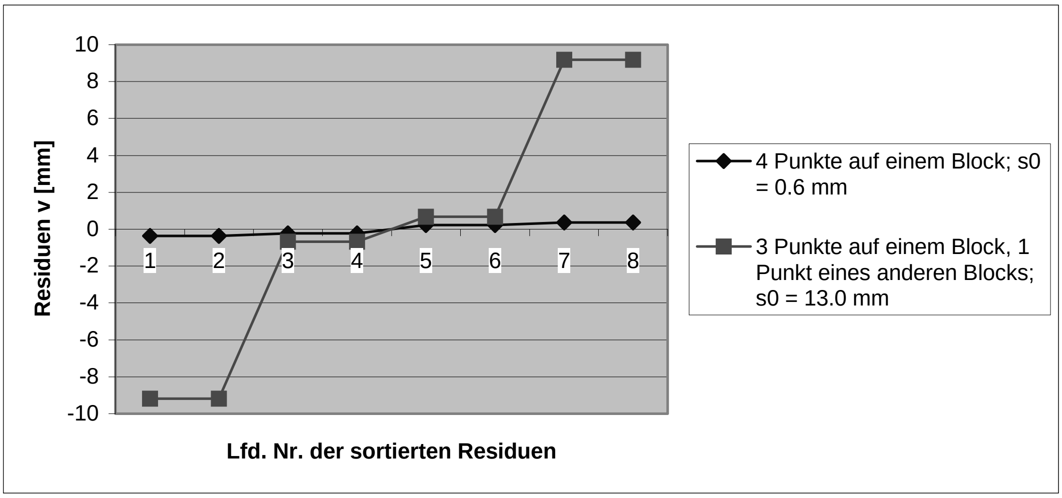

***Abbildung 1**. Vergleich der 2n nach Größe sortierten Residuen (n...Anzahl der zur Transformation verwendeten Punkte) im korrekten Fall (Rauten) und bei einem irrtümlich hinzugenommenen Punkt (Quadrate).*

The P-T-D evolution of Cretaceous eclogite facies metamorphism in the Austroalpine Texel Complex (Eastern Alps, Italy)

G. Habler, H. Sölva, M. Thöni

Institut für Geologie, University of Vienna, Austria

Eclogite facies rocks of Cretaceous age occur in several parts of the Austroalpine Basement Units south of the Tauern Window (Texel Complex, Schober- and Kreuzeck basement, Saualpe-Koralpe Complex). In this study eclogites and metapelites from the Saltausertal (Texel Complex) were investigated concerning their metamorphic and structural imprint.

The eclogites show a complex succession of mineral growth stages during eclogite-facies metamorphism: 1) Ca-rich garnet cores (= Grt 1) preserved part of the compressional path, as they contain omphacite-inclusions with lower Jd content and amphibole-inclusions with lower Na (B) than the matrix-grains. Epidote 1 has the highest Fe^{3+} and REE content. Garnet 1 grew syn- or interkinematically relative to an early deformation event D1a. 2) In a second stage the garnet composition continuously changed towards lower Ca, higher Mg, Fe, Mn and XMg. A garnet consuming, omphacite and epidote producing reaction occurred close to the pressure peak, indicated by the highest Jd-content in omphacite 2. 3) Further garnet growth occurred with compositions similar to garnet 1, still coexisting with omphacite. Omp 3 is characterised by synkinematic growth relative to intense shear deformation (D1b), and has lower acmite-, Na-content and XMg but higher Al and Ca content than omp 2 at equal Jd-content.

The mineral zoning of the eclogite facies assemblages indicates a relative PT-path of nearly isothermal pressure increase prior to Pmax (stages 1-2), followed by a temperature increase at the pressure peak (stage 3). Mini pressure conditions based on the Jd-content of omphacite gave 13 ± 1 kbar at 600 °C for Pmax. Temperature conditions derived from garnet-clinopyroxene thermometry range between 530 and 580 °C for stages 1 and 2 and between 570 and 630 °C for stage 3. As garnet does not show diffusional reequilibration, temperature conditions probably did not significantly increase during decompression.

Within metapelites, garnet displays either a simple chemical zonation of continuously decreasing Ca and increasing XMg from the core to the rim, or a complex zonation pattern, where a Ca-rich generation overgrew an older, continuously zoned garnet generation. In both cases the garnet growth evolution was interrupted by a stage of corrosion, which is either a product of short-lived garnet consuming mineral reactions during one single high-pressure evolution, or of polyphase metamorphism.

The major deformational imprint occurred during maximum burial and subsequent exhumation (Sölva et al., 2001). The high-pressure shear deformation D1 (producing the mylonitic foliation S1 and F1 fold axes parallel to the Ls1 stretching lineation) was followed by large-scale tight, asymmetric D2 folds (with N-S trending F2 fold axes) and D3 folds (with E-W trending fold axes), both at amphibolite facies conditions. Further greenschist facies deformation and related (re)-crystallisation occurred only within localized shear zones.

The present mineral chemical and microstructural data form the basis for further quantitative PT-estimates, thermodynamic modelling and mineral dating.

This study was supported by the FWF (project number P13227-GEO) and the European Community Access to Research Infrastructure action of the Improving Human Potential Programme, contract HPRI-CT-1999-00008 awarded to Prof. B. J. Wood (EU Geochemical Facility, University of Bristol).

Sölva et al. 2001: Geodinamica Acta, 14, 345-360

The Karcham Normal Fault: A new brittle structure in the Sutlej Valley, NW-Himalaya

C. Hager[1], C. Janda[1], B. Grasemann[1], E. Draganits[1], J-C. Vannay[2], B. Bookhagen[3], R. Thiede[3]

[1] *Institut für Geologie, University of Vienna, Vienna, Austria (a9504048@unet.univie.ac.at)*
[2] *Institut de Minéralogie et Pétrographie, Université de Lausanne, Lausanne, Switzerland*
[3] *Institut für Geowissenschaften, Universität Potsdam, Potsdam, Germany*

The present tectonic situation in the Sutlej Valley is dominated by the active extrusion of a wedge-shaped metamorphic unit (Lesser Himalayan Crystalline Sequence, LHCS) between a floor thrust (Munsiari Thrust, MT) and a roof normal fault (Karcham Normal Fault, KNF). Evidences for neotectonic deformation in the Sutlej Valley are: (i) deformed Quaternary lake deposits (Draganits et al., 2001), (ii) seismicity, (iii) significantly younger cooling ages within the LHCS (Jain et al. 2000, Grasemann et al., 2001) and (iv) a number of hot springs. This poster presents fault-slip analyses, mainly from the KNF at the top of the LHCS wedge, giving an insight into the brittle/ductile history of this structure.

The KNF is a N-S trending normal fault within the Higher Himalayan Crystalline (HHC), 1000 m above the LHCS-HHC contact, which separates dynamically recrystallized mylonitic gneisses and quartzites in the footwall from statically recrystallized mylonitic high grade meta-sedimentary rocks in the hanging wall.

In the Sutlej Valley, the KNF is perfectly exposed along a road cut 200m upstream from the confluence of the Baspa and Sutlej Rivers.

The KNF is defined by an about 50 m thick zone of different lithologies, ranging from carbonates, mica-schists to graphite-pyrite bearing calcsilicates. Because of their different behaviour during brittle/ductile deformation, distinct layers of cohesive-cohesionless cataclasites and ultracataclasites can be distinguished. The fault zone is parallel to the foliation of the ductile MCT history that led to N-S trending, E dipping planes with NNE-NE dipping stretching lineations. Micro-structures and different generations of slickenlines bear evidence for multiphase normal faulting which started at the brittle/ductile transition zone and resulted in NNE-NE dipping lineations, whereas the younger lineations show a more E-ESE direction.

Extensional brittle deformation is not only found in the LHCS but is typical for the hanging wall of the wedge. Fault breccias and slickensides, mineralized with quartz, tourmaline and chlorite, indicate an overall NE-SW to W-E extensional regime, which corresponds to syn-sedimentary deformation structures in rock avalanche-dammed lake sediments near Sangla (Draganits et al., 2001).

Draganits, E., Bookhagen, B., Gier, S., Grasemann, B., Hofmann, C.C., Janda, C. & Hager, C., 2001. Deformation structures in rockfall-dammed lake sediments near Sangla: implications on neotectonic activity in the Sutlej region (NW India*), J. Asian Earth Sci.* 19, 14.

Jain, A.K., Kumar, D., Singh, S., Kumar, A. & Lal, N., 2000. Timing, quantification and tectonic modelling of Pliocene-Quaternary movements in the NW Himalaya: evidence from fission track dating. *Earth Planet. Sci. Lett.* 179, 437-451.

Grasemann, B., Vannay, J.-C., Rahn, M., Frank, W. & Carter, A., 2001. Active tectonic exhumation of high-grade metamorphic rocks in the frontal part of the Himalayan Orogen; $^{40}Ar/^{39}Ar$ and fission track geochronological evidences from the Sutlej Valley (NW India), *J. Asian Earth Sci.* 19, 24-25.

Vannay, J.-C., Grasemann, B., 2001. Himalayan inverted metamorphism and syn-convergence extension as a consequence of a general shear extrusion. *Geol. Mag.*, 138 (3), 253-276.