

## A Reevaluation of the “Betsimisaraka Suture” in Madagascar

R. D. TUCKER<sup>1</sup>, J.-Y. ROIG<sup>2</sup>, C. DELOR<sup>2</sup>, P. GONCALVES<sup>3</sup>, Y. AMELIN<sup>4</sup>,  
M.H. RABARIMANANA<sup>5</sup>, AND A.V. RALISON<sup>5</sup>

<sup>1</sup>United States Geological Survey, 12201 Sunrise Valley Drive, Reston, VA 20192 USA

<sup>2</sup>Bureau des Recherches Géologiques et Minières, 45060 Orléans, Cedex 2, FRANCE

<sup>3</sup>Research School of Earth Sciences, ANU, Canberra ACT 0200, AUSTRALIA

<sup>4</sup>Université de Franche Comté, UMR 6249, 25030 Besançon Cedex, FRANCE

<sup>5</sup>Project de Gouvernance des Ressources Minérales, 101 Antananarivo, MADAGASCAR

Over the past decade, several authors have suggested that the Precambrian shield of central Madagascar hosts a major boundary – the “Betsimisaraka suture” – where vast sections of oceanic crust were consumed in latest Neoproterozoic time. The boundary is reported to join disparate Archean blocks; the Dharwar Craton to the east and an Archean block of African provenance (“Azania”) to the west. Additionally, an allochthonous sheet of Archean mafic gneiss and schist (Tsaratana Complex) was emplaced onto Azania during this period of Neoproterozoic convergence. Commonly cited lines of evidence in support of these hypotheses include:

- (i) The disposition of different Archean blocks (or cratons): the dominantly *Mesoarchean* block of East Madagascar (Antongil/Masora) and the exclusively *Neoarchean* block of central Madagascar (Antananarivo).
- (ii) A medial Proterozoic platform sequence (Itremo Group) on the central block with detrital zircon ages of proposed *African* provenance.
- (iii) Metaigneous rocks, of purported supra-subduction origin (ca. 840-760 Ma) scattered throughout the central block and absent in the eastern block.
- (iv) Extensive “Pan-African” (600-520 Ma) overprinting of the central block and *not* the eastern block. Thus the “suture” delineates the eastern margin of the East African Orogen.
- (v) Metamafic and ultramafic rocks (gabbro, harzburgite, and serpentinite) of inferred oceanic origin within the “suture”.

We offer an alternative proposal based on the work of recent surveys and new U-Pb geochronology. Rather than an oceanic “suture”, the zone is redefined as a series of highly-sheared and inverted rift basins, filled with terrigenous detritus, that mostly hides the Archean boundary between contrasting parts of the Greater Dharwar Craton. Along part of its length, the “suture” follows a zone of crustal weakness and very high strain that may be traced into the Palghat-Cauvery shear zone of southern India. The regional implications for this interpretation will be discussed.