down to about 245 Ma points to elevated temperatures up to the end of the Permian. This is also supported by the U/Pb titanite age and Ar-Ar amphibole ages; the latter confirming cooling below ca. 550 °C between 260 and 245 Ma.

(4) Cooling below 300 °C (biotite ages) occurred in the Middle Triassic.

(5) K-feldspar Ar-Ar ages indicate cooling below ca. 250 °C in mid-Jurassic time and probably some reheating in the Cretaceous.

CLIFF, R., HOLZER, H. & REX, D. (1975): The age of the Eisenkappel granite, Carinthia and the history of the Periadriatic lineament. - Verh. Geol. B.-A., **1975**: 347-350.

SCHARBERT, S. (1975): Radiometrische Altersdaten von Intrusivgesteinen im Raum Eisenkappel (Karawanken, Kärnten). - Verh. Geol. B.-A., **1975**: 301-304.

VISONA, D. & ZANFERRARI, A. (2000): Some constraints on geochemical features in the Triassic mantle of the easternmost Austroalpine-Southalpine domain: evidence from the Karawanken pluton (Carinthia, Austria). - Int. J. Earth Sci., **89**: 40-51.

Ar-Ar ages of detrial mica from rivers draining the Qilian Shan on the NW margin of the Qaidam basin

GENSER, J.[1], LIU, Y.[2], NEUBAUER, F.[1] & REN, S.[3]

[1] FB Geography and Geology, University Salzburg, Salzburg, Austria;
[2] College of Earth Sciences, Jilin University, Changchun, China;
[3] Strategic Research Center of Oil & Gas Resources, MLR of P.R. China, Beijing, China

Our study of Ar-Ar ages of detrital white mica from Eocene to Pliocene successions of the Qaidam basin shows almost exclusively ages with 250±3 and 279±3 Ma in the northeastern part of the basin (RIESER et al. 2006), in contrast to a dominance of mainly early Palaeozoic ages in its western part. As no nearby source of these Indosinian ages is known so far, we dated mica from rivers draining the Qilian Shan between Delingha in the SE to Dachaidan in the NW in order to assess the Qilian Shan as a possible source. All sample locations are northeast of the early Palaeozoic UHP-belt running along the basin margin. Direct access to the Qilian Shan for collecting samples is very restricted and no Ar-Ar ages from this mountain range are published until now. Confirmation or rejection of an Indosinian belt in the Qilian Shan would have implications for both the geodynamic evolution of the area and filling models of the Qaidam basin.

We dated white mica (175 grains) and biotite (45 grains) from six rivers that drain the mountain ranges south of the drainage divide to the Danghe and the Qinghai Hu. Pooling all white mica ages gave minimum and maximum ages of ca. 175 Ma and ca. 1300 Ma, respectively. There are 3 significant groups in the age distribution with median ages of 190 Ma, 255 Ma and 425 Ma, with a minor peak at about 380 Ma. Their proportions are ca. 15 %, 30 % and 45 %, respectively. The rivers show marked differences in their age distributions. 2 samples from the Ar Gol at Delingha, which drains the eastern part of the range, show 2 groups with ages of 250 and 430 Ma. The Hiagtin Gol, which drains the middle part of the range, displays the same age groups, but their medians are shifted to somewhat younger ages. There are also a number of ages between 300 and 400 Ma, though they display no distinct peak. The rivers at and north of Dacaidan show extremely different age distributions: The Iqe river, which drains a large portion of the northern range, display only one age group with 425 Ma, two small catchments to the south and to the north of the Iqe river gave each one age group too, but with median ages of 190 Ma and 255 Ma, respectively.

These white mica ages indicate two main thermo-tectonic events in the Qilian Shan, a Silurian and a Permo-Triassic event. The significance of the early Jurassic ages needs further investigations, as these ages are from a very small area only and the type of source rocks is unknown so far (metamorphic or magmatic). The Silurian („Caledonian“) age group is well known from the area (Qinling, Qilian, Altyn) and related to an orogenic cycle from subduction to continental collision. Indosinian ages are obviously substantial, as they make up a considerable part of the age population and occur in rivers draining a major part of the range. Therefore we propose an Indosinian orogenic belt running within the southern Qilian Shan.

Regarding filling models of the Qaidam basin, the occurrence of Indosinian ages in the Qilian Shan allows a local derivation of the sediments in the eastern part of the basin. A big difficulty for a provenance solely from the Qilian Shan are the missing Caledonian ages in the whole Tertiary sedimentary sequence in the eastern part of the basin.

RIESER, A.B., LIU, Y., GENSER, J., NEUBAUER, F., HANDLER, R. & GE, X.H. (2006): Uniform Permian $^{40}Ar/^{39}Ar$ detrital mica ages in the eastern Qaidam Basin (NW China): where is the source? - Terra Nova, **18**: 79-87.

Changes in ostracod assemblages during the onset of Lake Pannon (Styrian Basin)

GITTER, F.[1], GROSS, M.[1] & PILLER, W.E.[2]

[1] Department for Geology & Palaeontology, Universalmuseum Joanneum, Graz, Austria;
[2] Institute of Earth Sciences, University of Graz, Austria

The clay pit Mataschen (near Fehring/Styria) gives an exceptional insight to the onset of Lake Pannon during the Early Late Miocene. Due to the uplift of the Carpathian mountain range, the Central Paratethys became restricted to the Pannonian Basin. Within the Pannonian Basin a vast brackish to successively freshening waterbody - known as Lake Pannon - was established.

An extensive multidisciplinary research campaign in 2004 led to a very detailed picture of the evolution of the section at Mataschen. The c. 30 m thick section represents a complete transgressive-regressive cycle bearing insects, molluscs and vertebrates as well as plant fossils like leafs, fruits and in situ tree trunks. The supposed time frame for the sedimentation of the succession is about 30 ky.

For micropalaeontological analyses six 50 cm long drill cores - each 10 cm in diameter - were taken at the basal part of the outcrop using a percussion drill. To gain information on palynomorphs as well as on ostracods each core was split in two equivalent parts. The cores were cut into 5 mm thick samples (= 20 cm³ sediment). After washing and sieving the >250 µm fraction were picked out totally for ostracods. This enabled us to reconstruct short-term shifts in faunal composition.

Here, we present data on shifting ostracod associations throughout a c. 2.5 m thick profile covered by the cores. The ostracod fauna is dominated by the genera *Cyprideis*, *Loxoconcha*, *Hemicytheria* and the family of the *Candonidae*. The latter ones are mainly represented by *Fabaeformiscandona*, *Caspiolla, Lineocypris* and *Typhlocypris*. Furthermore, rare occurrences of *Amplocypris*, *Herpetocypris*, *Herpetocyprella*, *Xestoleberis* and *Leptocytheridae* are recognised.

At the basal part of our record ostracod valves are scarce (maximum ~25 valves per sample). In this part *Hemicytheria* and *Candonidae* are more frequent than *Loxoconcha* and *Cyprideis*. Around 30 cm up-section the association is dominated by *Loxoconcha* representing 40-70 % of the ostracod fauna. Shortly after first peaks of *Loxo-concha*, *Cyprideis* starts to increase slowly. This increase results in maxima of over 200 *Cyprideis*-valves per sample, which represent constantly 55-80 % of the total ostracod assemblage. Afterwards, at around 1.5 m a general decrease in ostracod abundance and a slow shift to a fauna dominated by *Candonidae* is observed.

Therefore, the faunal composition of ostracods clearly shows a brackish transgression leading to stable conditions as indicated by the high abundances of *Cyprideis* and *Loxoconcha*. Subsequently, *Cyprideis* and *Loxoconcha* show a general decrease in abundances whereas *Candonidae* start to increase slowly. Thus, a freshening of the waterbody or a slight increase of fluvial influence is supposed.

This work is supported by the Austrian Science Fund (P21748-N21).

Bemerkungen zur Geochemie, Genese und Altersstellung von Turmaliniten aus der Grobgneisserie

Göd, R.[1], Heiss, G.[2] & Koller, F.[1]

[1] Faculty of Earth Sciences, Geography and Astronomy, Department of Lithospheric Research, University of Vienna, Althanstraße 14, A-1090 Vienna; richard.goed@univie.ac.at; friedrich.koller@univie.ac.at;
[2] Austrian Institute of Technology, A-2444 Seibersdorf; gerhard.heiss@ait.ac.at

Turmalinite stellen innerhalb des prämesozoischen, kristallinen „Grobgneiskomplexes“ kleinsträumige, jedoch charakteristische lithologische Elemente dar. Die allgemeine lagerstättenkundliche Bedeutung von Turmaliniten sowie eine örtlich beobachtete räumliche Nähe der gegenständlichen Turmalinite zu einer stratiformen Arsenkiesmineralisation gaben Anlass zu einer näheren Bearbeitung dieser Gesteine (Göd & Heiss 2006, Göd et al. 2010). Die Turmalinite treten in Form konkordanter, linsenförmiger Körper von wenigen Metern streichender Länge und Mächtigkeiten im dm-Bereich ($\leq$0,5 m) innerhalb von Phylloniten auf. Die Entfernung zwischen den am weitesten auseinander liegenden Fundpunkten beträgt rund 50 km. Es handelt sich um überwiegend massige, meist schwarze und sehr feinkörnige Gesteine, die im Wesentlichen aus Turmalin (60-80 vol%), Quarz und Muskovit (<<5 vol%) zusammengesetzt sind. Feldspäte fehlen. Hervorzuheben sind akzessorische Granate mit Einschlüssen von Turmalinen. Die Turmaline entsprechen ihrer chemischen Zusammensetzung nach einem Mg-reichen Schörl. Der Hauptelementchemismus der Turmalinite wird durch das wechselnde Verhältnis von Turmalin und Quarz kontrolliert. Die Turmalinite und ihre phyllonitischen Nebengesteine weisen einen äußerst ähnlichen Chemismus auf, der sich nur durch den hohen Bor und den niedrigeren Kaliumgehalt der Turmalinite unterscheidet. Erz- oder Sulfidmineralisationen konnten nicht beobachtet werden. Das δ^{11}B Verhältniss von ~ -11 ‰ entspricht exakt dem Durchschnittswert der kontinentalen Kruste (Chaussidon & Albarede 1992) und erlaubt nicht, zwischen einer Herkunft des Bors aus Sedimenten oder einem granitischen Magma zu unterscheiden. Die nahezu identische chemische Zusammensetzung der Turmalinite und ihrer Nebengesteine spricht für eine in situ Entstehung der Turmalinite durch hydrothermale, B-reiche Lösungen. Eine naheliegende Herkunft des Bors aus dem Grobgneis respektive dessen ursprünglichem Magma erscheint jedoch unwahrscheinlich. Zum Einen wegen des krassen Ungleichgewichtes zwischen den riesigen Volumina des Grobgneises einerseits und der verglichen damit verschwindend kleinen Ausdehnung der Turmalinitkörper und zum Anderen wegen des Fehlens signifikanter Anreicherungen „granitophiler“ Spurenelemente in den Turmaliniten, wie sie im Falle einer Herleitung des Bors aus einem granitischen Magma zu erwarten wären. Daraus folgt, dass die Bildung der beschriebenen Turmalinite mit größter Wahrscheinlichkeit zeitlich vor die Intrusion des Ausgangsmagmas des Grobgneises zu stellen ist. Die Turmalinite und ihre umgebenden Gesteine sind von zwei metamorphen Überprägungen erfasst worden, die aufgrund regionaler Beobachtungen als permisch respektive spätkretazisch interpretiert werden (Schuster et al. 2001, 2008). Dies wird durch ein zweiphasiges Wachstum der in den Phylloniten auftretenden Granate unterstrichen. Der ältere Granatkern wird der permischen Metamorphose zugeordnet, der Rand der spät-kretazischen. Die Granate innerhalb der Turmalinite hingegen zeigen einphasiges Wachstum, das mit der jüngeren Metamorphose - also mit dem jüngeren Granat aus den Phylloniten - zu korrelieren ist. Aus dem Auftreten von Turmalineinschlüssen innerhalb dieser jüngeren Granate folgt das demgegenüber höhere Alter der Turmalinitbildung. Zusammenfassend lässt sich schließen, dass die Turmalinite altersmäßig als präalpin und gleichzeitig älter als das Ausgangsmagma des Grobgneises einzustufen sind.