Comagmatic volcanic and granitoid rocks of the Kingston belt, southern New Brunswick - a Silurian volcanic arc?

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Mapping and petrochemical studies in the northeastern part of the Kingston belt in southern New Brunswick show that earlier interpretations of the belt as a bimodal dyke swarm are not correct. The Kingston belt consists mainly of Silurian metavolcanic rocks of the Bayswater Group, intruded by high-level comagmatic granitoid plutons. The Bayswater Group consists mainly of dacitic and rhyolitic crystal and lithic-crystal lapilli tuff, with less abundant basaltic to andesitic flows and tuffs, rare dacitic and rhyolitic flows, and minor volcanogenic siltstone. The associated Sand Point, Centreton, Bradley Brook, and Redden Brook plutons are characterized by fine grain size and granophyric and locally porphyritic textures, consistent with high-level emplacement. Both the Bayswater Group and granitoid plutons are intruded by abundant mafic dykes, now amphibolite, which have been regionally metamorphosed together with their host rocks to upper greenschist facies. Primary volcanic layering, metamorphic foliation, and mafic dykes all trend north-northeast, and are steeply dipping. The rocks commonly display a steep intersection lineation, and are not mylonitic. Major faults now separate the Bayswater Group and associated plutons and mafic dykes from unmetamorphosed Silurian volcanic rocks to the northwest, and from Neoproterozoic to Cambrian rocks of the Brookville terrane to the southwest.

Most of the volcanic and plutonic rocks in the Kingston belt have experienced chemical alteration, resulting in wide compositional variations and considerable ambiguity in interpreting original chemical characteristics and tectonic setting. However the volcanic and plutonic rocks appear to be calc-alkalic, and may have been emplaced late in the evolution of a continental margin volcanic arc. In contrast, the mafic dykes are tholeiitic, and may have formed in a subsequent extensional tectonic regime.