

## **A zircon study from the Rhodope Metamorphic Complex, N-Greece: Age constraints for the UHP event**

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We present a zircon study from the Kimi Complex of the northern Rhodope Metamorphic Province, which is considered to be an ultrahigh-pressure (UHP) unit (Perraki et al., 2005). Zircons from diamond-bearing metapelites and from an unretrogressed eclogite were separated and investigated by Micro Raman Spectroscopy, SEM, SHRIMP and LA-ICPMS to obtain information about inclusion mineralogy, ages and trace element contents of the zircons. In addition, investigations of the hosts were carried out to link the metamorphic history of the host rocks with the ages of the zircon growth domains.

The metapelitic host rock is formed by a palaeosome consisting of garnet, mica and kyanite, and a quartz and plagioclase bearing leucosome, formed at granulite-facies metamorphic conditions. In these garnets, micro-diamond inclusions are described by Perraki et al. (2005). Hence, the palaeosome is assumed to have experienced UHP conditions. Despite the expectation that zircons from UHP rocks contain characteristic indicators of these extreme conditions, it was not possible to find typical (U)HP mineral inclusions in the zircons separated from the diamondiferous metapelite. Numerous inclusions of melt, kyanite and high-Ti biotite as well as the absence of any (U)HP mineral in metamorphic zircon domains suggest that zircon formation occurred during this pervasive granulite-facies metamorphism, which was already proposed for this region (Mposkos 2002). This inclusion-rich metamorphic zircon domain show ages of  $172 \pm 4$  Ma, indicating that the high-temperature metamorphic overprint occurred at that time. Hence, UHP must have occurred before 172 Ma.

Zircons separated from eclogite contain HP inclusions, which are indicative for eclogite facies metamorphism as well as the subsequent retrograde overprint. The eclogitic host shows matrix omphacites with  $X_{Jd40}$  and subordinately a retrogressed paragenesis of omphacite with  $X_{Jd>17}$ , plagioclase, biotite and pargasitic amphibole. This retrogressed paragenesis occurs as inclusions in garnet and in two metamorphic zircon domains. These domains yield ages of  $143 \pm 5$  Ma and  $127 \pm 8$  Ma, respectively. Another metamorphic zircon domain yields  $79 \pm 3$  Ma and indicates amphibolite facies metamorphic overprint. These ages are restricted to the eclogite and are not preserved in any metapelitic zircon. They correspond to zircon ages from a mafic rock, presented in a previous work (Liati et al., 2002).

The different ages of the two investigated samples suggest the presence of two tectonic slices showing a different exhumation history within the Kimi Complex. A mutual exhumation occurred earliest from  $79 \pm 3$  Ma (this study) and latest from  $62 \pm 2$  Ma (Liati et al., 2002).

Liati et al., 2002: Chem Geol 184, 281 - 299.

Mposkos 2002: Bull Geol Soc Greece, 34/6: 2169 - 2188

Perraki et al. (2005): EPSL 241, 672-685.