Ad hoc Working Group Soil in Germany

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Abstract
To coordinate soil information in Germany, a network of soil specialists of the respective authorities of the 16 federal state agencies and the Federal Institute for Geosciences and Natural Resources (BGR) was formed. This network, the "Ad-hoc-AG Boden" mainly synchronizes methods of soil description and other relevant data structures and data collections among the 16 federal states; resulting in proper soil information (e.g. data sets, soil maps) across Germany.

Key Words
Soil information system, Germany, soil map, mapping guide, network.

Introduction
The Ad hoc Working Group Soil of Germany, commonly known as "Ad-hoc-AG Boden" is a scientific and communication network of the heads of the soil surveys of the 16 federal states in Germany and the Federal Institute for Geosciences and Natural Resources (BGR). It coordinates soil related tasks of the respective federal state agencies, which generally are responsible for soil mapping and their federal state soil information systems. One of the members of this working group from the beginning was the later president of the German Soil Science Society Prof. Dr. Eduard Mückenhausen.

A report on the status of soil information in Germany in the European context has been published in 2005 (ECKELMANN 2005). Updates are given on the occasion of the annual meetings of the German Soil Science Society. The most recent report (ECKELMANN *et al.* 2009) was at the same time the first joint presentation of the Ad hoc Working Group Soil of Germany, given at the annual meeting 2009 at Bonn..

The formal establishment of the "Ad-hoc-AG Boden" by the Conference of the German Ministries of Economics is reported as from 1984, but earlier papers document similar activities and responsibilities from 1946 on. Though the formal name of the group has been changed several times, mainly for political reasons, the continuous work of this group is documented for the timespan before 1984.

Activities
Soil Mapping Guides
From the beginning, the "Ad-hoc-AG Boden" was aiming at using a common soil mapping guide by all 16 federal states agencies. After a long period of drafting and field testing, the first version of a German soil mapping guide was issued in 1965 (AG Boden 1965). Taking close contacts to scientists of the German soil science society; this first version was updated several times, resulting at least in the 5th version (KA 5; Ad-hoc-AG Boden 2005). This version is the first German soil mapping guide, offering links to the World Reference Base for Soil Resources (WRB, IUSS 2007).

To meet the needs of local soil protection authorities, it was decided to reduce and condense the contents of the 2005 soil mapping guide to a short version, which is using the same standards in all formal aspects, tables and coding, as they have been described in the traditional version (Ad-hoc-AG Boden, 2009). This assures a common basis and comparable results for the user.

With respect to international soil description and to facilitate access to the World Reference Base for Soil Resources for German speaking scientists and staff, the BGR coordinated the preparation of a German version of the WRB. It is available as download from www.bgr.bund.de/boden (IUSS, 2007).

Soil map at scale 1:200,000
Starting with the reunification of the western and eastern parts of Germany in 1990 the now larger "Ad-hoc-AG Boden" developed a mutual basis for a common German soil map at scale 1:200,000. This map became the first German soil map under the new standards. It is available at BGR and the cooperating 16 federal state agencies as well. The common standards ensure comparable outputs at federal and national levels (HARTWICH *et al.* 2007).

One of the most important steps in preparing a mapping manual for the 1:200,000 scales was the definition of a soil regions concept, which was later enlarged to the area of the European Union in close cooperation with the members of the European Soil Bureau Network (ESBN; HARTWICH *et al.* 2006). This regional concept has turned out to be one of the most crucial prerequisites for the compilation of a harmonized soil map system for the different regional authorities.

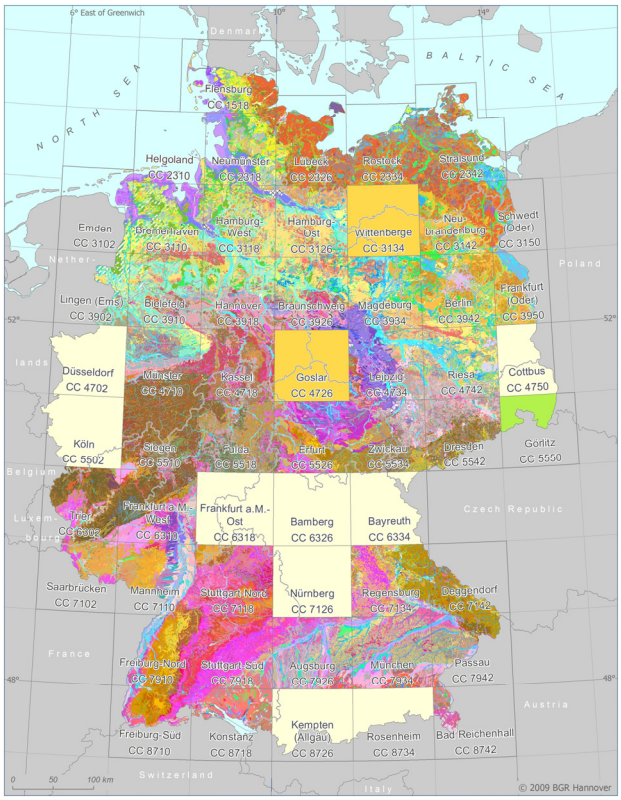

Figure 1. The spatial distribution of printed sheets of the German soil map at scale 1:200,000. granulometry (MÜLLER *et al.* 2009).

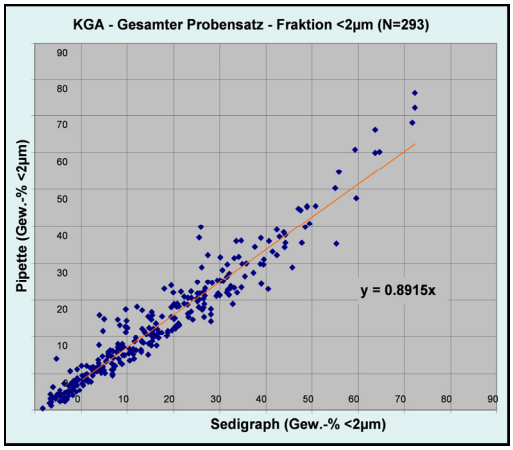

Figure 2. Comparing two different methods for particle-size analysis, KÖHN pipette and X-raywww.bgr.bund.de/boden**.**

By the end of 2009, 42 of the 54 map sheets needed to cover Germany have been printed (Figure 1), the last map shall be printed in 2014. For each soil map unit, comprehensive soil property information from representative soil profiles as well as the respective land use had to be documented. To enable easy scientific and administrative use of all data across political regions, it was decided to put the relevant data into a single data base covering all 16 federal state agencies. This procedure seems to be singular for such a political structure.

Laboratory work and quality standards, applications
Aiming at high standard and reliable soil information at federal state and national levels, the "Ad-hoc-AG Boden" initializes and coordinates comparisons of analytical methods of field or laboratory scale. Recent studies e.g. were comparing extraction methods for heavy metals (e.g. aqua regia; UTERMANN *et al.* 2005) or particle-size analysis. The comparison of two methods for particle-size analysis in soils has stated a better suitability of the KÖHN pipette method in this respect (MÜLLER *et al.* 2009; Figure 2).
A later consecutive round robin test including all the coordinating federal state laboratories has confirmed that the "Ad-hoc-AG Boden" can rely on a high data quality within this frame of the federal state agencies and their contributions to the common databases.

The "Ad-hoc-AG Boden" has published a comprehensive collection of methods, parameter lists and flow sheet diagrams offering the consistent use of soil data for scientific, administrative and political applications (www.bgr.bund.de/boden). As a member of the "Ad-hoc-AG Boden" and the European Soil Bureau Network (ESBN) as well, BGR is in the position to support activities at the European scale (ECKELMANN *et al.* 2006). Extensive information is available at:
http://www.bgr.bund.de/cln_101/nn_334066/DE/Themen/Boden/Zusammenarbeit/Adhocag/adhocag__node.html?__nnn=true

Conclusions

The "Ad-hoc-AG Boden" is the German network for the coordination of soil information for scientific, administrative and political needs. This close cooperation between the 16 federal state agencies and the Federal Institute for Geosciences and Natural Resources (BGR) – also in its role as a member of the European Soil Bureau - as well as further scientific partners exhibits the crucial position of such networks for high quality standards for soil information and long term data availability on the national and supranational level.

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