**Impact-Related Pseudotachylitic Breccias in the Schurwedraai and Baviaan-Krantz Alkali Granite Complex of the Vredefort Dome, South Africa.**

Crasselt, Claudia[1] Reimold, Wolf Uwe[1]
[1]Museum of Natural History, Humboldt University Berlin, Mineralogy, Invalidenstr. 42/43, 10115 Berlin, Germany

The aim of this project is to contribute to the understanding of the formation of pseudotachylitic bodies in large impact structures by macro- to microscopic structural, petrographic and geochemical analysis of pseudotachylitic breccias and host rock of the Schurwedraai and Baviaan-Krantz Alkali Granite Complex. This complex is one of five ultramafic-mafic and felsic intrusions in the Late Archean to Paleoproterozoic, subvertical to overturned supracrustal collar rocks of the Vredefort Dome. The pluton intruded into the lower Witwatersrand Supergroup at ˜ 2.05 Ga ago (Graham et al. 2005). Pre-impact lithological heterogeneities are absent in the complex, and pre-impact textural and structural features are scarce in contrast to the Archean granitic gneiss of the core of the dome and the metasedimentary collar strata. For the pre-impact metamorphism of the alkali granite a temperature of 300-400°C is estimated (Gibson et al. 1995). The alkali granite is whitish to reddish, homogeneous, and massive, with hypideomorph minerals, mostly of medium to fine grain size. It consists of quartz, K-feldspar, albite, potassic amphibole, potassic pyroxene, and minor biotite. Veins of aplitic and pegmatitic nepheline syenite, quartz, K-feldspar with hornblende and aegerine are common. Pseudotachylitic breccia occurrence is widespread. These breccias occur typically as single veins or dykes from a few millimeters to about 1.5 m wide, or as networks up to 6 m wide. Clasts in pseudotachylitic veins are overwhelmingly composed of alkali granite. At some contacts of veins to host rock quench zones are apparent. First microscopic analysis shows that the matrix of the pseudotachylitic veins is devitrified and composed of quartz, feldspar and amphibole. SEM and electron microprobe studies are underway to determine feldspar and amphibole compositions. Clasts in pseudotachylitic breccia comprise quartz, K-feldspar and plagioclase, with feldspar grains more extensively melted and showing stronger recrystallization than quartz grains. Rounding of clasts seems to be related to thermal abrasion. Matrices of marginal quench zones appear compositionally similar to vein interiors. Clasts within these margins are relatively more strongly recrystallized. Some host rock grains show shock effects. Strongly fractured and mechanically twinned amphibole is noted. In a few quartz and feldspar grains PDFs, mostly one set but occasionally two sets, are observed. Most PDFs are decorated; planar fluid inclusion trails in quartz and feldspar are commonly observed. These observations indicate a regional shock pressure of about 10 GPa and local attainment of shock pressures of 15-20 GPa (calibrated for cold targets - Stöffler et al. 2007). Further petrographic analysis is in progress, and so is chemical analysis of pseudotachylitic breccia vein and host rock pairs. Results will be presented at the conference.

References:

Gibson R.L, Wallmach T (1995) Low pressure-high temperature metamorphism in the Vredefort Dome, South Africa: anticlockwise pressure-temperature path followed by rapid decompression. Geol. J 30:319-331.

Graham I.T, De Waal S.A, Armstrong R.A (2005) New U–Pb SHRIMP zircon age for the Schurwedraai alkali granite: Implications for pre-impact development of the Vredefort Dome and extent of Bushveld magmatism, South Africa. JAES 43:537-548.

Stöffler D, Grieve R.A.F (2007) Impactites. http://www.bgs.ac.uk/SCMR/docs/papers/paper_11.pdf

→

Abs. No. **291**
Meeting: **DMG 2008**
submitted by: **Crasselt, Claudia**
email: **claudia.crasselt@museum.hu-berlin.de**
date: **2008-06-02**
Req. presentation: **Vortrag**
Req. session: **S03**