The Parautochthonous "Greenstone Belts" of Madagascar: Implications for Neoarchean Linkage to the Dharwar Craton of India

J. Y. ROIG[1], D. BOSCH [2], C. DELOR[1] and R. D. TUCKER[3]

[1] *BRGM, 3 avenue Claude Guillemin 45060 Orléans cedex 2, FRANCE*

[2] *Géosciences Montpellier, UMR 5243 Université Montpellier 2, Place E. Bataillon 34095 Montpellier cedex 5, FRANCE*

[3] *United States Geological Survey, 12201 Sunrise Valley Drive, Reston, VA 20192 USA*

A program of geologic mapping, petrologic and structural analysis, and U-Pb geochronology, administered by the "**P**rogramme de **G**ouvernance des **R**essources **M**inérales" from 2005-2008, has defined eight geological domains in the crystalline shield of Madagascar. They are, from south to north, the Vohibory, Androyen, Anosyen, Ikalamavony / Itremo, Antananarivo, Anaboriana / Manampotsy, Antongil / Masora, and Bemarivo domains.

We focus on the Archean shield of central Madagascar that includes the Antongil/Masora domain to the east, and the Antananarivo domain to the west. The Antongil/Masora domain consists of Paleo-Neoarchean tonalite-granodiorite gneisses interpreted as a fragment of the western Dharwar Craton of India. The Antananarivo domain consists of granitic gneisses (2.7-2.5 Ga) and four synformal belts of mafic-ultramafic gneisses (2.75-2.5 Ga) interpreted as Archean "greenstone belts". The "greenstone belts" are traditionally grouped as the "Tsaratanana Complex" and interpreted as a single allochthonous sheet, thrust over its Archean substrate (Antananarivo block) in latest Neoproterozoic time (630-530 Ma). Two aspects of this notion are controversial: *(i)* the very nature of the proposed allochthon, and *(ii)* the age of its proposed emplacement.

New structural data and U-Pb geochronology demonstrate that the allochthonous model of nappe tectonics is no longer tenable. In its place we propose the belts of the "Tsaratanana Complex" are parautochthonous assemblages of mostly mafic and juvenile gneisses juxtaposed with granitic gneiss of the Antananarivo Domain in Neoarchean / Early Palaeoproterozoic time. Thus the Antananarivo Domain, including its distinctive belts of mafic gneiss and schist, is similar to the Neoarchean terranes of the Eastern Dharwar Craton. We propose, therefore, that the oldest rocks of Antongil / Masora and the Western Dharwar form an ancient nucleus (> 3.2 Ga) bordered on both sides by mostly "juvenile" belts of the Eastern Dharwar and Antananarivo Domain. Hence, the dominant N-S tectonic grain of central Madagascar is essentially a Neoarchean fabric although it has been modified extensively by late Neoproterozoic orogeny.