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Granulite facies metamorphism in the Pare and Usambara Mountains, NE-Tanzania

S. Oberwalder (1), C.A. Hauzenberger (1), G. Hoinkes (1), V. Tenczer (1), H. Fritz (1), C.K. Makene (2), S. Muhongo (3)

(1) Institute of Earth Sciences, Universitätsplatz 2, 8010 Graz, Austria, (2) Geological Survey of Tanzania, Dodoma, Tanzania, (3) International Council for Science (ICSU), Pretoria, South-Africa (E-mail: stefan.oberwalder@stud.uni-graz.at)

The Pare and Usambara mountains are located in North-eastern Tanzania and are part of the north south trending Mozambique Belt. The Mozambique Belt on his part belongs to the East African Orogen, which ranges from the Sinai Peninsula to Antarctica. The main metamorphic overprint in the investigated area took place between 650 and 630 Ma, where Azania (parts of Madagascar, Ethiopia, Somalia and Arabia) and the Congo/Tanzania/Bangweulu Block (Angola Kasai Craton, Tanzania Craton and Bangweulu Block) collided (MÖLLER et al., 2001, COLLINS & PISAREVSKY, 2005). The Pare and Usambara mountains can be subdivided into 3 mountain ranges: (1) the Northern Pare Mountains which are characterized by east dipping foliation planes and north - south directed faults, (2) the Southern Pare mountains which are also characterized by east dipping foliation planes and northwest - southeast directed faults and (3) the Usambara mountains which show east dipping foliation planes and north - south and northwest - southeast directed faults. The most common rock types in these areas are Grt-Px+/-Amph granulites, migmatites, amphibolites, gneisses, as well as rare occurrences of Grt-Bt-metapelites, meta-ultrabasites, quarzites, calcsilicates, pegmatites and meta-anorthosites. Petrographic observations indicate a two-phase garnet growth in granulites as well as in metapelites. In a metapelitic sample the two stage garnet growth is seen by an inclusion poor core, followed by a concentric sillimanite-rich zone and again an inclusion poor rim. In Grt-Px bearing granulites the two stage garnet growth is indicated by inclusion poor cores and inclusion rich rims. Although the petrographical observations clearly show the two-phase nature of garnet, garnet core and rim compositions in major elements are similar as a result of the fast diffu-

sion rates of elements at granulite facies conditions. By contrast trace elements and REE show a distinct zonation. P/T calculations using granulites and metapelites of the Pare- and Usambara Mountains indicate peak temperatures around 820+/-30°C and pressures of c. 10+/-1kbar. From other studies in the Pare and Usambara mountains (MÖLLER et al., 2001) and Taita Hills (HAUZENBERGER et al., 2005) a slow, near isobaric cooling period could be determined. The prograde path is still debated but most likely not the result from a magmatic assisted geodynamic setting. The financial support by FWF Project 15599 and a scholarship to O.S. by the Natural Science Faculty, University Graz are gratefully acknowledged.

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