

**PRE-ALPINE AND ALPINE METAMORPHISM IN THE ADULA NAPPE,
CENTRAL ALPS: CONSTRAINTS BY SHRIMP-DATING AND REE OF ZIRCON**

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The Adula nappe (AN), including the Cima Lunga unit to the W and the Gruf Complex to the E is the structurally deepest and largest basement nappe in the eastern part of the Central Alps. It consists mainly of pre-Mesozoic orthogneisses, pelitic schists and minor metabasic / ultrabasic rocks, as well as metamorphosed Mesozoic marls, limestones, dolomites and sandstones. It contains HP relics (blueschist- to eclogite-facies). The northern part of the AN shows lower metamorphic grade, compared to the middle and southern parts.

We dated by SHRIMP II (ANU, Canberra and GSC, Ottawa) zircons from two eclogites and two country rock paragneisses, as well as from a quartz vein concordant to the schistosity of one paragneiss from the middle AN, area of Trescolmen, situated in the so-called 'Lepontine area'. Zircon cores from the paragneisses yielded dates older than ca. 500 Ma (most between 500 - 650 Ma). The metamorphic rims yielded both pre-Alpine ages (378 ± 11 Ma and 372 ± 4 Ma; error at 95% c.l.) and Alpine ages (32.8 ± 0.6 Ma and 32.7 ± 1.4 Ma), as well as various amounts of Alpine Pb-loss. The eclogite zircons are strongly recrystallized and consist almost entirely of a metamorphic domain with rare relics of magmatic cores. Metamorphic domains yielded ages of 371 ± 8 Ma and 33.2 ± 1.1 Ma and Alpine Pb-loss. Three magmatic cores yielded analytically concordant ages of 655 ± 12 Ma, 610 ± 10 Ma and 561 ± 22 Ma (1σ). REE analyses (SHRIMP II, ANU, Canberra) of a 371 ± 8 Ma old metamorphic zircon rim of the eclogite show no Eu anomaly in the chondrite-normalised REE pattern, thus indicating that it formed in the absence of plagioclase (which would cause a negative Eu anomaly) at HP conditions.

The Alpine ages obtained for the HP rocks of Trescolmen are identical with the ca. 33 Ma granulite-facies ages reported for the middle AN (Cima Lunga: Alpe Arami and Cima di Gagnone; GEBAUER, 1994, 1996 and Gruf Complex; LIATI & GEBAUER, 2003). The ca. 35 Ma HP age recorded at Alpe Arami and Cima di Gagnone (GEBAUER, 1994, 1996) was not identified in the HP rocks of Trescolmen. HP metamorphism in this part of the AN is probably connected with a pre-Alpine, ca. 375 Ma old event known also in other parts of Europe (e.g., Münchberg Gneiss Massif, NE Bavaria or Cabo Ortegal, NW Spain). An additional ca. 35 Ma old HP metamorphism completely reset due to the ca. 33 Ma Lepontine metamorphism, although unlikely, cannot be excluded. Given the Alpine HP age of metamorphism in its N' and S' part, it is evident that the AN consists of different tectonic slices with different evolution in time. Pre-Alpine HP rocks constitute part of the AN basement, as is the case for the basement of other areas of Europe.

References

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