resulting prospectivity maps set the basis for further detailed exploration activities in the country.

Developed in 2009, the Kosovo Mineral Resources Management Plan (KMRMP) targets on the sustainable utilisation of the high mineral potential of the country in the given economic and social framework. All known mineral deposits and occurrences were ranked with regard to their economic potential and legal status. The KMRMP clearly outlines the prospective areas and describes steps for further investigation. It forms the basis for the development of the mining industry of Kosovo, the implementation of improved land use planning procedures and environmental protection as well.

Data Management System GEORIOS – Documentation and evaluation of natural hazards

Kociu A., Tilch N. and Schwarz L.

Department of Engineering Geology, Geological Survey of Austria, A-1030 Vienna, Neulinggasse 38, Austria, arben.kociu@geologie.ac.at, nils.tilch@geologie.ac.at and leonhard.schwarz@geologie.ac.at

Natural hazards and their effects on the population and economy are for the Austrian Alpine region of increasing relevance. The events of the last years have shown that high meaning is to be attached to a comprehensive scientific understanding of mass movement processes. The quest for security gives rise to develop strategies and measures to counter the threats and to protect the people and the infrastructure. To determine where protective measures are necessary, we produce landslide inventory and risk assessment maps for many areas in Austria.

Since the foundation of the Geological Survey of Austria (GBA) in 1849 have been received a lot of data or knowledge about geogen natural hazard into the archives of the department of engineering geology.

To manage this data diversity and to make this entire pool of data available for everyone is necessary to develop a row of policies and strategies. Three main steps are followed in order to create this management system: (i) the development of spatial database, (ii) the development of an integrated procedure for design of susceptibility maps, (iii) and development of a tool set for the visualization and web-enabled data query. The final application based on the concept of Landslide Information Systems, will be used as an additional tool for risk and emergency assessment as well as for planning and decision making purposes.

Landslides unfortunately, do not display a clear relationship between magnitude and frequency as do for example floods. Landslide studies are challenging to scientists, due to the difficulty to represent landslide hazards in quantitative terms over large areas.

To be able to clarify which method to which conditions (scale of area, quality of data, area heterogeneity) and for which questions /objectives is suitable in the different measure, a classification of the areas to be modelled is necessary. However, this also means that the modelling results must be judged concerning her statement quality for different objectives (at least semi quantitatively). Otherwise it would be unclear furthermore for what, the produced maps (e.g., hazard potential maps, susceptibility maps) by means of different methods and data quality, are to be used generally.

Experience has shown that in this regard the following criteria should be used:

- Relative size of area
- Data quality (the quality of process data, the quality of the parameter maps)

Nevertheless, all these criteria cannot be quantified. Therefore, different areas with regional variety and different data quality are very important for model calculations. Only different models and methods, can be tested concerning her usefulness for the production of maps as bases for spatial planning, and estimated, under which conditions which method is for which question more suitable

In addition, the GBA is also keen to apply methods and to develop strategies, through which an evaluation of existing data towards large scale maps (for example hazard potential maps).

For one project area were used in addition to the simple heuristic method also a neural networks method to produce a susceptibility map. From the visual comparisons of the results can actually see any big differences. A comparison with the results of other methods shows only small differences exist, however, all validation results using artificial neural networks are slightly better than those using heuristic method.

However due to the random and selective available process data, there is a risk, that the generated susceptibility maps lead to good validation results. This means that the causes of the well-validated results are not clear and further developments are necessary.

Isotopic tracking of the Western Carpathians Hercynian granitic rocks sources

Kohút M.

Dionýz Štúr State Institute of Geology, Mlynská dolina 1, SK-817 04 Bratislava, Slovakia,milan.kohut@geology.sk

The present-day structure of the Western Carpathians was derived from Late Jurassic to Tertiary (Alpine) orogenic processes connected with the evolution of the Tethys Ocean, in a long mobile belt sandwiched between the stable North European Plate and continental fragments of African origin. A typical feature of this mobile belt is the presence of huge reworked slices of Hercynian crystalline basement within the Mesozoic and Cenozoic sedimentary successions that have been deformed into large-scale nappe structures. Granitic rocks of various origins form an important constituent of these basement fragments. The Hercynian granitic rocks were related to distinct sources and/or geotectonic position. They present spatially developed granitic suites from subduction-related I-type, through syn-collisional S-type to late- and post-orogenic A-type granites. The genesis and history of the local crust sampled by the granitoid rocks can be traced back to the Early Palaeozoic and/or Neoproterozoic times, consistent with a derivation from the north-Gondwanan margin. A complex study integrating petrological, geochemical and/or isotope data have been performed during last decades, resulting in distinguishing of following rock suites: *a)* the older sheared granitic rocks – orthogneisses (OG) with intrusive age 495–475 Ma; *b)* related mafic suite gabbros & diorites rocks (M-s) intrusive age 370 Ma; *c)* biotite granodiorite to hornblende-biotite tonalite (I-s) with intrusive age 365–355 Ma; *d)* two micas granodiorites to granites (S-s) intrusive age 360–350 Ma; *e)* biotite granodiorite to granite (A-s) intrusive age 270–260 Ma; and *f)* suite of specialised ore-bearing, biotite granodiorite to biotite-muscovite granite (S_s-s) intrusive age 265–250 Ma. The Sr isotopes with $^{87}Sr/^{86}Sr_{(i)}$ values 0.707–0.720 (OG), 0.702–0.706 (M-s), 0.704–0.709 (I-s), 0.706–0.714 (S-s), 0.705–0.709 (A-s), and 0.715–0.730 for S_s-suite suggest for significant crustal recycling and mantle related influence for mafic varieties of Carpathians granites. Similarly Nd isotopic characteristics with $\varepsilon Nd_{(i)}$ values -7.4 to -2.0 (OG), +0.9 to +5.8 (M-s), -2.8 to +2.2 (I-s), -7.0 to -1.3 (S-s), -3.1 to +1.9 (A-s), -4.4 to -0.2 (S_s-s) indicate recycling of vertically zoned lower and/or middle crust with significant contribution from basic metaigneous rocks. The stable isotopes with $\delta^{18}O_{SMOW}$ (in ‰) for OG = 11.0–11.7; M-s = 6.6–8.4; I-s = 7.6–9.9; S-s = 9.0–11.3; A-s = 7.8–8.0; and S_s-s = 9.9–11.5 together with $\delta^{34}S_{CDT}$ (in ‰) for M-s = +0.3 to +0.8; I-s = -2.9 to +2.6; S-s = -1.0 to +5.7; A-s = -2.0 to -0.7; and S_s-s = +4.5 suggest for mixed sources in metasedimentary and basic metaigneous rocks. The OG suite has δ^7Li = -4.5 to +1.6‰ indicating crustal source. Mafic rocks (gabbros and diorites), associated with several occurrences of granites, are uniformly Li-rich and isotopically light (δ^7Li = -0.5 ~ -3.7 ‰), precluding a direct derivation from the mantle, and require an explanation invoking an initial loss of original Li inventory, followed by a secondary enrichment in light Li via ingress of diffusing or percolating fluids. The Carpathian I-suite granites (δ^7Li = -1.2 to +0.5 ‰) are on average isotopically lighter and show minimal scatter pointing to a homogeneous meta-igneous source; the S-type granites on the other hand (δ^7Li = -3.2 to +7.0 ‰) testifying to highly variable meta-sedimentary/igneous precursors. The A-type granites are systematically heavier than the other types or even Earth's mantle (δ^7Li = +4.7 ~ +6.6 ‰), which could hint to a significant role of a material processed in a subduction event modified by slab-derived fluids. The S_S-suite of the ore-bearing granites with δ^7Li = -0.42 to +1.22 ‰ looks to have a metapelitic parentage. The