Interactive evaluation module for soil quality data – an application within the Austrian soil information system BORIS

Freudenschuß A. [1], Huber S. [1], Tulipan M. [1], Ackerl, W. [1],
Weber M. [1] & Schwarz S. [1]

Introduction

For effective soil conservation, nation-wide comparable information on general soil conditions, contamination and the sensitivity of soils to detrimental impacts is necessary. Detrimental effects upon soils can be assessed more easily by means of a nationally standardised way of recording data in a soil information system. Therefore the Federal Environment Agency (FEA) has developed BORIS, a nation-wide soil information system. It provides the basis for an evaluation system needed for effective soil protection.
Austria disposes of quite comprehensive soil data. Yet, these data are structured heterogeneously, since they have been collected by different institutions with varying objectives (BLUM et al., 1999; SCHWARZ et al., 2001). In Austria the Federal Provinces have the main legal responsibility for soil management and soil protection. Therefore it is necessary to harmonise the data records of the different investigations and for this purpose, a handbook called „data key soil science“ (SCHWARZ et al., 1999) has been developed by FEA with the co-operation of many institutions concerned with soil issues and approved of by the Austrian Soil Science Society (ASSS). For the implementation of a soil information system a complex data model and a data management programme, **BORIS INTERN**, was developed (SCHREIER et al, 2001).
For the beginning of 2002 the BORIS database holds a soil map of Austria (scale 1:750,000) and more than 1.5 million records from more than 10,000 sites. The records comprise site descriptions, soil profile descriptions and analytical measurements.

Methods

As one of its specific features the soil information system BORIS provides access to soil information via internet. **BORIS INFO** is opened to the public (http://www.ubavie.gv.at./umweltsituation/boden/boris) and contains detailed information about site and profile description,

as well as meta data about analytical parameters. Internet users get an overview of existing data and information about ownership and possible access. **BORIS EXPERT** provides access to the complete database for those institutions concerned with soil issues and which are included in the list of licensed institutes with granted access.
One part of BORIS EXPERT is the **assessment module**. It enables experts to assess analytical measurements contained in the database by comparing them with certain national and international reference values such as thresholds, standard values, guidelines or background values. So far, data on heavy metals and other trace elements can be assessed. The measurements can be selected according to individual requirements using a query mask. The reference values can be selected in two ways:

- via a list of regulations (first choice) and a list of parameters linked with the selected regulation (second choice)
- via a list of parameters (first choice) and a list of regulations linked with the selected parameter (second choice)

Results

The results are calculated as positive or negative exceedances (as % of the reference values) for each selected soil sample. The amount and frequency (as %) of the exceedances is reported as a summary. Some selected assessments are shown as tables, figures and maps on the poster.

Conclusions

The BORIS soil information system offers harmonised data sets and technical data processing tools developed to meet several demands. This facilitates linkages and, therefore, combined studies of soil data beyond provincial borders, and makes it easier to deal with various aspects of soil protection such as the assessment of soil quality. On account of the internet applications the BORIS project is certainly an effective way of raising public interest in soils and their quality. Furthermore the internet applications promote the use of soil data, in particular by experts and decision makers, for the future development of sustainable land use.
Efforts to the enlarge and intensify the nation-wide soil information system will be continued as well as the co-ordination with European soil information networks.

Literature

BLUM, W.E.H.; ENGLISCH, M.,; NELHIEBL, P.; SCHNEIDER, W.; SCHWARZ, S. & WAGNER, J. (1999): Soil Survey and Soil Data in Austria. In: BULLOCK et al. (1999).

SCHREIER, I.; SCHWARZ, S.; TULIPAN, M. & MIKSITS, H. (2001): Entwicklung von Datenmodell und Schnittstelle - Fachliche Anforderungen und EDV-technische Umsetzung. Mitteilungen der DBG Band 96, Heft 2.

SCHWARZ, S.; HUBER, S.; TULIPAN, M.; DVORAK, A. & ARZL, N. (1999): Daten-schlüssel Bodenkunde - Empfehlung zur einheitlichen Datenerfassung in Österreich. Monographien Band 113, Umweltbundesamt. Wien.

SCHWARZ, S.; ENGLISCH, M.; AICHBERGER, K.; BAUMGARTEN, A.; BLUM, W.; DANNEBERG, 0.; GLATZEL, G.; HUBER, S.; KILIAN W.; KLAGHOFER, E.; NESTROY, O.; PEHAMBERGER, A.; WAGNER, J. & GERZABEK, M. (2001): Bodeninformationen in Österreich – Aktueller Stand und Ausblick. Mitt. d. Österr. Bodenkundl. Ges. H. 62, Wien.