

Mesoproterozoic geology of the Nampula Sub-province, northern Mozambique

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ABSTRACT

The Nampula Subprovince (NSP) of the Mozambique Metamorphic Province covers over 100 000 km², making it the largest Mesoproterozoic crustal block in northern Mozambique and an important component of the Neoproterozoic to Cambrian (Pan-African) East African Orogen. It is bounded in the north by the WSW–ENE trending Lúrio Belt. The oldest rocks (Mocuba Suite) are a polydeformed sequence of upper amphibolite grade layered grey gneisses and migmatites associated with intrusive TTG and granitic orthogneisses. A sample of banded gneiss, interpreted as a meta-volcanic rock, yielded a U-Pb SHRIMP zircon date of 1127 ± 9 Ma. Metamorphic rims, dated at ca. 1090 Ma, probably grew during the emplacement of a later magmatic phase, represented by the tonalitic Rapale orthogneiss, two samples of which were dated at 1095 ± 19 and 1091 ± 14 Ma respectively. The earliest (D1) deformation and associated amphibolite-grade metamorphism and migmatization recognised, took place at approximately this time. The geochemistry of these rocks suggests that they were generated in a juvenile, island-arc setting. The Mocuba Suite is interlayered with extensive belts of meta-pelitic/psammitic, calc-silicate and felsic to mafic meta-volcanic supracrustal gneisses termed the Molôcué Group. U-Pb data from detrital zircons from a calc-silicate paragneiss gave a bimodal age distribution at ca. 1100 and 1800 Ma, showing derivation from rocks of the same age as the Mocuba Suite and a Palaeoproterozoic source region. The age of the Molôcué Group has been directly determined by dates of 1092 ± 13 and 1090 ± 22 Ma, obtained from two samples of the leucocratic (meta-acid volcanic?) Mamala gneiss, one of its major constituent formations. The final phase of Mesoproterozoic activity is represented by voluminous plutons and sheet-like bodies of foliated megacrystic granite, augen gneiss and granitic orthogneiss (Culicui Suite) which have A-type granite geochemical characteristics, and were interpreted to have been generated in a late tectonic, extensional setting. Three samples from the suite gave identical ages of ca. 1075 Ma. The NSP was extensively re-worked during the major (D2: Pan-African) collision orogen in Late Neoproterozoic to Cambrian times, when the major regional fabrics were imposed upon the Mesoproterozoic rocks under amphibolite grade metamorphic conditions. In the dated samples, this major orogenic event is represented by metamorphic zircon rims and lower intercept ages of ca 550 to 500 Ma.

The Nampula Subprovince probably made up the NE part of a major Mesoproterozoic mobile belt which was accreted to the old cratonic nucleus of the Kalahari craton (combined Archaean Kaapvaal-Zimbabwe-Grüneghna cratons and various Palaeoproterozoic blocks). This mobile belt, fragmented by Gondwana break-up, consisted of (from west to east) the Namaqua-Natal belt (South Africa), the Falkland microplate, the Haag Nunatak block (West Antarctica) and the Maudheim (East Antarctica) (Jacobs et al., 2008). The belt, with a restored length of over 3000 km is a major part of a worldwide in a system of "Grenvillian" orogens associated with the amalgamation of the supercontinent of Rodinia (e.g. Li et al., 2008).

Jacobs, J, Pizarevsky, S, Thomas, R.J., Becker, T. 2008. *Precambrian Research* 160, 142-158.

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