



Europäische Bodenkarten

Dr. Einar Eberhardt (BGR)



Stremme, H. (Hrsg., 1937):

Internationale Bodenkarte von Europa 1 : 2.500.000
Bearbeiter: W. Hollstein. 1925-1937. Gea-Verlag, Berlin

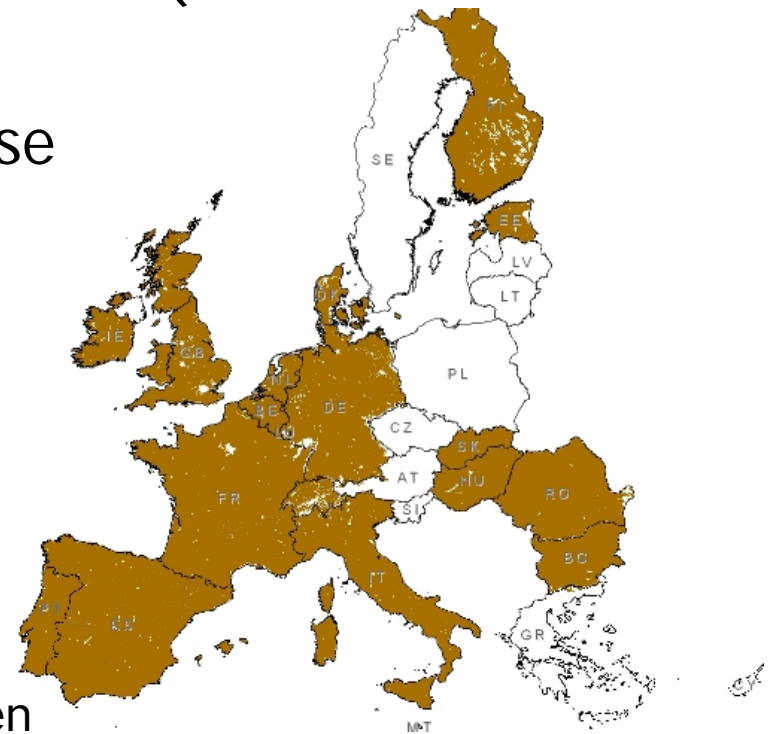
(Vorläufer: Murgoci, G. 1925: Internat. Bodenkarte von Europa 1 : 10.000.000.)



European Soil Database

besteht aus:

- Soil Geographical Database of Europe/Eurasia 1 : 1.000.000 (SGDBE v. 3.2.8.0)
- European Soil Profile Analytical database, SPADE-1 (v. 2.1.0.0) – 588 „estimated“, 560 „measured“ (auch veröffentlicht als SPADE/M, EU-15)
- European Pedo-Transfer Rules database (v. 2.0)
- HYPRES pedo-transfer functions (v.1.0)
- SPADE-2: geographische Erweiterung von SPADE-1



SPADE-Daten

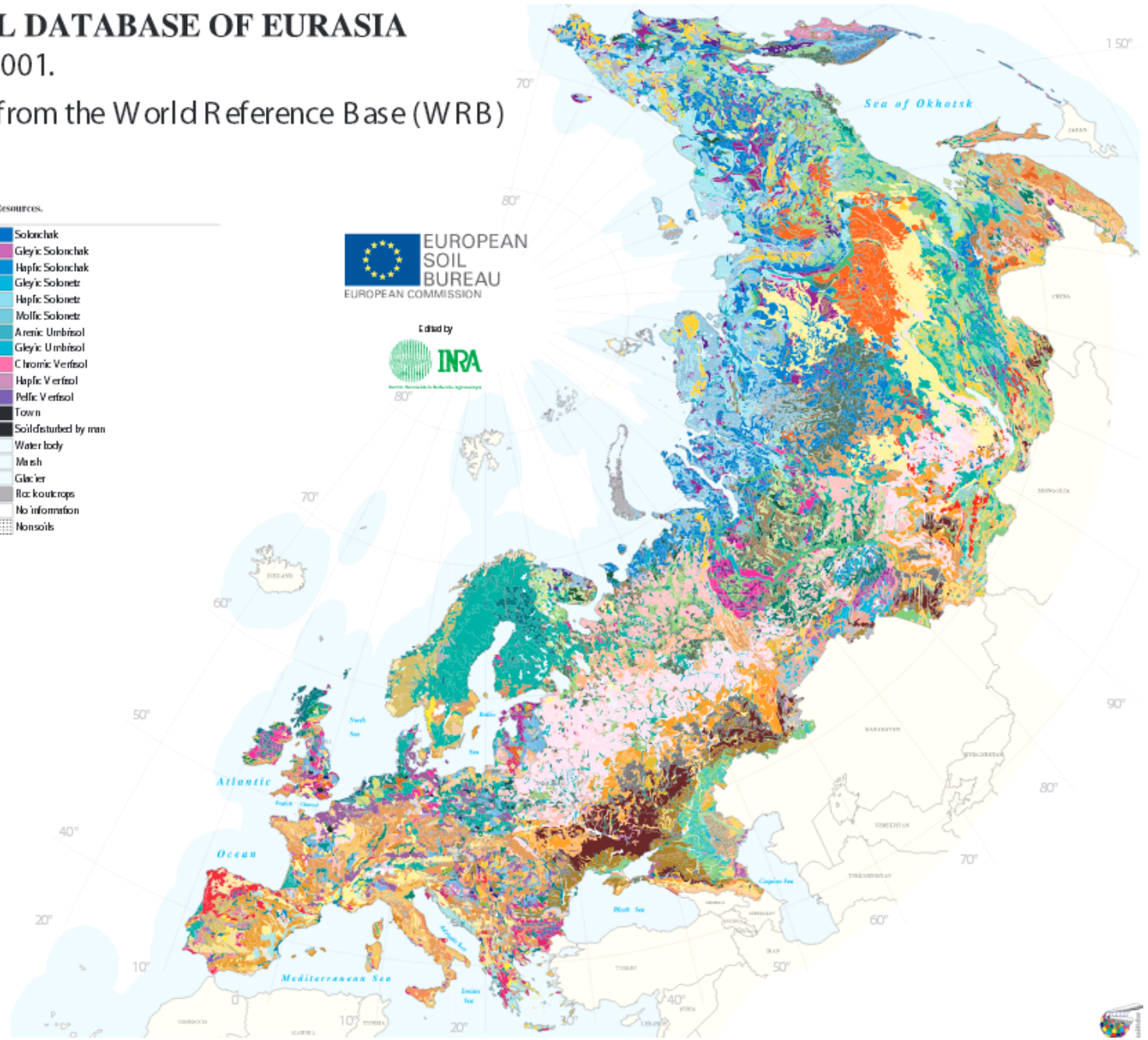
SOIL GEOGRAPHICAL DATABASE OF EURASIA

VERSION 4 beta, 25/09/2001.

Full soil code of the STU from the World Reference Base (WRB) for Soil Resources.

Full soil code of the STU from the World Reference Base (WRB) for Soil Resources.
(Attribute WRB-FULL):

| | | | |
|----------------------|-------------------|------------------|-----------------------|
| Endeemic A lbelvisol | Histic C ryosol | Lithic Leptosol | Solonchak |
| Gleyic A lbelvisol | Turbic C ryosol | Mollic Leptosol | Gleyic Solonchak |
| Haplic A lbelvisol | Umbric C ryosol | Bemdic Leptosol | Haplic Solonchak |
| Histic A lbelvisol | Calcic Fluvisol | Umbric Leptosol | Gleyic Solonetz |
| Sagric A lbelvisol | Dystric Fluvisol | Albic Luvisol | Haplic Solonetz |
| Umbric A lbelvisol | Eutric Fluvisol | Arenic Luvisol | Mollic Solonetz |
| Gleyic Acrisol | Gleyic Fluvisol | Calcic Luvisol | Arenic Umbrisol |
| Haplic Acrisol | Histic Fluvisol | Chromic Luvisol | Gleyic Umbrisol |
| Acrossic A rdsol | Mollic Fluvisol | Dystric Luvisol | Chromic Vertisol |
| Dystric A rdsol | Sa fic Fluvisol | Ferric Luvisol | Haplic Vertisol |
| Histic Andosol | T hionic Fluvisol | Gleyic Luvisol | Pellic Vertisol |
| Hydic A rdsol | Umbric Fluvisol | Haplic Luvisol | Town |
| T haplic A rdsol | Calcic Gleysol | Vertic Luvisol | Soil disturbed by man |
| Albic Arenosol | Dystric Gleysol | Albic Phaeozem | Water body |
| Haplic A enosol | Eutric Gleysol | Calcic Phaeozem | Mire |
| Podic Arenosol | Haplic Gleysol | Gleyic Phaeozem | Glacier |
| Calcic Chernozem | Histic Gleysol | Haplic Phaeozem | Roc koutcrop |
| Chemic Chernozem | Humic Gleysol | Luvis Phaeozem | No information |
| Glossic Chernozem | Mollic Gleysol | Sodic Phaeozem | Nonsoils |
| Haplic Chernozem | Sodic Gleysol | Albic Planosol | |
| Luvis Chernozem | T hionic Gleysol | Dystric Planosol | |
| A rdic Calcisol | A rdic Gypsisol | Eutric Planosol | |
| Haplic Calcisol | Cryic Histosol | Luvis Planosol | |
| Endoa fic Calcisol | Dystric Histosol | Mollic Planosol | |
| Calcic Cambisol | Eutric Histosol | Calcic Podzol | |
| Chromic Cambisol | Fibric Histosol | Eutric Podzol | |
| Dystric Cambisol | Gelic Histosol | Gleyic Podzol | |
| Eutric Cambisol | Sagric Histosol | Haplic Podzol | |
| Gelic Cambisol | Sa fic Histosol | Histic Podzol | |
| Gleyic Cambisol | Calcic Kastanozem | Lamellic Podzol | |
| Leptic Cambisol | Haplic Kastanozem | Placic Podzol | |
| Mollic Cambisol | Luvis Kastanozem | Rustic Podzol | |
| Vertic Cambisol | Calcic Leptosol | Umbric Podzol | |
| A rdic Cryosol | Dystric Leptosol | Calcic Regosol | |
| Calcic Cryosol | Eutric Leptosol | Dystric Regosol | |
| Gleyic Cryosol | Haplic Leptosol | Eutric Regosol | |
| Haplic Cryosol | Humic Leptosol | Haplic Regosol | |



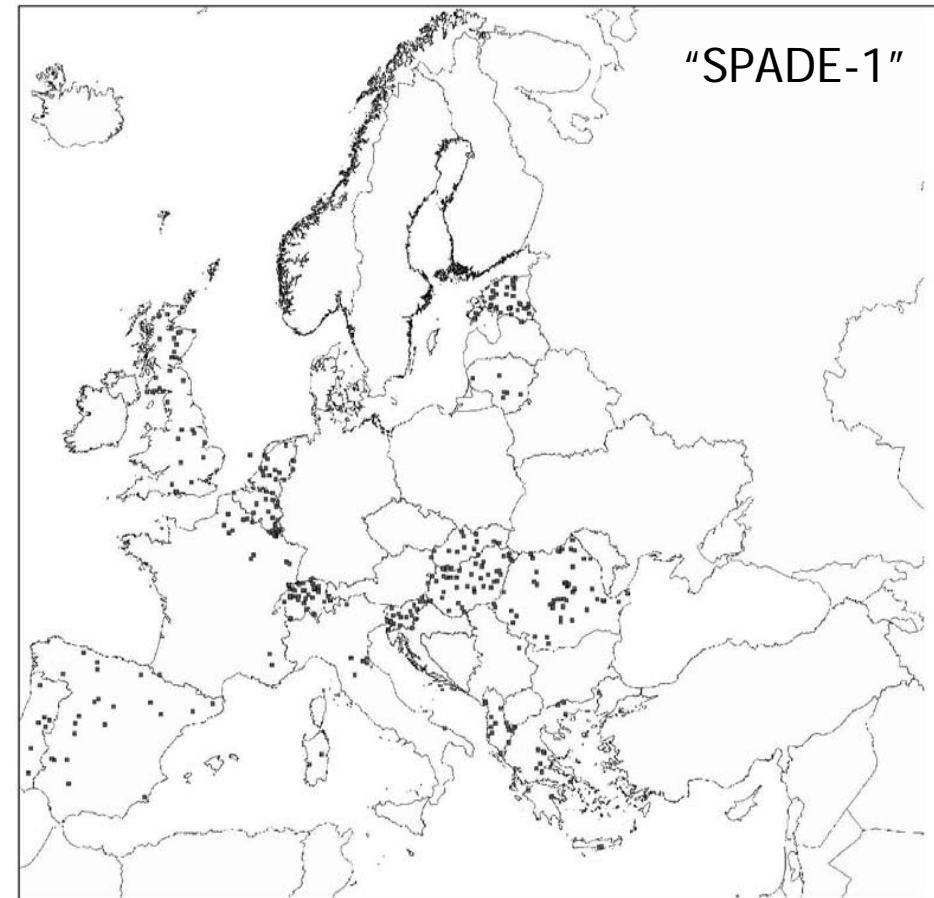
Printed: 02/10/2001



European Soil Database

Soil Profile Analytical Database (SPADE-1 v 2.1.0.0)

- v.a. bodenchemische Charakterisierung
- 496 der 5.306 STUs (SGDBE version 3.2.8, 1999)
- polygon-referenziert
- Projektstart 1992
- Vollständigkeit hinsichtlich typischer Bodeneigenschaften ca. 4 [!] bis 100 %; z.B. geogr. Koordinaten: 82%)



(Hiederer et al. 2006)

SPADE-2

- verbesserte Daten zu Bodeneigenschaften (z.B. für Modellierung)
- 'primäre Bodeneigenschaften' für alle Soil Typological Units der SGDBE v 3.2.8.0 und für dominante und weitere Landnutzungstypen (für die 'geschätzten' Bodenprofile)
- primäre Bodeneigenschaften: Ton-, Schluff-, Fein-/Mittel-/Grobsand-Gehalt in %, org. C in %, pH, Lagerungsdichte



(Hollis et al. 2006)

SGDBE-Auswertungskarten

Soil classification:

WRB: kompl. Name, RSG, erstes und zweites ‚Adjektiv‘

FAO 1990-Legende: kompl. Name, Soil major group, 2nd level

FAO 1974 (mod. 1985): kompl. Name, Soil major group, 2nd und 3rd level

Texture:

Dominant/Secondary surface/sub-surface textural class of the STU, Depth class to a textural change of the dominant and/or secondary surface texture of the STU

Parent Material:

dominant/secondary parent material of the STU, Major/2nd/3rd level group code for the dominant/secondary parent of the STU.

Land Use:

dominant/secondary land use

Limitation to agricultural use:

most important/secondary limitation

Obstacle to roots:

Depth class of an obstacle to roots

Impermeable Layer:

presence of an impermeable layer within the soil profile

Soil Water Regime:

Dominant annual average soil water regime class of the soil profile

Water Management System:

normal presence, purpose/type of an existing water management system in agricultural land on more than 50% of the STU.

Altitude:

Maximum/Minimum elevation above sea level of the STU (in metres)

Slope:







Dominant/secondary slope class of the STU

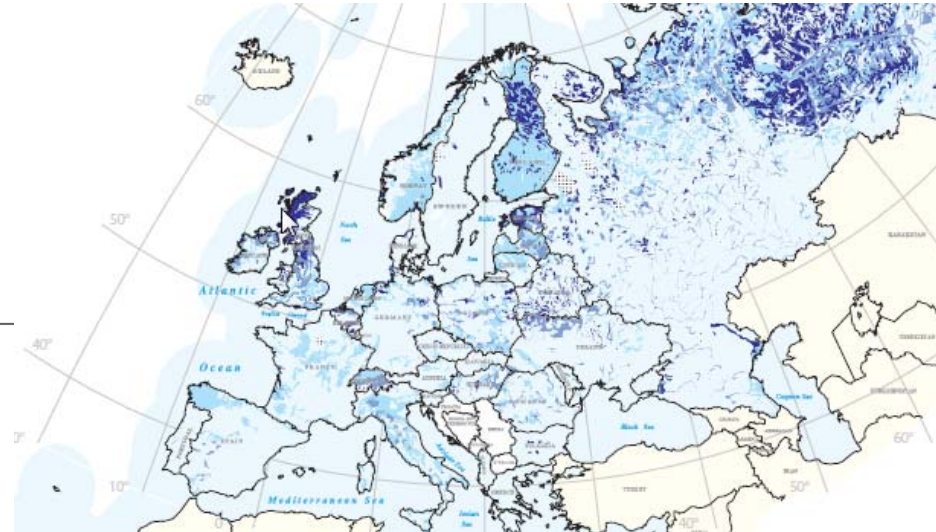
Primary properties:

Dominant surface textural class, Topsoil organic carbon content







SGDBE-Auswertungskarten + Reinheitsgrad + Vertrauensbereich

% OF MAP: **Dominant annual average soil water regime class of the soil profile of the STU. (Attribute WR):**

| | | |
|------|---|---|
| 3 % |  | No information |
| 69 % |  | Not wet within 80 cm for over 3 months, nor wet within 40 cm for over 1 month |
| 13 % |  | Wet within 80 cm for 3 to 6 months, but not wet within 40 cm for over 1 month |
| 6 % |  | Wet within 80 cm for over 6 months, but not wet within 40 cm for over 11 months |
| 10 % |  | Wet within 40 cm depth for over 11 months |
| |  | Non soils |










% OF MAP: **Purity of SMUs (for attribute WR):**

| | | |
|------|---|--------------|
| 0 % |  | 0 24 % |
| 3 % |  | 25 49 % |
| 10 % |  | 50 74 % |
| 35 % |  | 75 99 % |
| 53 % |  | 100 % (pure) |
| |  | Non soils |



% OF MAP: **Confidence level of SMUs (for inferred attribute WR):**

| | | |
|------|---|---|
| 5 % |  | High |
| 89 % |  | Moderate |
| 2 % |  | Low |
| 5 % |  | Very low |
| . | | or unknown confidence level |
| 0 % |  | Data originates from author (no pedo transfer interpretation) |
| . | | |
| 0 % |  | No information |
| |  | Non soils |



Soil Atlas of Europe (JRC, 2005)

SOIL ATLAS OF EUROPE

What is soil? When you touch soil you know it is not just a dead material. It has been formed by the action of living organisms and the soil is the result of their activity. The soil is the result of the interaction of living organisms and the soil is the result of their activity.

A layer of living organisms on the surface of the soil is called the soil surface. It is the result of the interaction of living organisms and the soil is the result of their activity.

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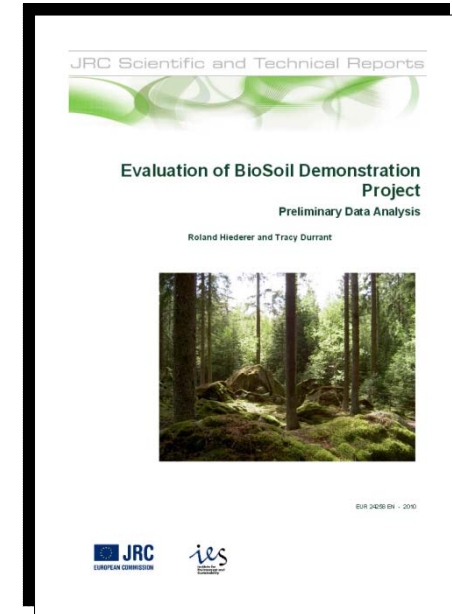
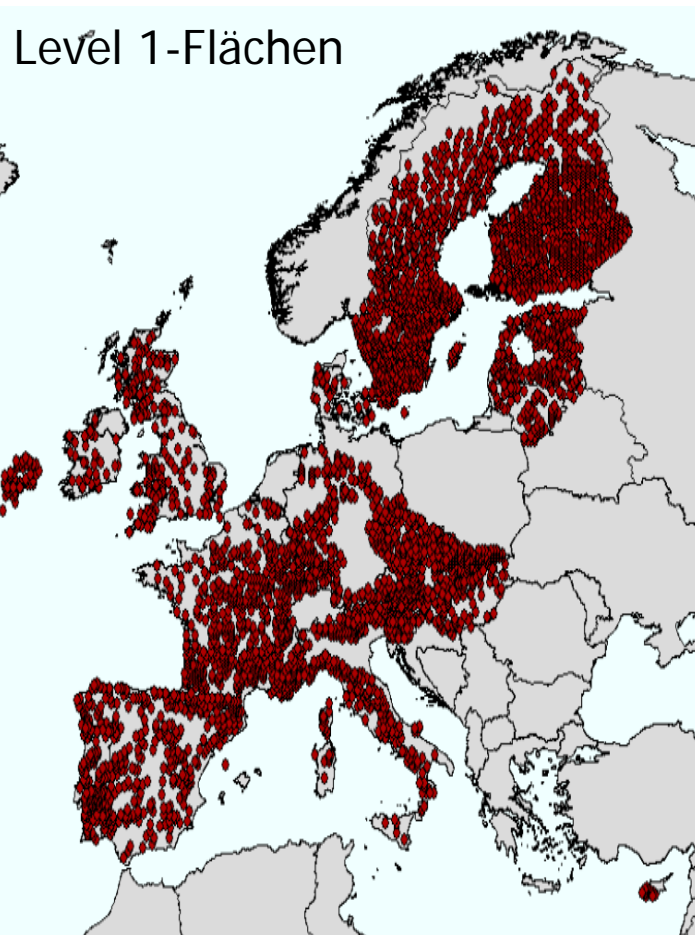
European Commission

In Switzerland there are three main soil areas from northwest to southeast: the Jura mountains formed chiefly by limestone gives Rendzic Leptosols and Calcic Cambisols, the more or less flat Moraine- and Molasse-Area of the Swiss Plateau is characterised by Haplic Luvisols and Eutric Cambisols and the Alps with a height up to 4000 metres above sea level are partly covered by glaciers or permanent snow cover. The Alps make up 60% of the country and can be again divided into the Flyschzones, characterised by Eutric, Gleyic, Dystric Cambisols and Humic Gleysols; the Northern Calcareous Alps with predominantly Rendzic and Lithic Leptosols and the Central Alps, including the south facing slopes, where Dystric, Umbric and Lithic Leptosols, Haplic Podzols as well as Dystric and Skeletic Cambisols are formed.



ICP-Forests/BioSoil

- EU Forest Focus-Projekt: Boden und Biodiversität



ICP-Forests

Level 1-Flächen, ca. 6000

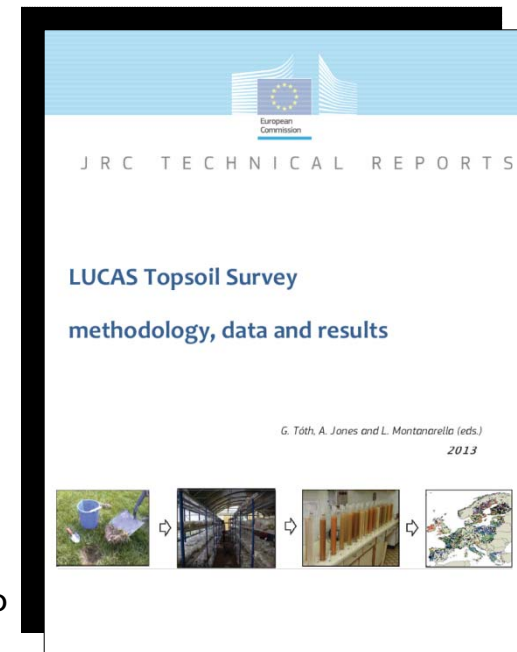
Level 2-Intensivflächen, ca. 800, davon

- 738 Bodenchemie alle 10 Jahre
- 254 mit kontinuierlichem Monitoring der Bodenlösung (Chemie)

BioSoil, 4035 Flächen

LUCAS - Land Use/Land Cover Area Frame Survey

- in 23 (+ 4) EU-Staaten seit 2009
- 2 x 2 km-Raster, multi-stage stratified random sampling
- 19.967 Probennahmepunkte, nur Oberboden (0 – 20 cm) bis max. 1000 m. ü.d.M., Ackerland leicht überrepräsentiert
- Parameter: Grobbodenanteil, Korngrößenverteilung (% T, U, S), pH(CaCl₂ und H₂O), Corg, Carbonatgehalt, P-Gehalt, Ntot, extractable potassium content (mg/kg), KAK, multispektrale Eigenschaften; derzeit in Analyse: Schwermetalle



E. VAN RANST et al. (2004)

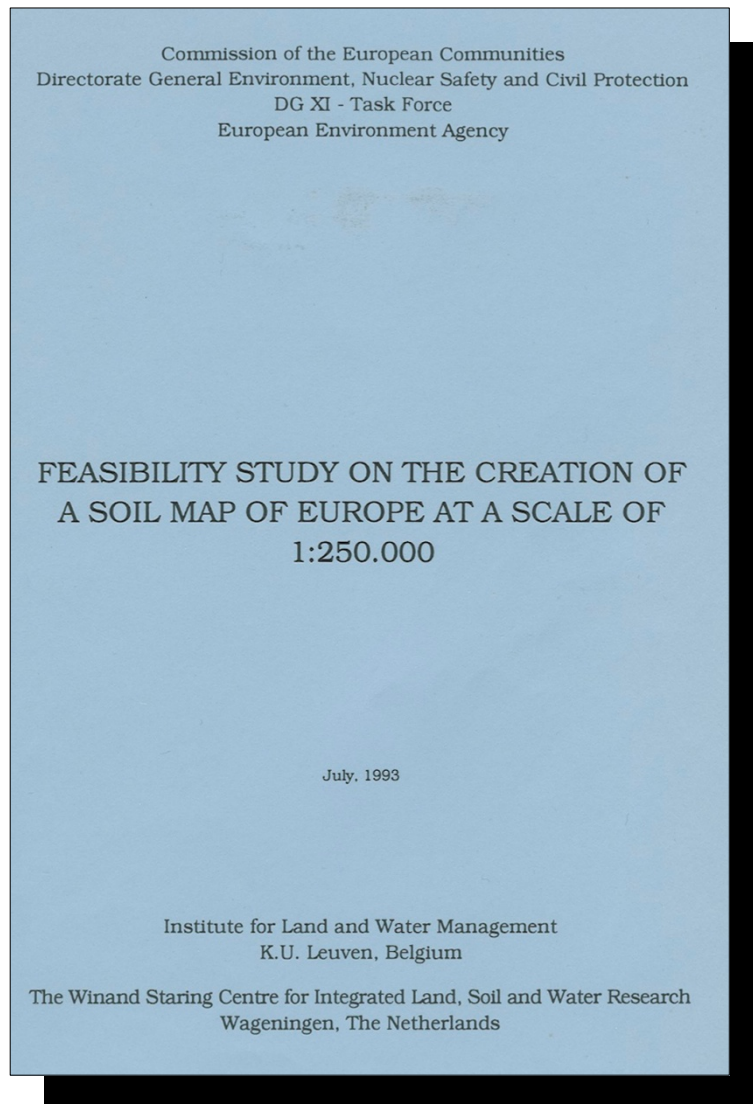
Evolution and availability of geographic soil databases

The Global Pedon Database (subset of WISE IGBP-DIS/CSIRO/USDA/FAO/ISRIC 1999)

| Geographic Region | WISE | Homogenized Database (subset of WISE) | | | |
|--------------------------------------|-------|---------------------------------------|-------------------|-------------------|-------|
| | | FAO ¹ | NRCS ² | ISIS ³ | Total |
| Africa | 1 799 | 93 | 204 | 18 | 315 |
| S., W. and Northern Asia | 522 | 24 | 44 | 0 | 68 |
| China, India, Indonesia, Philippines | 553 | 45 | 129 | 106 | 280 |
| Australia and Pacific Islands | 122 | 28 | 27 | 0 | 55 |
| Europe | 492 | 5 | 2 | 0 | 7 |
| North America | 266 | 14 | 144 | 0 | 158 |
| Latin America and the Caribbean | 599 | 41 | 114 | 86 | 241 |
| Total | 4 353 | 250 | 664 | 210 | 1 124 |

→ Europa: von 492 Bodenprofilen bleiben 7 nach Qualitätsprüfung (Konsistenz, Vollständigkeit hinsichtlich Geo-Referenzierung, Metadaten zu Method)

Maßstabswechsel: Soil Map of Europe 1 : 250 000



FEASIBILITY STUDY **on the creation of a Soil Map** **of Europe at a scale of** **1 : 250.000**

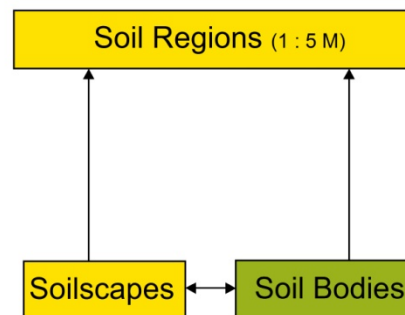
(R. Dudal, A.K. Bregt, P.A. Finke, 1993)

MANUAL OF PROCEDURES for the Georeferenced Soil Database for Europe 1 : 250 000

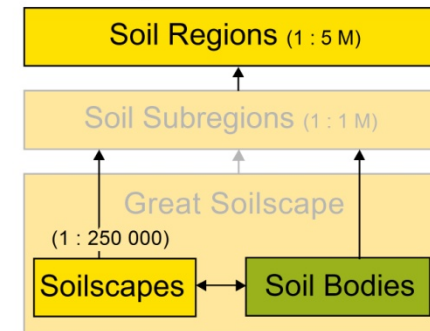


Geo-referenced Soil Database for Europe 1 : 250 000, V. 1.1

General outline



Realisation in Po Valley pilot area



- Version 1.1 1998
- quasi-3 D-Ansatz
- derzeit nicht weiter verfolgt

INSPIRE als Ersatz für ESM 250?

Bodenkarten/-flächendaten unterscheiden sich u.a. hinsichtlich

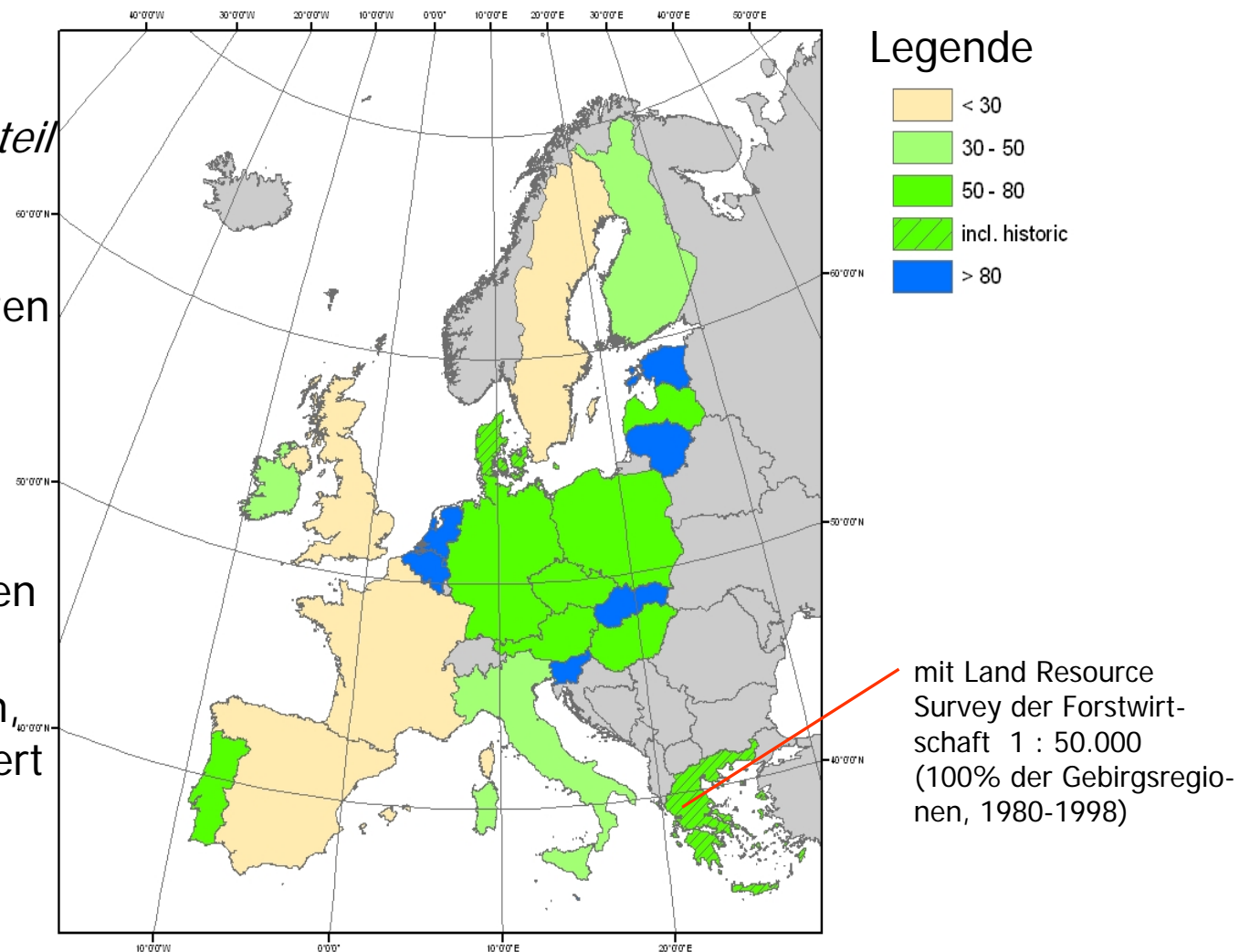
- des Zielmaßstabs
- der topographischen Grundlage
- Anforderungen an Geometrien (Mindestflächengrößen etc.)
- verwendeter Nomenklaturen/Klassifikationen

- Kriterien zur Abgrenzung von Bodenarealen
- Auswahl der vergesellschafteten Bodenformen
- Erstellung von Profilen zur Hintersetzung der Legende
- (Regeln für die) Generalisierung, Stil der Grenzföhrung
- Aktualisierung

... macht Harmonisierungsbedarf deutlich!

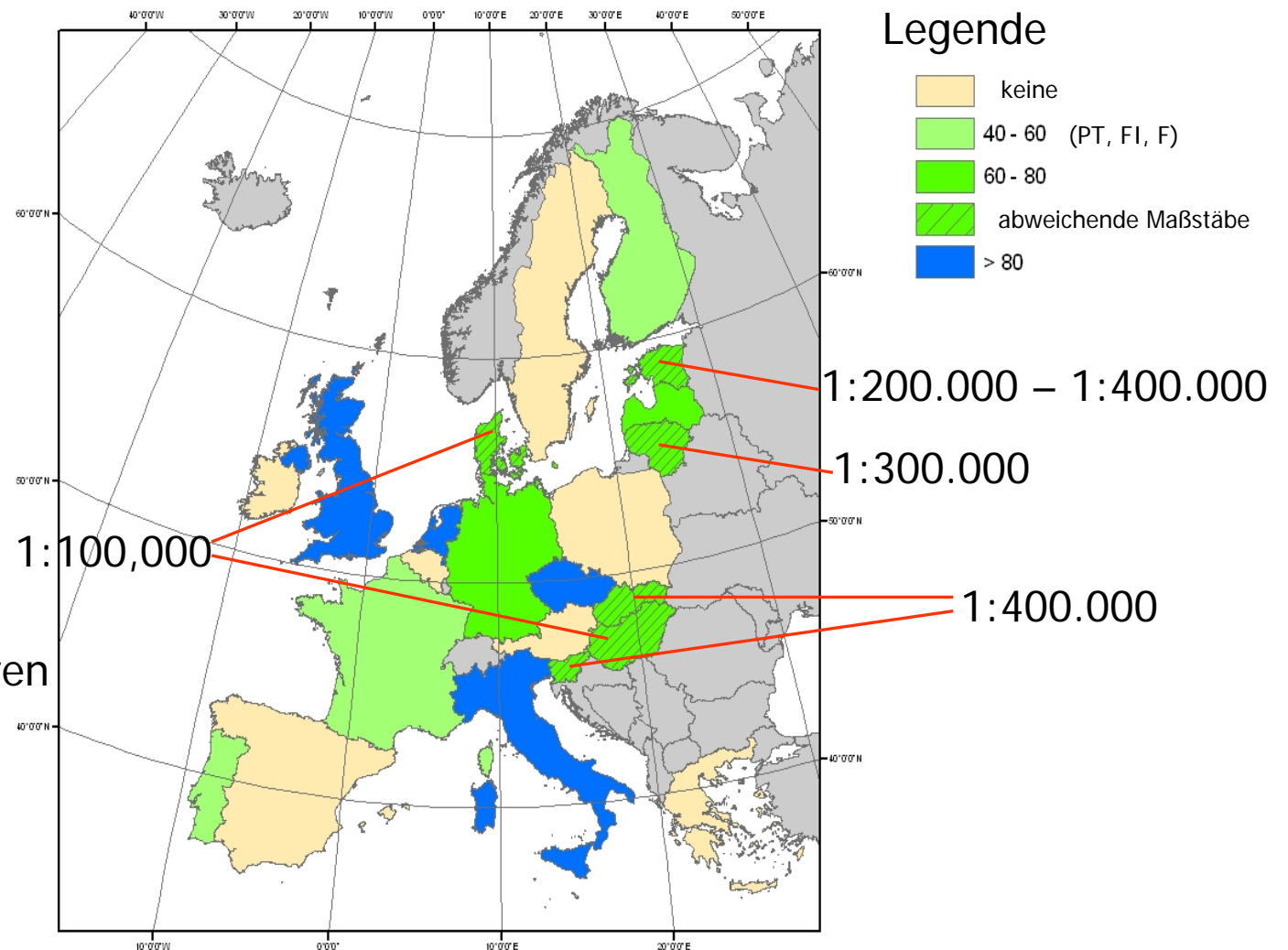
Abdeckung mit höher auflösenden Bodenkarten (EU25)

- 1 : 10.000, 1 : 25.000, 1 : 50.000 (*meist Großteil der landwirtsch. Nutzfläche kartiert*)
- z.T. forstl. Standortkarten berücksichtigt (1 : 5.000/1 : 10.000)
- untersch. Digitalisierungsgrad
- nationale Nomenklaturen
- zumeist Nachkriegskartierungen, bodengenetisch orientiert



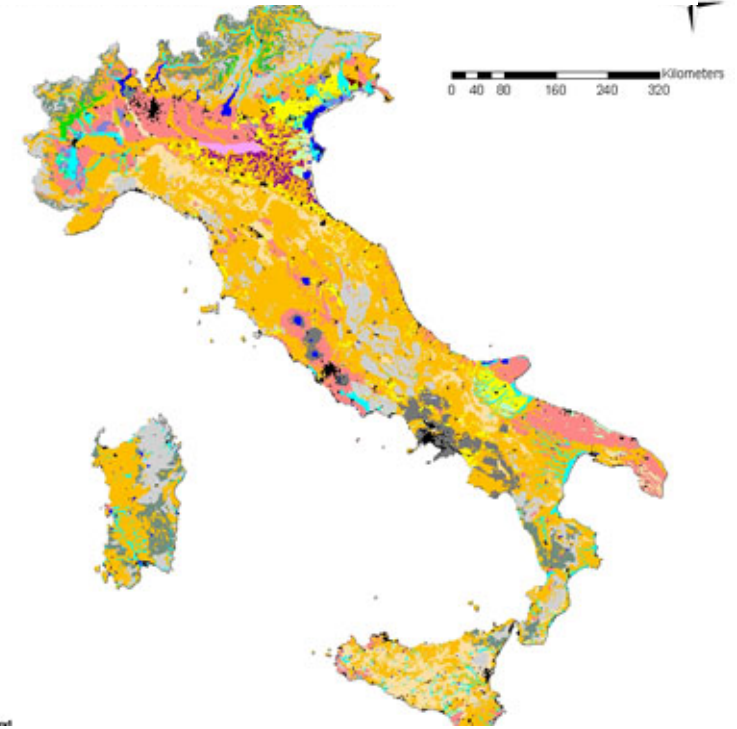
Abdeckung kleinermaßstäbige Bodenkarten (EU25)

- 1 : 200.000 und 1 : 250.000
- alle digital verfügbar
- landesweit einheitliche Legenden
- meist mit Profilinformationen hinterlegt
- nationale Nomenklaturen



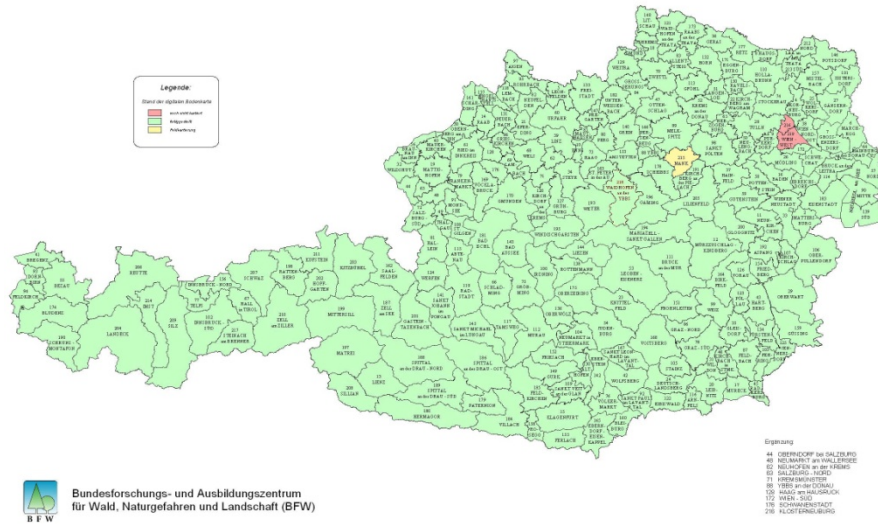
u.a.

Digitale Ökopedologische Karte Italien 1 : 250.000



<http://eusoils.jrc.ec.europa.eu/library/data/250000/Italy.htm>

Digitale Bodenkarte Österreich 1 : 25.000

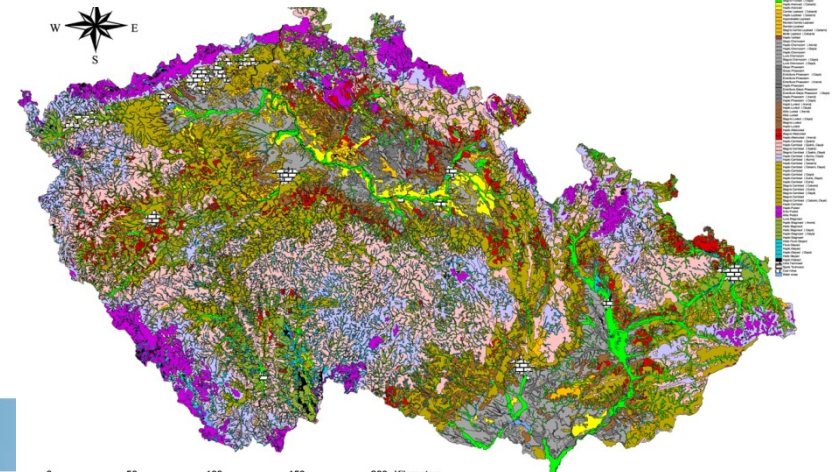


http://bfw.ac.at/rz/document_api.download?content=kb_uebersicht_g.jpg



Kreybig-Standortkundl. Karte
Ungarn 1 : 25.000
Quelle: RISSAC, Budapest;
22.000 analysierte Bodenprofile

Digitale Bodenkarte Tschechische Republik 1 : 200.000



<http://eusoils.jrc.ec.europa.eu/library/data/250000/Czech/Czech.jpg>

Vielen Dank ...

... für Ihre Aufmerksamkeit!