

**CAMBRIAN MIGMATISATION AND ORDOVICIAN TONALITIC INTRUSION –  
KLOPAIER AREA, ÖTZTAL CRYSTALLINE COMPLEX, EASTERN ALPS**

by

**E. Klötzli-Chowanetz<sup>1</sup>, U. Klötzli<sup>2</sup> & T. Skiöld<sup>3</sup>**

<sup>1</sup>Institut für Petrologie  
Geozentrum, Universität Wien, Althanstrasse 14, A-1090 Wien

<sup>2</sup>Institut für Geologie  
Geozentrum, Universität Wien, Althanstrasse 14, A-1090 Wien

<sup>3</sup>Swedish Museum of Natural History  
Box 50007, SE-104 05 Stockholm

Elongated enclaves of anatectic paragneisses can be seen in a tonalite near the Klopaier Spitze in the SW part of the polymetamorphic Ötztal crystalline complex (Eastern Alps, Austria). In an attempt to decide whether or not anatexis and tonalite intrusion are contemporaneous, single zircon Pb-Pb evaporation and ion microprobe (Cameca 1270) U-Th-Pb dating have been carried out on both the Klopaier tonalite and the Klopaier migmatite.

Evaporation data of magmatic type zircons (typological subgroups S 23 – S 25) from the tonalite yield a mean plateau-age of  $487 \pm 16$  Ma. In contrast, different types of zircon populations extracted from the Klopaier migmatite suggest three or four zircon growth events, the first around 640 - 630 Ma, the second and possibly third within the Cambrian. In this case evaporation data alone did not resolve the number of events. An Ordovician event at around 490 Ma is commonly encountered within the region, but surprisingly enough this age figure is not depicted among the migmatite zircons. The youngest record in the evaporation results hint to a Late Ordovician – Early Silurian overprint.

The ion microprobe analyses from the migmatite document three events of zircon growth, namely at  $585 \pm 8$  Ma,  $531 \pm 11$  Ma, and  $430 \pm 6$  Ma. These sets of data were obtained from long prismatic zircons. Spheroidal zircons which are thought to have grown exclusively during the anatexis [1, 2] fall in the 531 Ma age group.

The comparison of zircon populations from the migmatite and the tonalite demonstrates a wall-rock assimilation of the anatectic metasediments by the tonalite, field relations give also evidence for stoping. This implies an anatectic event preceding the tonalitic intrusion which is in agreement with the older age result of  $531 \pm 11$  Ma for the spheroidal zircons from the migmatite, whereas the magmatic zircons of the tonalite give a younger, namely Ordovician intrusion ages of  $487 \pm 16$  Ma.

On a regional scale, i.e. throughout the Ötztal and the Silvretta crystalline complexes the high temperature event at  $531 \pm 11$  Ma encountered in the Klopaier migmatite appears to correspond to the Late Cambrian formation of granitoids such as the Mönchalpgneiss [3 and references therein]. The age of 487 Ma of the tonalite intrusion fits well into the model of an extended acidic magmatic activity in the Ordovician. Similarly, the age of  $430 \pm 6$  Ma can be compared with orthogneisses in the southernmost Kaunertal dated at  $435 \pm 8$  Ma [4] and crosscutting granites in the Winnebach area (central Ötztal) dated at  $444 \pm 4$  Ma [5]. These combined evidences of detailed age dating support the presence of another widespread acidic magmatic event in Early Silurian time.

### Literature

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