

## THE MOANA-TINGUINS MELILITITE PROVINCE, PIAUI STATE, NORTHEASTERN BRAZIL.

*P.A. Williamson<sup>(2)</sup>; N.B. da Silva<sup>(1)</sup>; P. Valle<sup>(2)</sup> and J.V. Robey<sup>(1)</sup>.*

*(1) Geology Department (Diamond Division), Anglo American Corporation of South Africa, Johannesburg, South Africa; (2) Sopemi - Pesquisa e Exploração de Minérios S.A. CP 04-0087, CEP 71200 - Brasília - DF, Brazil.*

### INTRODUCTION

Diamond prospecting by Sopemi S.A. during early 1980's led to the discovery of 40 intrusives of melilititic character in the Picos area of Piauí State, northeast Brazil.

The intrusions occur along a SW-NE trend between 6°30' and 7°10'S latitudes and 41° and 42°W longitudes. The bodies have been named Moana-1 to 20 in the southwest and Tinguins-01 to 20 towards the northeast (figure 1).

One of the intrusives have been dated at  $216 \pm 11$  Ma (mid-Triassic zircon fission track age) while U/Pb dating produced an age of 235 Ma (Upper Permian). Further dating is in progress.

### GEOLOGICAL SETTING

The melilitites intrude the Devonian Cabeças Formation which is composed of arenites and siltites in the eastern part of Maranhão Basin.

### TECTONIC SETTING

The Maranhão Basin formed in basement which was affected by the Brasiliano Orogeny (450-700 Ma). Inferences drawn as to the nature of the underlying basement through exposures along basin margins and from limited borehole information suggest a maximum basement age of 693 Ma (Brito Neves et al., 1984).

The intrusives are located along a southwest - northeast structural trend, suggesting an influence of the underlying basement structures. The most notable is the Transbrasiliano Lineament which seems to have controlled the emplacement of the bodies (figure 2).

### DESCRIPTION OF THE INTRUSIVES

The intrusions are often oval in shape and range in size between 1 to 130 hectares.

The bodies are classified texturally as crater facies olivine melilitites. Drilling of the Moana-01 body indicates a thickness of approximately 175 meters for the crater facies sediments. The crater infill consists of well to poorly sorted volcaniclastics showing planar structures. Rounded to angular country rock fragments composed of arenites and siltites occur in varying proportion, together with occasional basement fragments of schist and quartzite. Pelletal juvenile lapilli of olivine melilitite, interpreted as the host igneous source, are also present. Mantle derived peridotitic xenoliths are present.

The juvenile lapilli show relict textures typical of macroporphyritic hypabyssal facies melilitite. They consist of abundant olivine macrocrysts and phenocrysts set in a matrix dominated by melilitite laths, some phlogopite, minor opaques, apatite and perovskite. Occasional clinopyroxene microlites in or around lapilli are found set in an altered fine grained matrix. Olivine commonly shows the complex shapes and parallel growth aggregates typical of melilitites.

#### XENOCRYST MINERAL CHEMISTRY

Garnet xenocrysts are predominantly Ti-poor, low to moderate Cr types which are similar to the garnets from garnet lherzolites. Subordinate amounts of Ti-rich, megacrystic and eclogitic garnets also occur.

Ilmenites have low to moderate Mg and range to high Cr and Ti compositions.

Spinel is predominantly high Mg, moderate Cr varieties, typical of lherzolites. A few grains are high Ti varieties.

Clinopyroxenes show variations in the composition between individual intrusions but are predominantly low-temperature calcic types. Some relatively Fe-rich MARID varieties and a few high-temperature subcalcic clinopyroxenes are present.

#### CONCLUSION

The Moana-Tinguins province constitutes crater facies olivine melilitite intrusive into sediments of the Maranhão basin. The basement age is of a maximum of 693 Ma while the bodies intruded during the mid-Triassic to Upper Permian.

Mineral chemistry of xenocrystic minerals suggest sampling of relatively shallow regions of the upper mantle.

#### References:

Brito Neves et al. (1984). *Journal Geodynamics* 1, 495-510.

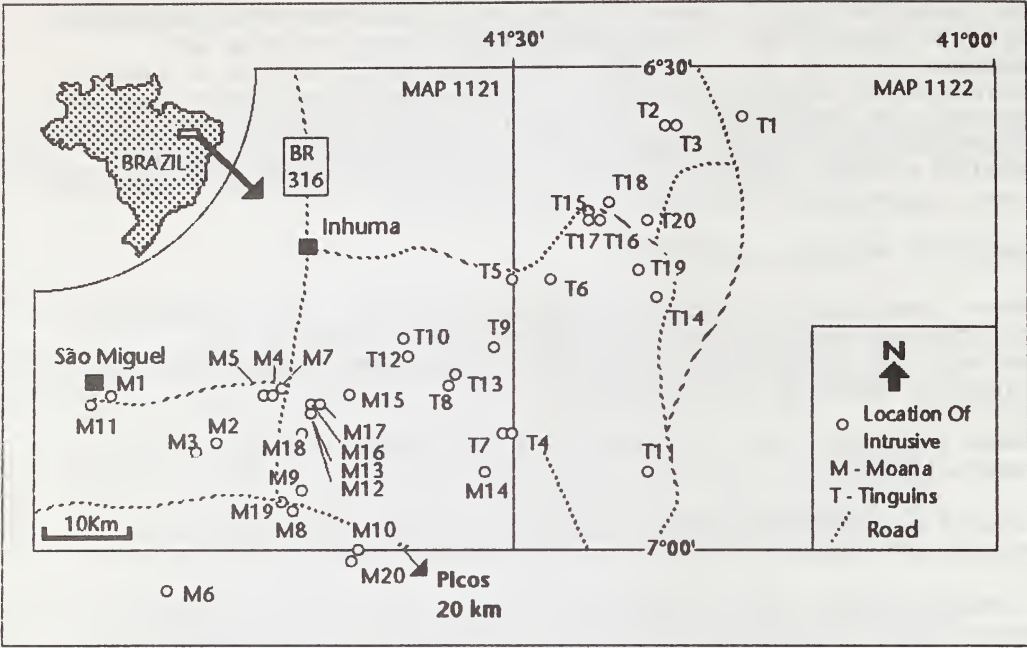


Figure 2: Geological Sketch Map Of The Maranhão Basin Basement

