

Paleoenvironment of the Upper Silurian/ Lower Devonian Eastport Formation, North Lubec, Maine

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The Eastport Formation in Lubec, Maine consists of interbedded volcanic and sedimentary rocks. Previous estimates of the age of these rocks are controversial (Gates and Moench, 1981). Only certain fossils of the sedimentary rocks, on which dating has been partially based, have been studied in detail. This study is an analysis of both the volcanic and the sedimentary rocks to gain a better understanding of the paleoenvironment. Mineral assemblages were studied in thin sections of the volcanic rocks and x-ray fluorescence spectroscopy was used to determine major and trace element concentrations. Fossil suites were collected to provide further information about the depositional environment. The volcanic rocks consist of a bimodal suite of basalts and rhyolites, consistent with an environment of continental extension and rifting. Major elemental analyses show the rocks to be slightly alkaline, which further supports an extensional tectonic regime in which melting of the upper mantle occurred beneath thick continental crust. Differing faunal assemblages in sedimentary rock localities present a complex environmental setting. Some of these faunas are characteristic of the Eastport formation, however some are characteristic of older formations, suggesting either an age or environmental difference. The varying assemblage of bivalves, gastropods, and ostracodes suggests a marginal marine environment, characterized by isolated smaller environments of differing salinities and/or water depths. The integration of geochemical studies of the volcanic rocks with the study of fossil assemblages in the sedimentary rocks indicates that the Eastport Formation was deposited in a dynamic setting of varying marine affinity, consistent with the development of extensional centers and small ocean basins in the Appalachian Mountains Acadian collisional belt.