The Magondi Belt in southern Africa: Implication for Paleoproterozoic crustal evolution in the northwestern Zimbabwe Craton

Toshiaki Tsunogae [1, 2*], Prince Mandingaisa [3], Maideyi Lydia Meck [3], Md. Sazzadur Rahman [1], Sam Uthup [1], Kazuki Takahashi [1]

[1] *Graduate School of Life and Environmental Sciences, University of Tsukuba, Ibaraki, Japan*

[2] *Department of Geology, University of Johannesburg, South Africa*

[3] *Department of Geology, University of Zimbabwe, Mt. Pleasant, Zimbabwe*

The Archean Zimbabwe Craton is surrounded by several orogenic belts; (i) Neoarchean (ca. 2.8-2.7 Ga) Limpopo Complex formed by collision with the Kaapvaal Craton, (ii) Paleoproterozoic (ca. 2.0 Ga) Magondi Belt and reworked regions of the Limpopo Complex, and (iii) Neoproterozoic (ca. 550 Ma) Zambezi and Mozambique Belts formed by collision with surrounding cratons (e.g., Congo Craton). The Magondi Belt has been regarded as a Paleoproterozoic collisional orogen formed by the collision of the Zimbabwe Craton and an unknown continental block during ca. 2.0 Ga Magondi orogeny. The dominant lithologies in the belt are meta-supracrustal rocks such as dominant metasediments and metavolcanics with subordinate orthogneisses. Our field observations and ongoing petrological studies confirmed the widespread occurrence of meta-supracrustal rocks in Karoi-Chinhoyi area to the west of the Zimbabwe Craton, and a remnant of the lithological unit is also exposed as a basement window in northwestern Zimbabwe (Dete-Kamativi Inlyer or Dete-Kamativi Block). The rocks in the Chinhoyi area is mainly composed of slate, meta-sandstone, and meta-carbonates, whereas the metamorphic grade increases toward northwest in Karoi area where amphibolite-facies mineral assemblages (e.g., hornblende + plagioclase in amphibolite) are dominant. The highest-grade rocks are exposed in Dete-Kamativi area in the northwestern margin of the block where amphibolites are associated with quartzo-feldspathic biotite gneiss/migmatite and quartzite. The migmatites are intruded by porphyritic granites with various dioritic microgranular enclaves suggesting bimodal magmatism in a subduction-related setting. Garnet-biotite-sillimanite assemblages in pelitic gneisses and orthopyroxene-bearing assemblages in felsic orthogneisses suggest peak granulite-facies metamorphism in the Dete-Kamativi Block. Our field and petrological data suggest that the Magondi Belt is a suture zone with remnants of magmatic arc fragments, and possibly formed during the Paleoproterozoic ocean closure and subsequent continent-continent collision.