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Constraints on the Nature and Delineation of the Highland Complex/Wanni Complex Boundary, Sri Lanka.

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Isotopic data have revealed that the granulite facies sequence of Sri Lanka is composed of two different crustal domains, the Wanni Complex (WC) in the NW and the Highland Complex (HC) in the S and SE. The role of the lithologically distinct Kadugannawa Complex in between either as a separate unit or belonging to the Wanni Complex is still unresolved. In spite of a growing number of isotopic ages, especially zircon ages, which confirm the differences in the crustal evolution of the HC and the WC, the nature and position of the boundary is still badly defined, especially in the SW where in all recent publications the suspected terrane border is normal to the general trend of the foliations and cross-cuts individual lithological horizons. As both the Wanni and Highland Complexes show similar HT-metamorphic conditions and a continuous structural evolution, it is supposed, that the contact formed prior to or early during the Pan-African high-grade metamorphism.

If the Kadugannawa Complex is, at the moment, regarded as part of the Wanni Complex (Kehelpannala, 1991, 1997), the area where the boundary is most tightly constraint is the eastern and southeastern surrounding of the Digana and Hulu Ganga Synform (the two most easterly synforms in the central part of Sri Lanka around Kandy). In this region, the boundary must be situated between the basic intrusive complex filling the synforms and one of the old granites (Digana Granite, 1.9 Ga (Baur et al., 1991).

A high strain zone is found in the central part between the upper and the lower bound and can be traced around the SE part of the synforms and more than 30 km to the north (Digana Movement zone, Kleinschrodt et al., 1991, Kleinschrodt and Voll, 1994, Kehelpannala, 1991, 2003). Because it is the most prominent structure in this area, which could be regarded as a major tectonic boundary it was speculated, that this horizon is the shear contact between both units (e.g. Kehelpannala, 1991, 1997, 2003). Yet, this shear zone is a post-peak metamorphic feature, active under already decreasing temperatures as can be proven by recrystallized feldspars, which recrystallized along the feldspar solvus with lower T compositions (Voll et al., 1994). There are no indications that this zone was active already through the beginning or even prior to granulite facies metamorphism.

Another possible location is the contact between the metapelitic sequence and the overlying pink feldspar granite, a late Pan-African (Hölzl et al., 1994), in parts anatectic looking granitic rock situated between the metapelites and the basic intrusive complex. This granitic injection could hide a former tectonic contact between both units.

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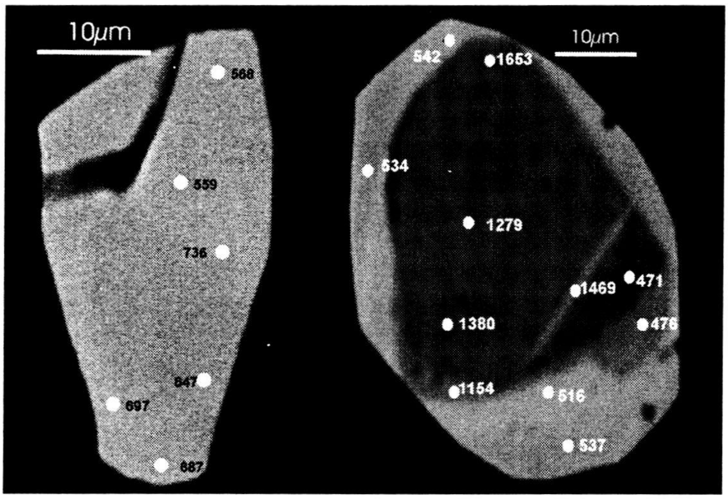
Kehelpannala (1991) proposed a further possible location for the WC/HC boundary above the uppermost marble. This is already close to the high strain zone, but could reflect an earlier event, where most of the deformation is accommodated by the marble horizon. Recrystallization and strong grain growth during high temperature metamorphism could theoretically obscure such strong deformation. Much more difficult is the delineation of the boundary from Gampola to the SW up to the coast. Recently, Kehelpannala (2003) proposed the possible extension of the boundary in the SW. It is supposed that the boundary follows a horizon within the stratified lithological sequence, i.e. due to the intense large-scale folding in this region it probably will have a very complicated trend.

As age data are, at present, the only possibility to delineate the boundary, we applied the EPMA-monazite dating method (e.g. Montel, 1996) to Sri Lankan metapelites. To evaluate whether the method is useful to discriminate between Wanni and Highland Complex rocks, we analysed a set of samples along a profile from Wanni Complex to the E into the Highland Complex and further to the SE to Kataragama (samples in part provided by V. Schenk).



A **B**

Figure 1. (A) BSE-picture of unzoned monazite from the central Wanni Complex, with typical pre-Pan-African age distribution. (B) BSE-picture of zoned monazite with an older core from the Highland Complex.

Preliminary results are promising. The monazite populations of samples from both regions are quite heterogeneous. BSE-pictures of monazites show highly variable microstructures (homogeneous, zonal or complex structured). Most of the different zones visible in BSE-pictures of most of the monazite grains yield Pan-African ages between 500 Ma and 600 Ma, but also slightly older grains or grain parts were found (Fig.1A). But no ages older than 900 Ma have been found in monazite from the Wanni Complex so far. On the other hand, in the Highland Complex samples analysed up to now monazites with zones or sectors with ages older than 1 Ga are common. A typical, zoned example is given in Figure 1B.

At our present state of knowledge, it seems that the EPMA monazite dating method seems to provide a fast and cheap tool, by which a large number of samples can be assigned to the Wanni Complex or the Highland Complex, which will allow to delineate the boundary more precisely.

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