identify rare phases. A differentiated list of garnet EDS spectra was used to generate semi-quantitative garnet zoning maps in a GXMAP mode. This revealed two generations of porphyroblasts, sometimes within a single sample. The EMP Th-U-Pb monazite dating identified Cretaceous (80-100 Ma), Permian (250-270 Ma) and Carboniferous (310-320 Ma) age groups which are variably distributed in the samples. Cation-exchange and net transfer geothermobarometry of the Mg and Ca rich late garnet porphyroblast generation with low Mn revealed a HP eclogitic stage which can be assigned to the Cretaceous monazite crystallization. Permian and Carboniferous monazites can be assigned to a prograde HP amphibolite-facies crystallization of an early garnet porphyroblast generation with bell-shaped zoning of Mn. SEM-EDS-based automated mineralogy methods resolved the complex combinations of multiple monazite and garnet generations within the micaschist samples.

Creation of semiquantitative mineral-chemical zonation maps of garnet porphyroblasts by automated SEM-EDS analysis in polymetamorphic micaschists

SCHULZ, B., SANDMANN, D., HASER, S. & GUTZMER, J..
Institut für Mineralogie, TU Bergakademie Freiberg/Sachsen

Automated mineralogical methods based on a combination of scanning electron microscope (SEM) and energy dispersive X-ray element analyser (EDS) are increasingly applied in studies of ore concentrates. Such a SEM Quanta 650 FEG-MLA by FEI was used to study polymetamorphic micaschists from the Saualpe nappe pile in the Austroalpine basement . The GXMAP mode was selected among several automated methods offered by the mineral liberation analysis (MLA) software. This mode produces a narrow grid of 1600 single EDS spectra per square mm from minerals with defined shades of gray (e. g. garnet and biotite) in the backscattered electron (BSE) image. For the classification of the sample EDS spectra, a list of reference EDS spectra from defined parts of several garnet porphyroblasts (core - mid - rim) was collected. These reference spectra were completed by EDS single spot elemental analyses. This revealed strong variations of Mg, Fe, Ca and Mn among the single spot analyses. In a next step, the reference spectra were labelled with the corresponding garnet Mg-Fe-Ca-Mn compositions and arranged in a pretty color scale. The spectra classification in complete thin sections uncovered two generations of garnet porphyroblasts, zoned, unzoned, and with overgrowths. This allowed to select a few typical garnets out of dozens of porphyroblasts as targets for quantitative electron microprobe analysis.

Reconstruction of a debris-covered glacier at the eastern margin of the Alps

SEIDL, S.1, REITNER, J.M. 2 & WAGREICH, M.[3]
[1] Department of Geodynamics and Sedimentology, University of Vienna
[2] Geological Survey, Vienna
[3] Department of Geodynamics and Sedimentology, University of Vienna

The intention of this work is the reconstruction of paleo-glaciers in the easternmost part of the Alps (Schneeberg mountain) with the main focus on chronology and sedimentology of Quaternary deposits. The area is dominantly made up of limestone bedrock and hence characterized by steep slopes and cirques.
Two juvenile moraine-systems can be deciphered based on geological mapping. The major system is characterized by an up to 60 m high latero-frontal dump moraine with a prominent breach-lobe moraine in a lateral position. It is regarded to represent the Last Glacial Maximum (LGM; Würm Pleniglacial). The other system is much smaller and was formed during the Würm Lateglacial.
The angular to subangular shape of the clasts and the abundant boulders on top of the ridges indicate a high portion of passive, i.e. supraglacial and englacial transport of debris before deposition.Thus the model of a debris-covered glacier is favored to explain both landforms and as well the corresponding sediment facies. For the pleniglacial moraine such an assumption is backed by a low accumulation/ablation area ratio (AAR) of around 1:1 based on the reconstruction of the equilibrium line altitude (ELA) using the maximum elevation of lateral moraines.