laurussian, Avalon, and Meguma terranes, a large system of strike-slip faults developed. These regional-scale strike-slip faults resulted in the formation of syn-collisional basins, and as a result, their sedimentary rocks preserve a record of the orogenic events that marked the formation of the supercontinent Pangea. One such basin, the Antigonish Basin, contains late Devonian marine, coastal, and lacustrine sedimentary rocks such as sandstone, conglomerate, limestone, and shale. These rocks are well-exposed at MacIsaacs Point approximately 17 km north of Antigonish. This project aims to better understand the relationship of the basin evolution to the regional tectonic development during the formation of Pangea. Previous work mapped this area as the 'Undivided Devonian-Carboniferous rocks', consisting of mainly conglomerate and sandstone. To better constrain the relationship between these sedimentary rocks and the regional tectonics: (1) a detailed stratigraphic succession was created, (2) a detailed geologic map and cross section were made, and (3) detrital zircon data were collected from the section and from granite clasts from the major conglomerate bed. The detailed stratigraphic log allows for depositional environment analysis and preliminary results indicate this area was likely a braided stream system. The sandstone units were further subdivided by sedimentary features such as plant fossils, cross bedding, and grain size changes, and indicated a lacustrine depositional environment. The conglomerate layers were distinguished based on clast compositions and clast sizes and are interpreted as the remnants of stream channels. Furthermore, the ability to subdivide this area based on the sedimentary rocks observed will increase the overall geologic understanding of the Antigonish Basin. [Poster]

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