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During the last decade considerable exploration activity directed towards finding new deposits of diamond and kimberlites has been underway in Brazil. For various and obvious reasons companies have not always reported their discoveries and it is rumored that there are in excess of 300 kimberlites, or kimberlitic-like intrusions, throughout Brazil (Svisero et al. 1979). Currently known ones are in Minas Gerais, Piauí and Rondônia States (Svisero et al. 1984). However, it is emphasized that because of the extensive tropical weathering the identification of several of the intrusions as kimberlitic is based on the presence of Mg-ilmenite, and pyrope garnet in heavy mineral concentrates of weathered rock and overlying soils. Based on similar studies, as well as examination of fresh rock in some instances, new occurrences of kimberlites are reported herein for the States of Piauí, Mato Grosso and Santa Catarina (Fig. 1).

In Piauí State the kimberlites of Redondão and Belmonte have been previously described. In this report we present data on the Açude kimberlite which is one in a field of several other possible kimberlites remote from Belmonte and Redondão. Geological reconnaissance shows that the body is a diatreme intrusive in reddish arenites of the Cabeças Formation, the Devonian member of the Parnaíba Basin. The intrusion is located near a dam 15 km south of Ipiranga do Piauí, not far from Picos, the main town in eastern Piauí State. Despite the arid climate, the kimberlite is weathered, with limonitic concretions dispersed over its surface. The material presently available from Açude is extensively weathered but appears to consist of serpentinized olivine macrocrysts in a fine grained groundmass in which only calcite, perovskite and opaques remain. One or two larger (0.5 mm) grains of Mg-ilmenite with reaction rims of perovskite are present. Macrocrysts (<1 cm) of garnet and Mg-ilmenite have been analyzed, plus a dark green clinopyroxene megacryst (>1 cm). Garnet is typically kimberlitic and contains MgO ~ 22 wt%, FeO ~ 7 wt%, CaO ~ 5 wt% and Cr₂O₃ ~ 3 wt%. Ilmenite contains up to 16 wt% MgO and lamellar intergrowths with silicate (now serpentinized) occur. The pyroxene megacryst is compositionally equivalent to low-Cr pyroxene megacrysts from kimberlites in Lesotho, South Africa and Colorado. For example, Al₂O₃ < 3 wt%, TiO₂ and Cr₂O₃ both < 1 wt% and Na₂O < 2 wt%. Ca/(Ca+Mg) is 0.35 which falls in the range of low-Cr pyroxene megacrysts from Monastery and Letseng.

In southeast Mato Grosso State, several possible kimberlite intrusions occur, mostly in difficult-to-reach places along the headwaters of the Batovi, Coliseu and Jatobá rivers. One of these intrusions (Batovi kimberlite), located 50 km north of Paranatinga, is intrusive in arkosic arenites of the Diamantino Formation the topmost member of the Proterozoic Alto Paraguai Group. Although weathered the rock is grey-green in color and fine grained with irregularly shaped macrocrysts (~3 mm) of serpentinized olivine (?), ilmenite and garnet. The groundmass is completely altered except for some perovskite, spinels and small Mg-ilmenites that are compositionally similar to the larger macrocrysts (8-13 wt% MgO). Garnets have Cr₂O₃ and CaO contents of 1.2 and 5.5 wt% respectively with high MgO (20-23 wt%) and low FeO (9 wt%). The spinels are generally low in TiO₂ and Al₂O₃ (both < 10 wt%), and MgO (< 12 wt%) but have high FeO (36-67 wt%) and variable Cr₂O₃ (2-40 wt%). The very high FeO and very low Cr₂O₃ spinels are mostly magnetites whereas those rich in Cr₂O₃ are mostly low-titanian magnesian chromites. Similar spinels occur in several kimberlites worldwide.

Surrounding the city of Lajes in Santa Catarina State are numerous diatremes intrusives in the Paleozoic-Mesozoic sediments of the southeast

border of the Paraná Basin. The most conspicuous is Janjão, near the Lajes airport, weathered on the surface and surrounded by pale yellowish arenites of the Permian Passa Dois Formation. Geophysical surveys (magnetometry, radiometry and gamma spectrometry) have revealed dimensions of 200 x 50 meters for the Janjão diatreme, with the main axis oriented N40E (Svisero et al. 1985). Preliminary study of minerals from Janjão and three other diatremes in the area (Pandolfo, Ipiranga and Cará) suggest possible kimberlitic affinity but at this date considerably more data are required to verify this suggestion. For example, Janjão diatreme contains Mg-ilmenites ($MgO \sim 4$ wt%), garnets (Cr_2O_3 1-2 wt%, CaO 4-7 wt%, MgO 20-22 wt% and $FeO \sim 7$ wt%), Cr-spinel, magnetite, zircon and numerous clinopyroxenes. Compositionally the clinopyroxenes are similar to the pyroxene megacrysts from kimberlite except that they (Janjão) have much higher contents of Al_2O_3 (~ 6 wt% versus < 1 wt%). In this respect they have similarity with the megacrysts from alkali basalts. Pyroxenes in the Cará, Ipiranga and Pandolfo are similar to those from Janjão.

In summary, the present data indicates that at least two new kimberlite fields and possibly a third exists in Brazil. Furthermore, during this study at least five more intrusions in the Coromandel area of western Minas Gerais State have been identified as containing kimberlitic-type minerals.

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Fig. 1 - Location of kimberlite intrusions and detrital diamond occurrences in Brazil.