

MOZAMBIQUE BELT IN THE MILANGE-MOCUBA-MALEMA AREA, MOÇAMBIQUE

Thomas, R.J.¹, Bauer, W.², Bingen, B.², de Azevedo, S.³, de Sousa Soares, H.³, Hollick, L.¹, Feitio, P.³, Fumo, C.³, Gonzalez, E.¹, Jacobs, J.¹, Manhica, V.³, Manuel, S.³, Motuza, G.², Tembe, D.³, Uachave, B.³ and Viola, G.²

¹ British Geological Survey (BGS), Keyworth, Nottingham, NG12 5GG, UK (bthomas@bgs.ac.uk)

² Geological Survey of Norway (NGU), Trondheim, Norway

³ Direcção Nacional Geologica, Moçambique, Maputo, Quelimane, Nampula and Lichinga (DNG)

Keywords: Moçambique, tectonostratigraphy, Mesoproterozoic, Neoproterozoic

Introduction

This work forms part of the Nordic Development Fund-World Bank program to produce 1: 250 000 scale geological maps of the whole of Moçambique. It forms a single (World Bank funded) project area known as the "Lot 1 Extension" within the program. The area lies between the Lot 1 project to the north (contractors: NGU-Norconsult and BGS) and Lot 2/CGS area to the south (contractors: GTK-Gondwana and CGS). It comprises 6 degree square sheets and part-sheets bordering Malawi, and has an area *in toto* of about 5 degree squares (50 000 km²). The mapping contract contains a series of stipulations with regards to number of observation points, samples, thin sections, geochemical analyses, age-dates, mineral occurrences etc required. Further requirements included construction of a lithostratigraphic legend and geotectonic model with reference to the whole country and involving all contractors. This project integration took place during a number of multi-lateral and bi-lateral meetings and workshops, usually with representatives of DNG and the appointed overseeing Consulting Engineers present. The aim of this abstract is to highlight the geological findings of the project within the context of the East African Orogen in northern Moçambique.

Tectonostratigraphy

The area includes parts of the Unango, Marrupa, Nampula, Ocuca and Xixano Complexes, a collage of tectonically-bounded, Mesoproterozoic terranes which were accreted and juxtaposed during the polyphase Neoproterozoic to Cambrian "Pan-African" collision event. It includes the critical region where the "Lurio belt" structure forms the northern boundary of the Nampula Complex with the complexes of N. Moçambique and the area where the Lurio belt shows a marked lateral change in character. The following tectonostratigraphic complexes are recognised (Fig. 1).

Nampula Complex: The SE part of the area is occupied by the Nampula Complex, the structurally lowest of the Mesoproterozoic terranes and probably the crustal block with the least pervasive Pan-African overprint. It comprises amphibolite-grade supracrustal gneisses (Alto Molocue Group) and various suites of intrusive orthogneisses (mainly migmatitic augen gneisses and granitic leucogneisses);

Unango Complex: The Unango Complex lies NW of the Nampula Complex in the western part of the area. It is composed of high-grade supracrustal gneisses intruded by orthogneisses dominated by massive charnockite. The tectonic contact with the Nampula Complex is marked by a series of deformed mafic-ultramafic pods and lenses;

Marrupa Complex: The Marrupa Complex lies north of the Nampula Complex, juxtaposed along the Lurio belt. It is composed of rocks of similar character to the Nampula Complex;

Xixano Complex: The presence of rocks of the Xixano Complex was only ascertained from a study of new high-resolution geophysical data, where it occurs as two isolated klippe of granulites and paragneisses overlying the Marrupa Complex in the northern part of the area. It is recognised by its highly distinctive radiometric signature

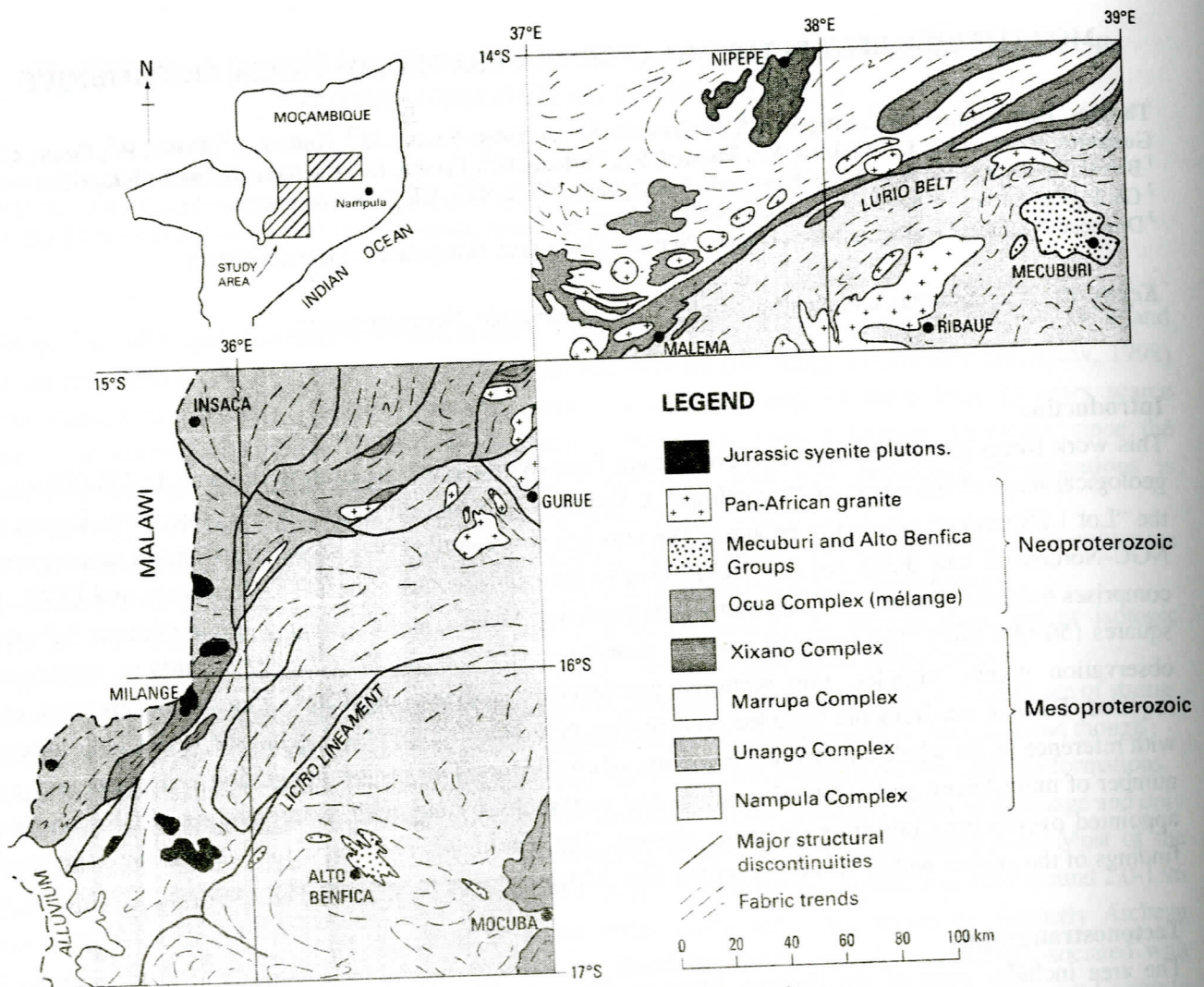


Figure 1. Sketch geological map of the study area.

Ocuca Complex: The newly-named Ocuca Complex is applied to highly dismembered granulite gneisses that occur as pods and lenses broadly within the Lurio Belt. The term has been introduced to dispel any confusion caused by previous usage of "Lurio" (e.g Lurio Supergroup) as both a lithostratigraphic and a tectono-metamorphic term. The Ocuca Complex occurs as a *mélange* of mafic, intermediate and felsic granulites which are spatially associated, but not exclusively enclosed, within the Lurio Belt. The southern margin of the Ocuca Complex is marked by a semi-continuous belt of white-weathering mylonitic leucogneiss with characteristic quartz-ribbon texture. The Ocuca Complex is somewhat different from the other units described above, in that it is made up of a tectonic *mélange* with unknown or mixed protolith ages which were emplaced during the Pan-African event.

Alto Benfica and Mecuburi Groups: The Nampula Complex is overlain by two sequences of sillimanite-grade paragneisses and schists. The Alto Benfica Group is a series of quartzites, quartzofeldspathic gneisses and sillimanite-nodule pseudoconglomerates that crop out in complexly-deformed, isoclinal, synformal "keels" within the Nampula Complex in the Alto Benfica area. Provisional U-Pb SHRIMP dating of detrital zircons suggests a Neoproterozoic depositional age for the rocks. The Mecuburi Group occupies a large tract of ground around Mecuburi. It comprises a series of "clastic" quartzofeldspathic gneisses and highly-deformed large boulder conglomerate-gneisses. The latter contain large clasts of locally-derived Nampula Complex granitic gneisses and the sequence is considered to unconformably overlie the Nampula Complex, but to have undergone the full Pan-African metamorphic and deformational history.

Younger rocks

Two suites of Pan African granites are recognised. Syntectonic granite gneiss sheets and late- to post-tectonic plutons, dykes, sheets and small bodies of mainly granite (Murrupula Suite) and sub-circular to elliptical ring complexes spatially associated with the western, less intense, part of the Lurio belt (Malema Suite).

Along the western part of the area, several large plutons and associated dyke swarms of Jurassic syenite and nepheline syenite are associated with the southern part of the East African Rift.

Conclusions

The area under review is underlain by a complex collage of mainly Mesoproterozoic complexes which were accreted during the Pan-African orogeny. It includes much of the enigmatic Lurio Belt which forms the contact between the Marrupa and Nampula Complexes in the east. The latter is unconformably overlain by a sequence of meta-sedimentary rocks which were probably deposited in syntectonic transtensional (?) basins during the Neoproterozoic, but underwent intense Pan-African deformation and high-grade metamorphism. The environs of the western Lurio Belt acted as the locus for extensive syn- to post-tectonic, Cambrian-age plutonism.

Acknowledgement - This work formed part of the Mineral Resources Management Capacity Building Project, Ministry of Mineral Resources of Mozambique, funded by the World Bank and implemented by a team from BGS, NGU and DN. The Directors these organisations gave permission to publish this abstract.