THE GEOLOGY AND GEOCHEMISTRY OF THE ANSONS BAY BATHOLITH, N.E. TASMANIA.

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ABSTRACT

The granitic complex forming the Ansons Bay Batholith (300 km^2) in northeastern Tasmania, is composed of a variety of granitoids which intrude the low-grade regionally metamorphosed Ordivician to Lower Devonian Mathinna Beds.

The granitoids are divided into five major types based on mafic mineralogy, plagioclase composition and textural variation. Geochemical evidence suggests that the granodiorite, microgranite and biotite-, garnet-biotite, and alkali feldspar granites have been derived by Rayleigh fractional crystallization of a melt from a chemically inhomogeneous source region. Major and trace element modelling of the biotite-, garnet-biotite, and alkali feldspar granites explains the linear trend observed between these granites by 25% fractional crystallization of a solid composed of 64% plagioclase, 20% biotite, and 16% K-feldspar.

Late Devonian dolerite dykes (up to 10 km long) associated with late stage crystallization of the granites, may provide an upper age limit to the Tabberabberan Orogeny within the Ansons Bay Batholith.

An agmatic migmatite, 2 km south of Eddystone Point, has a K-feldspar-cordierite hornfels facies mineral assemblage. P-T conditions of 1 kb and 600^{o}C are inferred for the migmatite formation. Granite contamination and Mathinna Bed xenoliths are largely restricted to the migmatite contact.

Mafic xenoliths from both the granodiorite and garnet-biotite granites have cognate (cumulate) origins and are unrelated to the country rocks. The aplitic xenoliths from the garnet-biotite granites, however, are interpreted as dismembered alkali feldspar dykes.

The mafic mineral assemblages from the garnet-biotite granites suggest low pressure conditions (1 kb) of emplacement at temperatures close to 700^{o}C. Garnet-biotite (cordierite) geothermometry and feldspar geothermometry confirm these temperatures.

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