Geophysical Research Abstracts
Vol. 14, EGU2012-10347-1, 2012
EGU General Assembly 2012

First evidence of UHP metamorphism within the Seve Nappe Complex of central Sweden

J. Majka (1), M. Janák (2), D.G. Gee (1), H.L.M. Van Roermund (3), and J. Verbaas (3)

(1) Uppsala University, Uppsala, Sweden (jaroslaw.majka@geo.uu.se), (2) Slovak Academy of Sciences, Bratislava, Slovakia, (3) Utrecht University, Utrecht, Netherlands

The first evidence of UHP metamorphism in the Seve Nappe Complex of northern Jämtland, central Swedish Caledonides, was discovered in 2010 (Majka & Janák 2011). The UHP parageneses occur within a kyanite-bearing eclogite, forming part of a metabasic dyke that truncates an orogenic garnet peridotite body. This kyanite-eclogite provides key information about the peak UHP metamorphic conditions and subsequent granulite facies overprint. The garnet peridotite body is located close to lake Friningen, northeast of the town Gäddede. The metabasic dyke consists predominantly of a bi-mineralic garnet pyroxenite (Cpx=diopside); however this dominant composition locally "grades" into that of the kyanite-eclogite described here.

The kyanite-eclogite is composed of coarse grained garnet and omphacite, with minor kyanite. Garnet occurs in three varieties: large (< 1 cm), small (< 100 μm) and tiny lamellae within omphacite. In terms of chemistry the three garnet varieties reveal similar compositions (XPrp = 0.40-0.44, XGrs = 0.25-0.29, XAlm = 0.29-0.33; XSps = 0.01). Large garnets commonly contain inclusions of omphacite, kyanite, zoisite, rutile, quartz, amphibole and rare phengite. Omphacite (25% of Jd and 2.6% of Ca-Eskola components) exhibits rods of SiO_2 and kyanite, which are crystallographically oriented and are interpreted as exsolutions.

A set of retrogressive microtextures is represented by symplectites of diopside + plagioclase (after omphacite), sapphirine+spinel+corundum (after kyanite) and, together with orthopyroxene and diopside, defining lower pressure granulite facies assemblages. The calculated peak P-T metamorphic conditions, obtained from Grt-Omp-Ky-Phn geothermobarometry and confirmed by pseudosection modelling, are 2.9-3.5 GPa and 720-822 ºC, clearly falling inside the coesite stability field. The retrograde granulite facies overprint occurred at 0.8-1.0 GPa and 750-850 ºC, constrained by pseudosection. Brueckner & Van Roermund (2007) reported a Sm-Nd mineral age of c. 453Ma for the garnet pyroxenite occurring in the same dyke as kyanite eclogite in the Friningen garnet peridotite body. This age may therefore constrain the timing of the Ordovician UHP metamorphism in the Seve Nappe Complex of northern Jämtland recorded by the kyanite eclogite, which is significantly older than the Scandian UHPM known in the hinterland of the Scandinavian Caledonides (WGR).

Brueckner H.K. & Van Roermund H.L.M. 2007. Journal of the Geological Society, London, 164, 117-128.
Majka & Janák 2011. IXth International Eclogite Conference.