

TIMING OF EARLY JURASSIC "FEEDER" DIKE EMPLACEMENT, NORTHERN APPALACHIANS: EVIDENCE FOR SYNCHRONICITY WITH BASIN BASALTS

WEST, David P., Jr., Dept. of Geology, Earlham College, Richmond, IN 47374, westd@earlham.edu, and McHONE, J. Gregory, Graduate Liberal Studies

Program, Wesleyan University, Middletown, CT 06459, jmchone@wesleyan.edu.

Large northeast-trending tholeiitic diabase dikes in New England and Atlantic Canada have been petrologically related to basalt flows within Mesozoic basins, but radiometric and paleomagnetic correlations for these rocks have been inconclusive. To better understand their magmatic relationships with basin tholeiites, we conducted $^{40}\text{Ar}/^{39}\text{Ar}$ whole rock analyses of three such dikes: the Caraquet dike in eastern Maine, the Higganum dike in central Connecticut, and the Christmas Cove dike in south coastal Maine.

The Caraquet dike near Bancroft, Maine yielded an essentially concordant age spectrum with total gas (201.7 Ma), plateau (201.2 Ma), and isotope correlation (201.6 Ma) ages. Release spectra and isotope correlation diagrams reveal no signs of excess ^{40}Ar contamination or ^{40}Ar loss. Caraquet dike emplacement is interpreted to be 201.5 ± 2.4 Ma based upon an average of these ages. The Higganum dike in central Connecticut yielded a slightly discordant age spectrum with plateau (201.7 Ma) and isotope correlation (200.6 Ma) ages slightly younger than the total gas (204.6 Ma) age. Both the shape of the age spectrum and the $^{40}\text{Ar}/^{36}\text{Ar}$ intercept (315) on the isotope correlation diagram suggest a tiny amount of excess ^{40}Ar contamination, and the Higganum dike emplacement is taken to be 201.2 ± 2.4 Ma based on the average of the plateau and isotope correlation ages. Including the site for a previous K/Ar whole-rock date of 196 ± 10 Ma, new samples from three different localities along the Christmas Cove dike in coastal Maine yielded variably discordant age spectra. Because of this discordance, plateau ages could not be calculated for the samples, and total gas ages of 202.6 to 214.8 Ma reflect variable amounts of excess ^{40}Ar contamination. Isotope correlation ages, which we believe more closely approximate the timing of emplacement, range from 196.4 to 204.8 Ma. Because the Christmas Cove dike is petrologically similar to the Higganum dike, we suggest that it too has an age near 201 Ma.

Our results indicate that large NE-trending diabase dikes in the northern Appalachians are synchronous with basaltic magmatism in Mesozoic basins (e.g., North Mountain basalt = 202 ± 1 Ma, U-Pb zircon age, Hodych and Dunning, 1992). The dikes were likely "feeders" into extensive fissure vents within and among the basins, creating a large Early Jurassic (Hettangian) flood-basalt province across the rifted margins of eastern North America and perhaps adjacent western Africa and northeastern South America.