

# THE TRANSAMAZONIAN IMPRINT ON THE SOUTHERN SAO FRANCISCO CRATON: ANATOMY OF A PALEOPROTEROZOIC OROGEN

*Cutts, K.A.<sup>1</sup>; Lana, C.<sup>1</sup>; Alkmim, F.F.<sup>1</sup>, Teixeira, L.P.<sup>1</sup>, Júnio da Silveira, G.<sup>1</sup>, Mazoz, A.O.<sup>1</sup>*

<sup>1</sup>Departamento de Geologia, Escola de Minas, Universidade Federal de Ouro Preto, Morro do Cruzeiro, 35400-000 Ouro Preto, MG, Brazil.

**ABSTRACT:** The Transamazonian orogeny is a laterally extensive orogeny which is the result of the proposed collision between a magmatic arc and the Sao Francisco Craton at 2.1 Ga. Transamazonian age events are recorded in both the northeastern and southern Sao Francisco Cratons as well as in French Guiana, Surinam, Guyana and Venezuela (Machado et al 1992). Despite this large lateral extent, very little is known about Transamazonian orogenesis. In the Sao Francisco craton this could be due to the fact that the position of the Transamazonian on the edge of the Archean craton mean that these rocks have been subjected to later c. 600 Ma Brasiliano orogenic events (Perez et al 2004). In addition, collapse of this orogeny is thought to result in the dome and keel geometry found in the Quadrilatero Ferrifero (Marshak et al 1997). In the Southern Sao Francisco craton, on the eastern edge of the Quadrilatero Ferrifero (QF), there is a region where Transamazonian metamorphism and structures are preserved (Alkmim and Marshak 1998; Perez et al 2004). Samples obtained from this region have the potential to record the metamorphic evolution of Transamazonian events as well as the later Brasiliano overprint.

This study investigates a series of granulite and amphibolite facies samples from the central and eastern QF. The central QF samples record the collapse of the orogeny, whereas samples from the eastern QF originate from the magmatic arc and preserve peak Transamazonian metamorphism as well as the Brasiliano overprint.

The central QF samples record clockwise P-T paths with peak conditions of 7 kbars and 700 °C at c. 2050 Ma. Amphibolite facies samples from the eastern QF contain complexly zoned garnet containing monazite which gives 2.0 Ga ages, whereas matrix grains give ages of c. 600 Ma. Matrix monazite from another sample give two age populations,  $597 \pm 3$  Ma and  $547 \pm 5$  Ma. Garnet core zonation indicates peak P-T conditions of c. 7 kbar and 650 °C for both samples. This is likely to represent Transamazonian metamorphic conditions.

Granulite facies samples from the eastern QF gave monazite ages in the range of 2015-1960 Ma with discordia intercepts at c. 620 Ma. Both granulite samples preserved two metamorphic textures. Coarse grained garnet + biotite + OPX+ plagioclase + quartz + ilmenite + melt and later, fined grained garnet + biotite + amphibole + quartz which grows at the expense of OPX. Peak conditions for the earlier event were c. 750 °C and 7-5 kbar and 650 °C at 5-6 kbar for the later event. Plausibly the earlier event corresponds to the c. 2.0 Ga ages obtained from the sample while the later event is the result of c. 600 Ma resetting. The high grade of metamorphism and range of monazite ages for the eastern region suggests long-lived high temperatures, possibly this could have contributed heat required for dome and keel formation in the central QF.

**PALAVRAS-CHAVE:** TRANSAMAZONIAN, QUADRILATERO FERRIFERO, SAO FRANCISCO CRATON