den Regeln im wissenschaftlichen Schrifttum dokumentiert werden. Zum Unterschied von den bisherigen Karten wird die digitale Karte einen „dynamischen" Charakter haben und entsprechend dem Forschungs- und Kartierungsstand laufend ergänzt und damit immer aktuell gehalten werden können.

Derzeit sind rund 60.000 km^2 fertig bearbeitet, das sind mehr als 50 % der Gesamtfläche mit den Auslandsanteilen und 55 % des österreichischen Staatsgebietes.

Gemäß der Konzeption des BEV erscheinen ab nun die topographischen Karten als "Bundesländerkarten" und ebenso geht die GBA bei der Ausgabe der geologischen Karten vor. Es sind aus der digitalen Karte ausgewählte und für den herkömmlichen Auflagendruck speziell bearbeitete rechteckige Ausschnitte. Am Posterstand werden gezeigt:

Geologische Karte des Burgenlandes 1:200.000 (erschienen 2000)

Geologische Karte von Niederösterreich 1:200.000 (im Druck)

Geologische Karte von Oberösterreich 1:200.000 (in weit fortgeschrittener Bearbeitung)

Geologisch-Tektonische Karte von Vorarlberg 1:200.000 (als vorläufige Karte für Schulen und öffentliche Dienststellen ausgegeben, die „Geologischen Karte" ist in Bearbeitung).

Die in Zukunft häufigste Nutzung der blattschnittslosen digitalen Karte wird aber wohl in der Weise geschehen, dass Gebiete maßgeschneidert auf die individuellen Bedürfnisse ausgeschnitten und von Nutzer entsprechend verwendet bzw. nachbearbeitet werden.

Die geologische Karte 1:200.000 könnte nicht in dieser Weise verwirklicht werden ohne die fundamentale finanzielle Unterstützung der oben genannten Bundesländer, für deren bisherigen Beitrag besonders zu danken ist. Bei Beteiligung weiterer Länder ist eine Fertigstellung des gesamten Bundesgebietes bis Ende 2004 realistisch.

Mapping of heavy metal loadings in soils by means of magnetic susceptibility measurements

R. Scholger, M. Hanesch

Institut für Geophysik, Montanuniversität Leoben

Contamination of soils with heavy metals is an issue all industrial and urban regions have to deal with. Generally, chemical methods are chosen to monitor soil pollution but measurements of magnetic susceptibility proved to yield additional information at low cost and consuming less time. We measured the magnetic susceptibility of soils which had been analysed chemically during the soil surveys of three Austrian provinces. Each anomaly of susceptibility either coincided with geogenic anomalies or indicated anthropogenic input of pollutants. The anomalies appearing on the susceptibility maps are a good indicator for pollution as long as knowledge on the underlying geology is available. Then, geogenic anomalies can be sorted out. A more reliable method to distinguish anthropogenic and geogenic anomalies is the additional measurement of subsoil susceptibility. Elevated values in the topsoil together with a considerable enrichment ($> 20 \cdot 10^{-8}$ m^3 kg^{-1}) in the topsoil proved to be a reliable indicator of anthropogenic stresses on the soil. Thus, susceptibility measurements on their own can yield valuable information on the distribution of potential contaminants. It is then possible to designate areas which should be further investigated.

An example how to obtain detailed information about a polluted area was given for the industrial city of Leoben. Volume susceptibility measurements at the soil surface yield a detailed picture of the spatial distribution of pollutants. The preferred direction of propagation can be seen in this picture. It was found that the pollutants reach a defined height above sea level. Information on the nature of the pollutants cannot be provided by susceptibility measurements. For the Leoben case study, chemical analyses were available from the Styrian soil survey at 22 sites and at up to three depths in the soil. Susceptibility was measured for these soil samples and correlations with the metals were calculated. Hg, Zn, Cd and PAH had the highest correlations with susceptibility and it was possible to estimate their content in the soil from the susceptibility values. A restricted number of chemical analyses combined with susceptibility measurements can thus be used to estimate the distribution of certain pollutants in a region. This approach is less time consuming and at the same time less expensive than a chemical analysis using a dense grid of sites. It is especially promising for regions where one source dominates the pollution pattern.

The applicability of susceptibility measurements should also be tested in a more complicated environment. The city of Vienna was chosen where no dominant source was expected. Correlation analysis of susceptibility and heavy metals showed, however, that the dominant source in Vienna is the pollution by traffic. The highest correlations were found with Cd, Cu, Zn and Pb. The main difference to Leoben is the spread of the source of pollutants over the city area of Vienna in contrast to the point source in Leoben which produces much higher peak values.

The great advantage of susceptibility measurements is their promptness and their low cost. It is possible to densify existing grids of chemical measurements and to make repeated measurements within shorter intervals. Thus, changes can be monitored quickly. Chemical analysis could be concentrated at locations where a severe pollution is to be expected from the susceptibility measurements.

Permo-Triassic Boundary Magnetostratigraphy from the Southern Alps (Italy)

R. Scholger[1], H.J. Mauritsch[1] , R. Brandner[2]

[1]*Institut für Geophysik, Montanuniversität Leoben, Austria*
[2]*Institut für Geologie und Paläontologie, Universität Innsbruck, Austria*

The exact chronostratigraphic position of the Permo-Triassic boundary in the Southern Alps and the type of contact between uppermost Permian Bellerophon Formation and lowermost Triassic Werfen Formation is still under discussion. Some authors believe that the formational contact is unconformable and that a gap representing early Dorashamian through earliest Griesbachian time occurs between the two formations, whereas several other authors emphasize a gradual transition in lithology and palaeontology with no time gap at the boundary. Palaeomagnetic investigations of Permo-Triassic boundary sections in the Dolomites provided a magnetostratigraphy for the uppermost part of the Permian unto the Lower Triassic.

The mean palaeomagnetic direction for the Bulla and Siusi sections (declination = 335.3°, inclination = 17.1°, alpha95 = 6.8°) is consistent with results from earlier palaeomagnetic studies of Permian and Triassic sediments and volcanites in the Southern Alps. These results imply very little net rotation of the Dolomites relative to Africa since Permian time, as well as a motion towards higher latitudes between the Lower Permian and the Middle and Late Triassic, indicating deposition and remanence acquisition at a shallow northerly palaeolatitude.

The obtained results from the Bulla and Siusi sections established well defined groups of normal and reversed primary magnetisations, enabling a magnetic zonation of the sediments. Importantly, the current event (i.e. boundary event) at the base of the Tesero Horizon can be regarded as synchronous boundary in a strict sense. In contrast, chronostratigraphic positions of the litho-stratigraphic boundaries between members of the Werfen Formation may vary between sites, since Tesero oolith and Mazzin member interfinger. The combined magnetostratigraphic results for the Bulla and Siusi sections result in a magnetic polarity zonation which is in good accordance with the composite Late-Permian/Early-Triassic magnetic polarity time scale of Steiner et al., but discrepancies with other results have to be mentioned.

In accordance with other magnetostratigraphic studies across the Permian/Triassic boundary in many regions of the world, we observed a zone of reversed polarity that corresponds to latest Dorashamian time at the top of the Permian sequence. The polarity change from reverse to normal polarity occurs shortly above the base of the Werfen Formation. The onset of the subsequent sedimentary cycle marks the beginning of the basal Triassic normal polarity zone in the Bulla and Siusi sections. The record of geomagnetic polarity across the Permian/Triassic boundary confirmed the apparent continuity as found by sedimentologic investigations which emphasise a gradual lithic transition with no evidence for a time gap at the boundary.

Paleomagnetic reconstruction of geodynamic events in the Eastern Alpine Miocene

R. Scholger, K. Stingl

Institut für Geophysik, Montanuniversität Leoben, Austria

In order to investigate the link of distinct changes of fossil communities with geodynamic events in the Eastern Alpine Miocene, we are establishing a systematic and comprehensive paleomagnetic database from the Molasse zone and the Vienna-, Styrian- and Lavanttal basins, which should enable to construct a quantitatively backed paleogeographic model of the development of the Eastern Alpine Miocene. This project is part of a multi-disciplinary FWF-funded project cluster (*Changes in Eastern Alpine Miocene Ecosystems and their Geodynamic Control; Coordinator: W. Piller*) that integrates paleoecological and biostratigraphical studies