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Note: A magnetite-bearing hornblende diorite with possible lamprophyric affinities at Eausiro West, Erongo Region, central Namibia

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Introduction

A hornblende diorite plug with gabbroic and possible lamprophyric affinities has been located on the farm Eausiro West 101 in the Erongo Region, central Namibia (Fig. 1). The intrusion is at least 400 metres in diameter, but, due to the poor exposure, the distribution of the dioritic, gabbroic and lamprophyric phases cannot be accurately determined. The discovery was made during reconnaissance mapping conducted as part of a mineral exploration program (Steven, 1987). Attention was focused on the area after the identification of considerable quantities of magnetite in the thin residual soil. A prominent aeromagnetic anomaly that covers much of the farm is probably related to this intrusion (see aeromagnetic map 2115BA, scale 1:50,000).

Petrography

In hand specimen the diorite has a dark green gabbroic texture and is commonly banded. The paler phase appears to replace the darker gabbroic phase. The diorite comprises hornblende (20-65 modal%), plagioclase feldspar (25-45%), clinopyroxene (15-20%), quartz (0-10%), microcline and orthoclase (0-10%) and accessory biotite, titanite, apatite, carbonate, sericite, zircon, epidote and iron ore. In thin-section, an inequigranular, medium-grained (0.05-2.0 mm), xenomorphic-granoblastic texture is evident Hornblende occurs either as stumpy anhedral prisms or as a replacement after clinopyroxene (probably augite) and is strongly pleochroic (dark green to pale brown). Quartz occurs as irregular to lobate grains, usually in small, interstitial aggregates. The plagioclase occurs as large, irregularly-shaped crystals, some of which are poikilitic. Some of the feldspars are strained and are locally altered to carbonate and sericite. Microcline and orthoclase occur generally as smaller crystals concentrated around the margins of the plagioclase grains. Euhedral crystals of titanite are common accessory minerals and apatite is a common inclusion in hornblende.

The lamprophyric phase of the intrusion contains coarse-grained biotite that is easily visible in hand specimen. The texture of the rock is highly inequigranular and the biotite is porphyroblastic in part. The biotite is reddish brown in colour and occurs either as large plates overgrowing all other minerals or as small platy inclusions within the clinopyroxene and hornblende. The mica may be a partial replacement of the amphibole. The other minerals show a similar mode of occurrence as they have in the diorite proper. The lamprophyre is mineralogically classified (after the nomenclature of Bates and Jackson, 1987) as a kersantitic camptonite on the basis of the proportions of plagioclase, hornblende and biotite.

Discussion

The most unusual aspect of the Eausiro West intrusion is its mafic composition. The majority of igneous intrusions in the Central Zone of the Damara Orogen are granitic (Miller, 1983). Hornblende-bearing intrusions are rare in central Namibia, plutons with large quantities of magnetite even more so. Basic intrusions are either early Damaran or late-/post -tectonic in age. The early mafic intrusions are hornblendites (Smith, 1965) whereas the younger mafic bodies tend to be noritic in composition and are confined to areas of crustal weakness such as the Okahandja Lineament (Miller, 1983).

No geochronological work has been conducted on the Eausiro West intrusion. The rocks are undeformed, but the petrographic evidence, specifically the xenom-

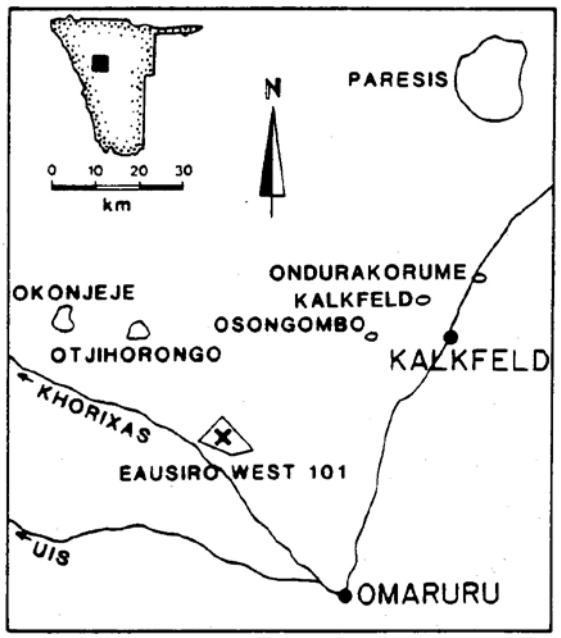

Figure 1: Location of the Eausiro West hornblende diorite and post-Karoo complexes in central Namibia

orphic-granoblastic texture, indicates that they have been weakly affected by regional metamorphism. Central Namibia was affected by intense deformation and amphibolite-facies metamorphism during the Damaran orogeny (Miller, 1983; Steven, 1993). It therefore seems unlikely that the intrusion is older than late Pan-African (480-460 Ma; Haack *et al.*, 1980) and certainly younger than the peak of Damaran metamorphism (~520 Ma; Haack *et al.*, 1980; Miller, 1983).

The significance of the slightly lamprophyric nature of the intrusion is unclear. One explanation for the presence of the red biotite is crustal contamination of mafic magma by K-rich metamorphic fluids generated during the Damaran orogeny. Alternative explanations are: (i) crustal contamination by potassium-rich fluids from the numerous Salem granitoids in this part of Damaraland; (ii) the diorite and gabbro may possess an inherent alkaline affinity. In regard to this second alternative, it is of note that the Eausiro West intrusion is located 40 km south-west of the Osongombo alkaline diatreme and in line with the three post-Karoo alkaline-carbonatite complexes of the Kalkfeld District (Fig. 1; Verwoerd, 1967; Prins, 1981). Marsh (1973) considered these complexes to lie along a NE-trending oceanic transform fault extension (Fig. 2). Generation and tapping of mantle-derived alkaline magma may therefore have already commenced in the latter stages of the Damaran orogeny.

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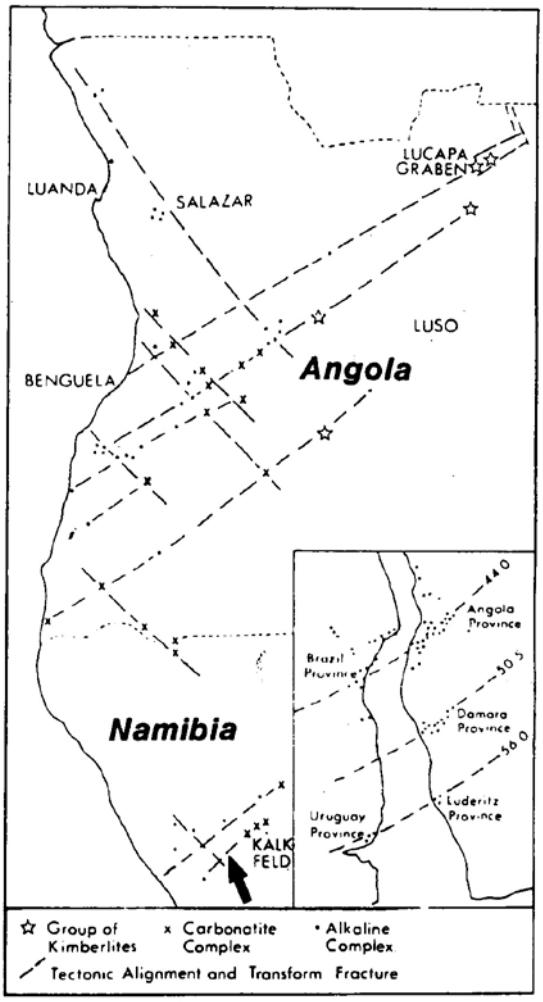

Figure 2: Distribution of kimberlites, carbonatites and alkaline complexes in Angola and Namibia with complexes clustered on extensions of oceanic transforms centred on Cretaceous pole of rotation (after Marsh 1973; diagram taken from Mitchell and Garson, 1981). Arrow marks Eausiro West intrusion.

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