Late Mesoarchaean high-pressure granulites in the Uauá Block, São Francisco Craton, Brazil

ELSON OLIVEIRA[1], WAGNER AMARAL[2], CRISTINA TALAVERA[3] AND JULIA SEMPRICH[4]

[124]Department of Geology and Natural Resources, Institute of Gesciences, University of Campinas, Brazil ([1]elson@ige.unicamp.br; [2]wamaral@ige.unicamp.br; [4]juliajennifer@ige.unicamp.br)

[3]John de Laeter Centre, Curtin University, Bentley 6102, Australia (cristina.talavera@curtin.edu.au)

High-pressure (HP) granulites of regional scale formed as a result of short-lived tectonic events that led to crustal thickening or subduction of the crust into the mantle (1). Most HP granulites are Phanerozoic and a few are Proterozoic. Archaean HP granulites are even rarer, probably owing to a higher thermal regime and thinner continental crust in the Archaean. Here we present ca. 2.8 Ga HP mafic granulites in the Uauá block, Brazil, as field evidence of a change in Earth's thermal regime probably associated with plate tectonics in the Mesoarchaean.

The HP mafic granulites occur as lensoid bodies over 5 km long and 1 km wide within shallow-dipping diorite to leucodiorite gneisses. The igneous protoliths of the HP mafic granulites have flat REE patterns (10x chondrite) with minor negative Eu anomaly, suggestive of plagioclase fractionation at low pressure. Other geochemical characteristics suggest similarities of the protoliths with MORB or oceanic plateau basalts. Garnet-clinopyroxene pairs with quartz, zircon, ilmenite, plagioclase, and clinopyroxene inclusions in garnet define the HP assemblage. Garnet porphyroblasts also show opx-cpx-plag symplectite coronas, which coupled with hornblende and plagioclase define retrogression to lower grade granulite and amphibolite facies. Thermocalc calculation and microprobe data indicate 13.5-14 Kbar and 850 °C for the HP assemblage.

Dated zircon grains contain cores with relict euhedral zoning, typical of igneous crystallisation, and resorbed outer margin and more massive, mostly structureless rim zones. The cores have variably, concordant (+/-5%) SHRIMP ages at ~3.1 Ga and several analyses up to ~3.2 Ga. The rims yield a population at ~2.83 Ga, with several older ages, which may represent mixtures of core and rim zircon. We consider ~2.83 Ga to date the high grade event. The HP mafic granulites were buried to deep crustal levels in a convergence zone with unknown colliding blocks.

(1) O'Brien & Rötzler (2003) *J. Metamor. Geology* **21**, 3–20.