Geochemistry of the Mafic Igneous Rocks Found in Enorama Diapir, Central Flinders Ranges, and their Relationship to Similar Rocks Found in Nearby Diapirs and Volcanic Bodies Throughout the Flinders Ranges.

BY
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DEDICATION

To my parents who have helped me in so many ways over the years.
Thank you.

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ABSTRACT

Throughout the northern Adelaide Geosyncline are found a series of diapirs which contain rafts of volcanic origin. The volcanic material was brought up with the diapiric breccia. Other sedimentary rafts have been correlated with the Willouran Callanna Group.

The volcanics consist of amygdaloidal basalts and intrusive dolerites. The basalts usually show intersertal textures with plagioclase laths. The dolerites are coarser equivalents of the basalts. Both contain clots of large Ca-rich plagioclase phenocrysts. The only difference is that, in general, the dolerites appear to be more Ca-rich.

The volcanics have been metamorphosed and severely altered with very few original minerals left. The dolerites were mainly oligoclase, augite, magnetite and rare olivine which have now been altered to actinolite, albite, chlorite and epidote. Similar alteration is seen in the basalts. This occured during passive heating up to approximately 300 degrees by regional hydrothermal metamorphism in solutions derived from the surrounding sediments.

Because of the alteration, geochemical interpretation is particularly difficult. Only P2O5, Al2O3, Y, Zr, Ti, La, and Nb have remained sufficiently immobile to show good trends. Classification diagrams show the volcanics are tholeiitic continental flood basalts.

Comparison with other in situ volcanics shows the diapiric volcanics to be geochemically identical to the Wooltana, Beda, Gairdner and Depot Creek volcanics. The Roopena volcanics were not similar, and appear to be related to a different stage of volcanic activity.

This suggests that the Adelaide Geosyncline was the site of rifting initiated about 700 - 800 Ma. The diapiric volcanics erupted rapidly onto the surface in the late rifting stage. The rift then stopped soon after for reasons that are yet to be determined.

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