THE CHRISTMAS COVE DIKE, COASTAL MAINE: PETROLOGY AND REGIONAL SIGNIFICANCE.

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A large Early Jurassic tholeiitic dike has been mapped for nearly 160 km along the coast of Maine. The dike has many exposures from Doyle Point (near Yarmouth) to Swan's Island (near Mt. Desert Island), and we believe it likely that the dike continues to the SW and NE. Dikes with similar characteristics occur in southeastern New Hampshire at Onway, and across Passamaquoddy Bay into New Brunswick. Including its type locality in Christmas Cove (South Bristol), the dike has features of a generally ENE strike; dip usually steep to the SE but varies to 55o or less; and width 20 to 35 m. There are offsets and discontinuities as well as long stretches of linear dike patterns. The dike shows large columnar fractures perpendicular to strike, as well as cross fractures that produce a rust-stained blocky appearance. A large sill apparently extends northward from the dike around Pemaquid Harbor. For all localities, thin sections show a distinctive subophitic tholeiite texture with scattered, corroded orthopyroxene phenocrysts and abundant augite. Fine-grained contact zones show clumps of glomerophyric augite.

New Ar/Ar dates correlate well with previous K-Ar dates of 190-200 Ma. These dates, new major-element chemistry, and especially petrography allow a same-magma correlation with the Higganum dike of southern New England. Future work will look for a geographic connection of the Christmas Cove dike with the Higganum dike, and with other dikes and flood basalts of the Fundy Bay region to the northeast. The dike also provides a control on the timing of activity for high angle faults of coastal Maine that cross it. In addition, the Pemaquid sill is a unique feature for Jurassic basalts outside of the Mesozoic basins, and it deserves a careful structural analysis.