# TECTONIC-MAGMATIC ORIGIN OF MESOZOIC ALKALIC MAGMAS IN EASTERN NORTH AMERICA



McHONE, J. Gregory, Department of Geology, Indiana University - Purdue University at Indianapolis, Indianapolis, IN 46202; and BUTLER, J. Robert, Department of Geology, University of North Carolina, Chapel Hill, NC 27514

Mesozoic alkalic igneous rocks of eastern North America form five provinces near and within the Appalachian orogen: (1) the Appalachian Plateau kimberlite province along the western side of the Appalachian Mountains; (2) the Shenandoah Mountain province of western Virginia and eastern West Virginia; (3) the New England-Quebec province of northern New England and adjacent Quebec; (4) the White Mountains Magma Series of New Hampshire; and (5) the Notre Dame Bay province of northern Newfoundland. The more alkalic plutons and dikes appear to be direct decendants of mantle-derived melts of basanitic to nephelinitic or kimberlitic affinity. The more silicic plutons formed from magmas contaminated by or melted from the lower continental crust, especially for plutons in New Hampshire where the crust may be abnormally thick.

The alkalic intrusions and entire provinces are located where specific cross-trending fracture zones intersect Appalachian orogenic structures. Tectonic activity, related to rifting events that opened the North Atlantic Ocean in Early Jurassic and Early Cretaceous times, initiated and located the intrusions in zones of decompression that extended through the lithosphere. The transverse continental fractures propagated across the rifts to become major transforms and fracture zones in the newly-forming Atlantic Ocean, and produced seamount chains. This model uses lithospheric tectonics as a control on the production and intrusion of alkalic magmas, in contrast with the model of fixed deep-mantle plumes. The structural differences between continental and oceanic lithospheres must be considered in studies of intraplate igneous patterns.