

THE MAFIC DIKE SWARM OF UAUÁ (BRAZIL): GEOLOGICAL AND PETROGRAPHICAL ASPECTS

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The Uauá mafic dike swarm stands out as one of the most extensive swarms in the São Francisco craton. These dikes crop out around the town of Uauá (State of Bahia) and to the east near the Rio Capim greenstone belt (Fig. 1). The dikes intrude the Archean basement which is composed of medium- to high-grade gneisses and migmatites. Table 1 shows the geochronological results for basement rocks, which have yielded ages between 2,730-3,016 m.y. (Rb-Sr,whole rock isochrons) indicating a Late Archean evolution for these rocks. On the other hand, available ^{40}Ar - ^{39}Ar (biotite) and K-Ar (amphibole) determinations for basement rocks yield Early Proterozoic ages, the result of overprinting of the Transamazonico orogenic cycle.

On the basis of field evidence (degree of deformation) and on petrographic grounds (metamorphic facies and mineralogy), two generations of mafic dikes have been recognized in the region. The first generation occurs mostly close to the Rio Capim sequence and presents a paragenesis compatible with medium to high amphibolite metamorphic facies. Penetrative foliation and folding are well-developed. These dikes are cut by the second generation and have been interpreted by WINGE (1984) as possibly representing volcanic conduits for the basic volcanism of the Rio Capim greenstone belt.

The second generation is more widespread than the first one. The dikes are usually associated with extensional or shear fractures and in general show straight or curved shapes. Most strike N-S or NE-SW and less often NW-SE. Their thicknesses range from a few centimeters to 30 meters and their lengths up to 8-10 kilometers.

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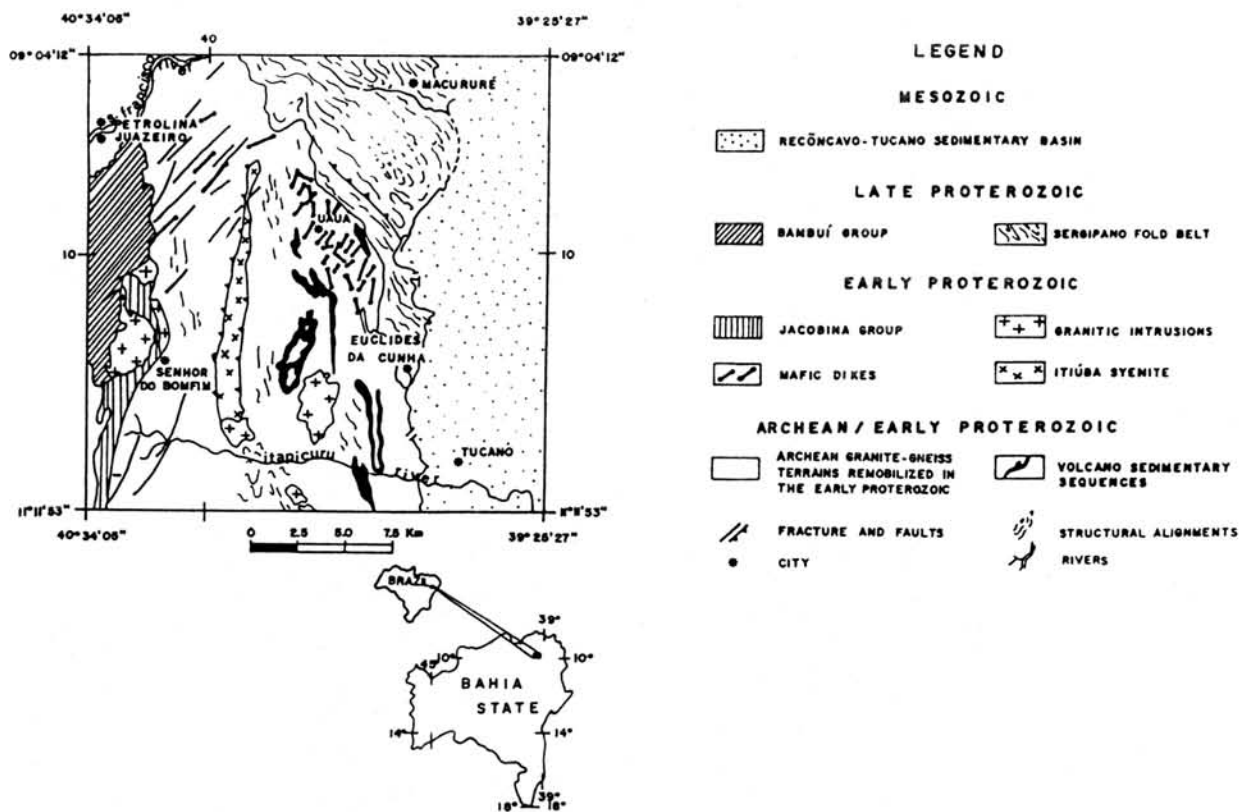


Figure 1 - Simplified geological map of the Uauá region in the northeast part of the São Francisco craton.

Table 1 - Geochronological determinations on the basement rocks and mafic dikes of the Uauá region.

ROCKS	METHODOLOGY	LOCALITY	MATERIAL	AGE (m.y.)	REFERENCE
B	Rb-Sr	Uauá	WR	~ 2,730 (IR = 0.7025)	MASCARENHAS & GARCIA (1989)
B	Rb-Sr	Rio Capim (Uauá)	WR	3,016±109 (IR = 0.7036)	
B	Rb-Sr	Uauá	WR	3,012±170 (IR = 0.7009)	
MF	Ar-Ar	Uauá	biotite	2,147±5	T.C.ONSTOTT (pers. commun, 1990)
MF	K-Ar	Uauá	amphibole	2,068±111	MASCARENHAS & GARCIA, 1989
MF	Rb-Sr	Uauá	WR	~ 1,890	Recalculated from MASCARENHAS & GARCIA (1989)
MF	K-Ar	Uauá	WR	1,890-2,160	JARDIM DE SÁ et al. (1984)
MF	K-Ar	Uauá	plagioclase	2,014±77	GAVA et al. (1983)

WR = Whole Rock

IR = Initial Ratios

MF = Mafic dikes

B = Basement rocks (gneiss, migmatite, amphibolite and granodiorite/tonalite)

There is no indication that the Rio Capim sequence has been cut by the second generation of dykes. However, these dikes are surely younger than this sequence as they were not generally affected by the five deformational phases described in both the Rio Capim and basement rocks (JARDIM DE SÁ et al., 1984). Although the second dike generation is usually undeformed, in some cases it may exhibit deformation by the fourth phase, specifically, whose major expression is NNW-SSE striking shear zones of great length. Those dikes closest to these shear zones are foliated and present low amphibolite metamorphic facies. Dikes farther from the shear zones show primary aphyric, ophitic/subophitic and intergranular textures and have the following igneous composition: plagioclase (labradorite to andesine), pyroxene (augite and/or pigeonite and less commonly hypersthene), and hornblende.

Available geochronological data on the second generation dikes (GAVA et al., 1983; Centro de Pesquisas Geocronológicas-USP, unpublished; MASCARENHAS & GARCIA, 1989) yield apparent ages between 1,890 and 2,014 My (K-Ar, Rb-Sr determinations; Table 1) suggesting that the main intrusive episode was associated with the Transamazonico cycle. On the other hand, from field observations the first generation of dikes appears to be pre-Transamazonico notwithstanding the lack of radiometric determinations on this assemblage.

Preliminary geochemical data (PICCIRILLO, per.commun., 1990) indicate a tholeiitic trend (Fig. 2) for the dike assemblages, with high titanium (HTI- $\text{TiO}_2 > 2\%$) and low titanium (LTI- $\text{TiO}_2 < 2\%$) characteristics.

OLIVEIRA & MONTES (1984) and OLIVEIRA (1989) described dikes of noritic composition in the Uauá area, but these dikes seem to be much less abundant than those presented here as such composition has not been found so far in our studies.

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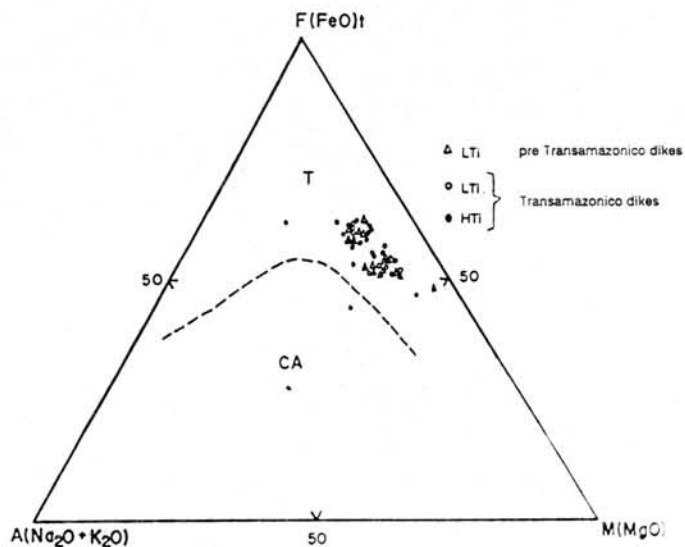


Figure 2 - AFM diagram for the Uauá dikes (data from E.PICCIRILLO, pers.commun., 1990). Calc-alkaline (CA) and Tholeiitic (T) fields after IRVINE & BARAGAR (1971). $\text{TiO}_2 > 2\%$ (HTI); $\text{TiO}_2 < 2\%$ (LTI).

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