the central area exhibits a coarse-grained texture and a larger number of phenocrysts resp. porphyroclasts. The marginal portions show a fine-grained texture, with little or no spot recrystallization. The gneissosity of porphyritic granitic gneiss and granitic gneiss is oblique to each other.
The biotite-adamellite is located in the northern and southern parts of the study area. They show the massive structure, as well as gneissic structure. The strongly deformed biotite adamellite developed a gneissosity structure and S-C fabrics, and laevogyrate (sinistral) shear features. The biotite adamellite intrudes into granitic gneiss and porphyritic granitic gneiss. The biotite adamellite formed in ~150 Ma (unpubl. U-Pb zircon age) produced by the magmatism in Late Jurassic times. Furthermore, we newly found also deformed deuteric granitic veins, which intruded into the granitic gneiss and porphyritic granitic gneiss.
The three series of gneisses exposed in the Xingcheng-Taili area, varying in their structural patterns, which represent essentially the rheological characters developed in the ancient craton and which reflect the different steps of the geological history of the North China Craton, particularly during its Mesozoic destruction. Therefore, the study area represents a potential location for considering the deep-crustal continental rheology of North China Craton's lithosphere.

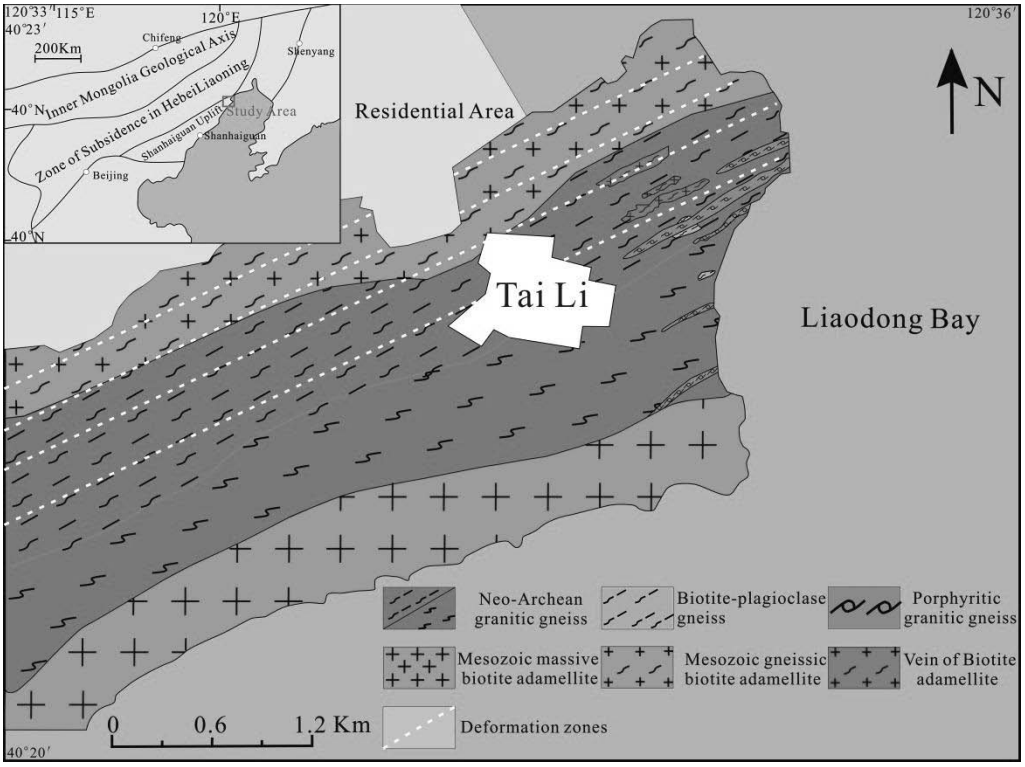

Fig. 1: Geological map of the Taili area showing the distribution of various types of granitic rocks

Wie kommt Geologie in die Schule? Erfahrungen mit einem Schwerpunkt der Lehrerinnen- und Lehrerfortbildung in der Steiermark

LIEB, G. K.
Univ. Graz, Inst. f. Geographie u. Raumforschung

Seit einigen Jahren bietet das Regionale Fachdidaktikzentrum Geographie und Wirtschaftskunde Graz in Kooperation mit der Pädagogischen Hochschule Steiermark und dem Inst. f. Erdwissenschaften der Universität Graz regelmäßig Fortbildungsveranstaltungen zu geologischen Themen für Lehrerinnen und Lehrer der Unterrichtsfächer Geographie und Wirtschaftskunde sowie Biologie und Umweltkunde an. Diese Seminare widmen sich unterschiedlichen inhaltlichen Schwerpunkten und bieten jeweils auch methodische Hilfestellungen und Unterrichtsmaterialien unter Berücksichtigung moderner didaktischer Prinzipien wie etwa Handlungs- und Kompetenzorientierung an, die im Internet frei zur Verfügung gestellt werden. Das Interesse an den bisherigen Veranstaltungen war außerordentlich hoch und es sind daraus auch mehrere erfolgreiche schulische Projekte initiiert worden. Der Vortrag gibt einen kurzen Überblick über die bisherigen Aktivitäten sowie die daraus

gewonnenen Erfahrungen und begründet einige Thesen zur verstärkten Einbindung geologischer Themen in den Unterricht der beiden genannten Schulfächer. Im Biologie und Umweltkunde-Unterricht bietet sich hierfür der zentrale Inhaltsbereich „Ökologie und Umwelt“ an, in den Geographie und Wirtschaftskunde-Lehrplänen finden sich geologische Bezüge an mehreren Stellen und können darin als Mosaiksteine beim Erwerb von Umweltkompetenz aufgefasst werden.

Terrestrial laser scanning, digital photogrammetry and RTK-GPS surveying in engineering geology: data acquisition, processing and application examples

LIU, Q. & KIEFFER, D.S.
Graz University of Technology, Institute of Applied Geosciences, Graz, Austria

In practices the results of engineering analysis and design depend on the quality of the input data. Over the last years, we have devoted research efforts to the acquisition and the generation of adequate and accurate spatial data based on remote sensing approaches. Our synergistic combination of terrestrial laser scanning (TLS), digital photogrammetry and the real time kinematic (RTK) global positioning system (GPS) surveying greatly facilitates the collection on the size, spatial position and orientation of engineering geological information. The results are geo-referenced virtual outcrop models (VOM), which are three-dimensional computer based representations of engineering rock mass characteristics with unprecedented accuracy and resolution. The direct applications of a VOM include: (1) spatial and temporal mapping of the geomorphologic features relevant to the stability of natural or excavated slope; (2) mapping of actual fracture network characteristics (fracture orientation, size, and topology); (3) mapping of block shape and size distribution on the natural and excavation surface; (4) documentation of an underground excavation (actual profile, lining evaluation, quality control of bolts etc.). The applications of virtual outcrop models to our actual engineering geological projects will be presented.

Synthetic Parameter Tests for Ambient Noise Tomography in the Vienna Basin

LLOYD, S.& BOKELMANN, G.
Institut für Meteorologie und Geophysik, Universität Wien

Ambient noise tomography has been applied worldwide to study the crust and uppermost mantle of the Earth. Phase velocities along the path connecting two stations are obtained from crosscorrelating the signals recorded at these stations at different periods. These periods typically lie within the second microseismic band between about 4 and 10 seconds, because a lot of noise is generated from ocean waves hitting the coast or interacting with the ocean floor at these periods. However, while it is preferable to work with these periods it is not always possible when interstation distances are too small (less than ~100 km). In such settings shorter periods need to be used for processing. Moreover, targeting shallow crustal structure also requires using periods shorter than 4 seconds, as longer period waves are not very sensitive to these depth ranges. We study the resolvability of crustal structure in the Vienna Basin area using ambient noise tomography. To that end we investigate the effects of crustal velocities on phase velocity sensitivity kernels and synthetic waveforms using crustal models and station distances which are representative of the Vienna Basin. Due to the lateral extent of the basin area as well as the currently available data from seismic stations we use distances ranging from 20 to 100 km, and periods from 0.3 to 3 seconds for our synthetic tests. Our aim is to establish what periods can be used for particular velocity structures and station distances, and later apply these to real data recorded at stations in or around the Vienna Basin.