Diffuse soil pollution assessment and policy support

Sigbert Huber
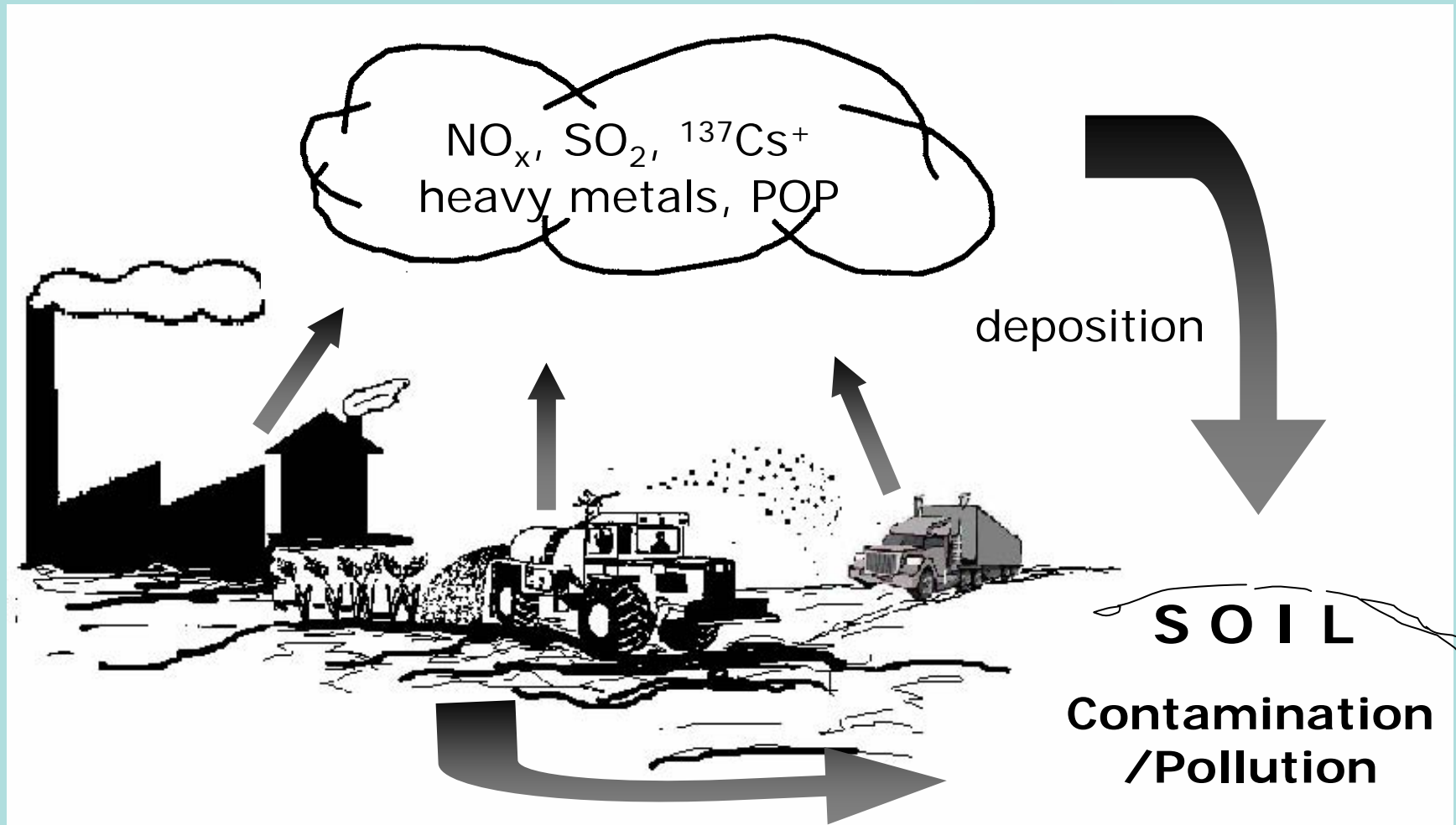
**International Conference
Soil Protection Strategy - Needs and
Approaches for Policy Support**

9-11 March 2006

Pulawy / Poland

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Diffuse soil contamination/pollution

NO_x, SO_2, $^{137}Cs^+$
heavy metals, POP

deposition

S O I L

Contamination
/Pollution

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Main targets for TWG Contamination

- **Draw a general picture of the extent of soil contamination in the enlarged EU**
- **Describe strategies and technologies for solutions**
  - **Local sources**
  - **Diffuse sources**
  - **Contaminated land management**
- **Identify the added value of action at the EU level**
  - **Policy recommendations**
- **Define what should be monitored**
- **Make a research agenda**

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Agricultural soil uses

- **Long-term Goal**
  - Balance inputs of substances with outputs
- **Tools**
  - Quality control of manure, fertilizers etc.
  - Quality control of crops
  - Methods to keep track of the balance
- **Incentives**
  - Maintenance of soil fertility (short-term)
  - Sustainable agriculture (long-term) must be stimulated by policy
  - Policies for EOM
  - Policies for food safety

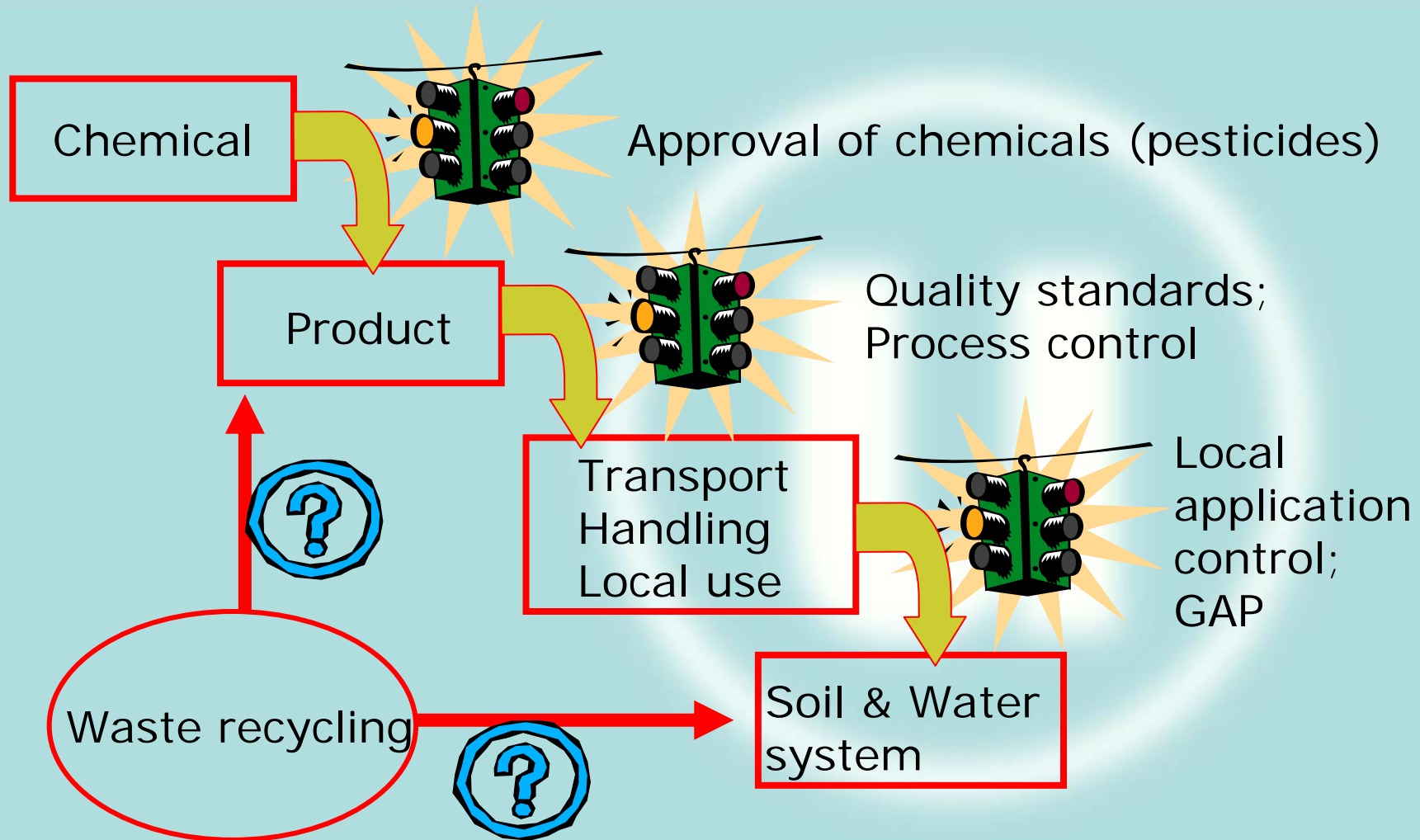umwelt**bundesamt**

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Water and air pollution

- **Long-term Goal**
  - Reduction (balance) to acceptable limits
- **Tools**
  - Emission control, deposition limits, water quality targets
  - Monitoring atmospheric deposition and sediment formation in surface waters
  - Large scale (riverbasin) integrated management systems
- **Incentives**
  - Policies for emission reduction
  - Policies for food safety and biodiversity
  - Policies related to health of ecosystems

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Recommendations - diffuse sources

- **Specification of long-term goals and short-term goals**
- **Specification of the responsibilities of the land users**
  - **Good agricultural practice**
  - **Society as a whole**
- **Link policies concerning contaminating substances**
  - **Policies for approving chemical substances (including pesticides) for the market**
  - **Policies concerning the quality of products applied on soils (fertiliser, compost)**
  - **Policies for good agricultural practices and the use of organic waste on soil**

Recommendations - diffuse sources

Chemical

Approval of chemicals (pesticides)

Product

Quality standards;
Process control

Transport
Handling
Local use

Local
application
control;
GAP

Waste recycling

Soil & Water
system

Austria: Legislation on soil protection

- **No comprehensive federal law on soil protection in Austria**
- **Soil Protection Acts at regional level**
- **Ordinances on Sewage Sludge Application on agricultural land at regional level**
- **Federal Forest Act**
- **Soil Protection Protocol of Alpine Convention**
- **Forthcoming: EU Soil Thematic Strategy**

Collection of soil information

- **Forest soil inventory at national level**

- **Environmental soil inventories at regional level**

- **Permanent soil monitoring at national and regional level**

- **Special soil investigations at local level**

- **Soil investigations at field level**

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Forest Soil Inventory of the Austrian Federal Office and Research Centre (514 sites)

Environmental Soil Inventories – Federal Provinces (5,462 sites)

Other about 30 special investigations (4,127 sites)
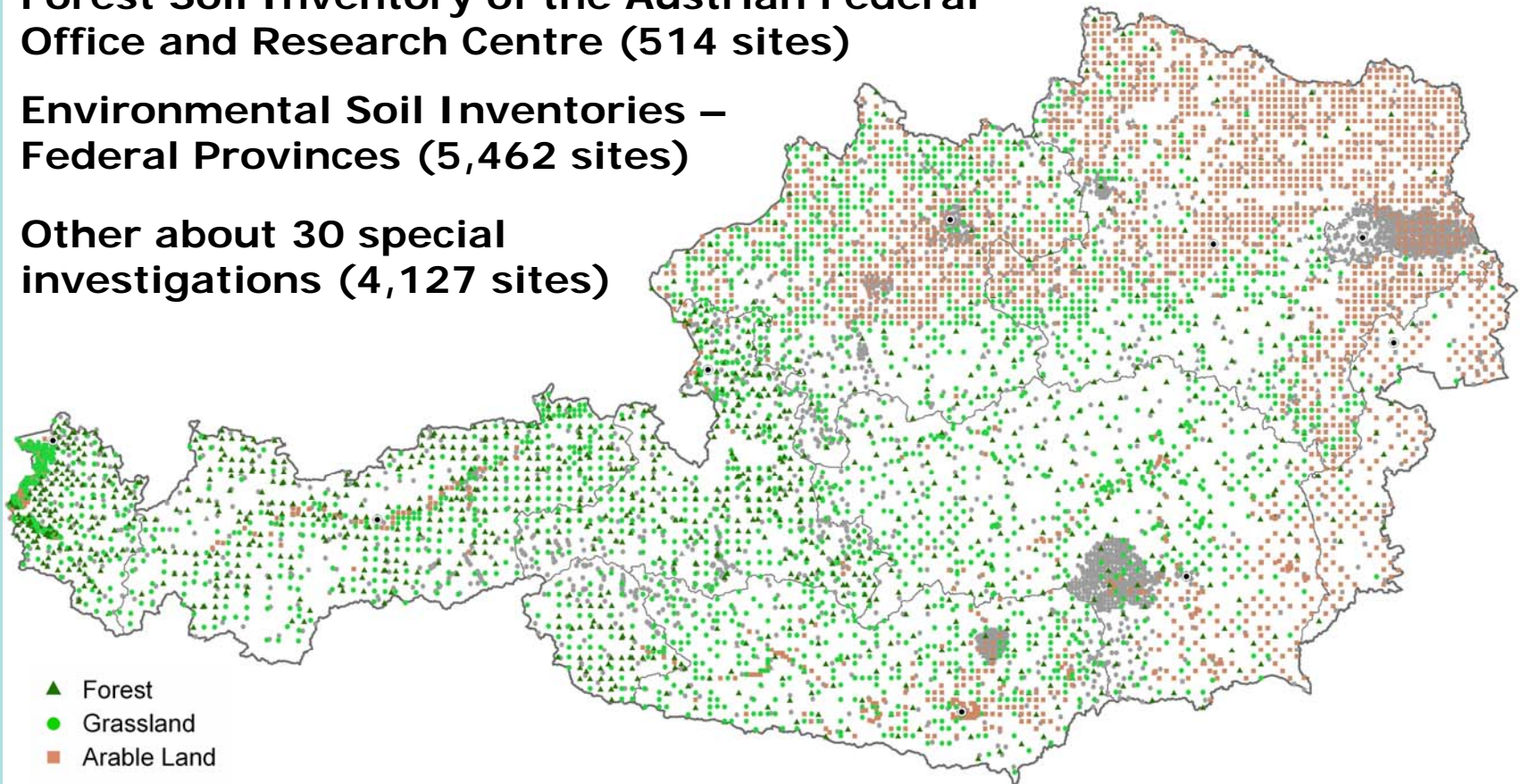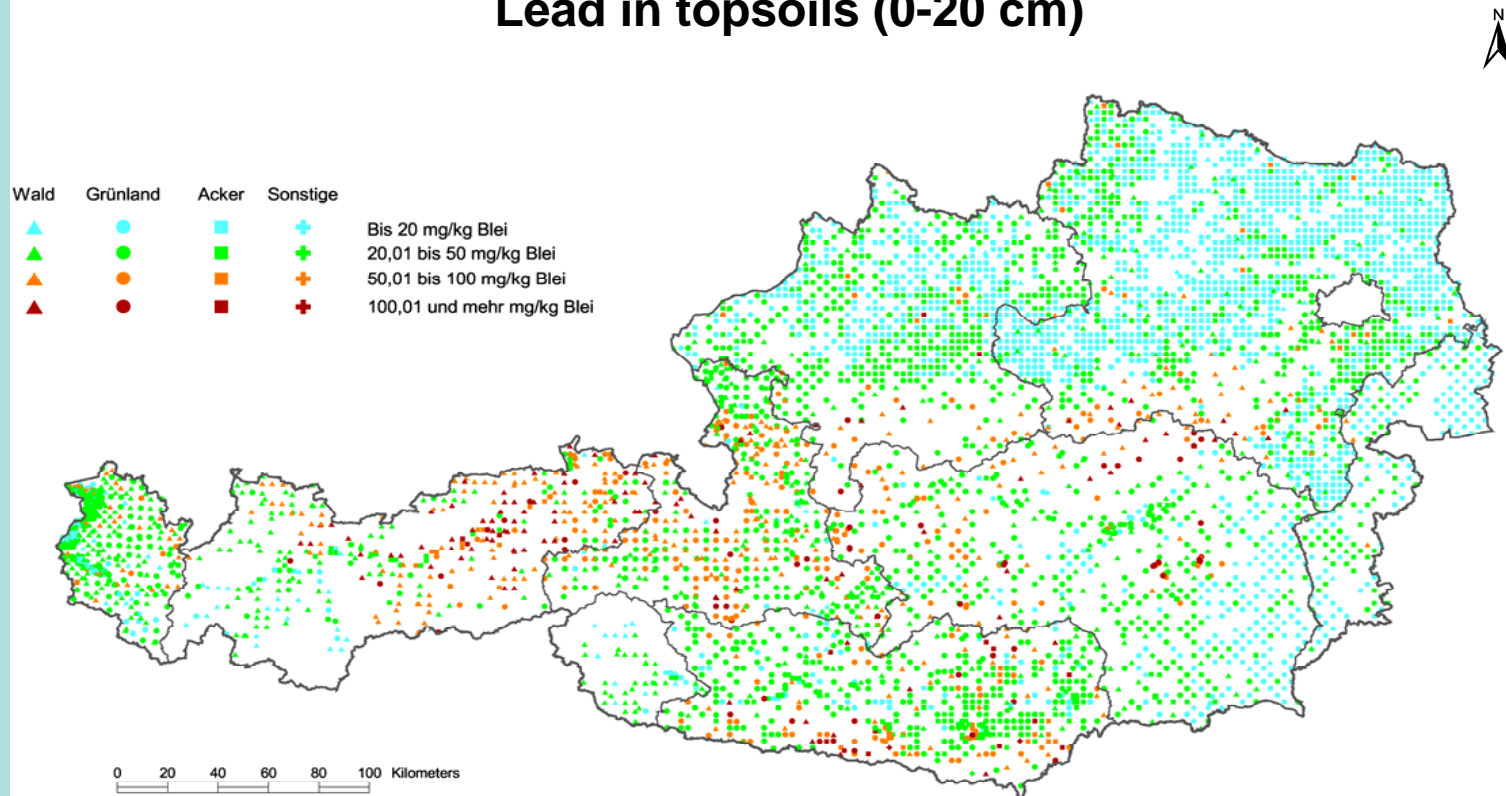
- ▲ Forest
- ● Grassland
- ■ Arable Land

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Lead in topsoils (0-20 cm)

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Cadmium in grassland soils of Austria (within 0-10 cm)
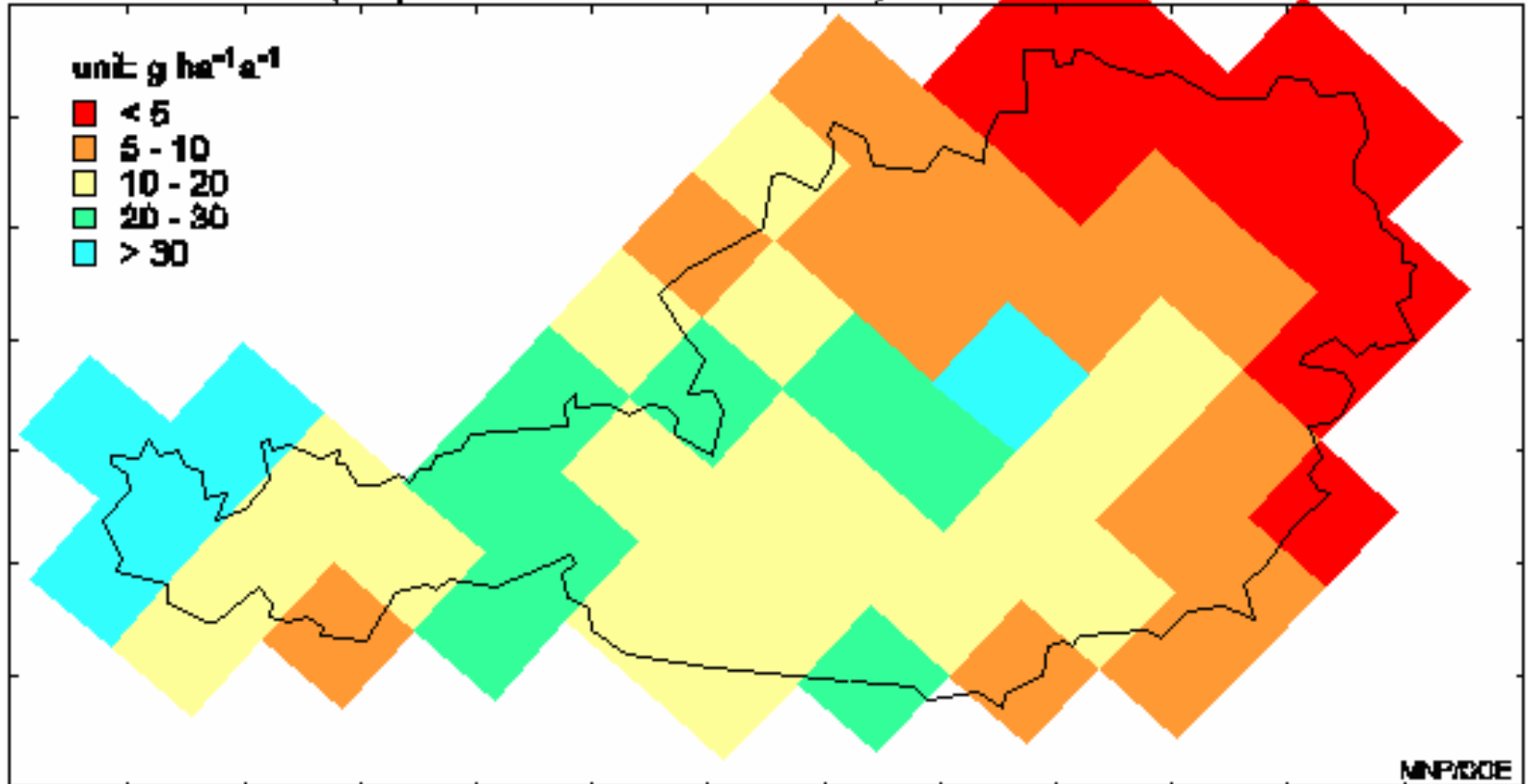**evaluated according to Austrian Standard L 1075:**
0.5 mg Cd . kg^{-1} soil

■ exceedance

■ no ecxeedance
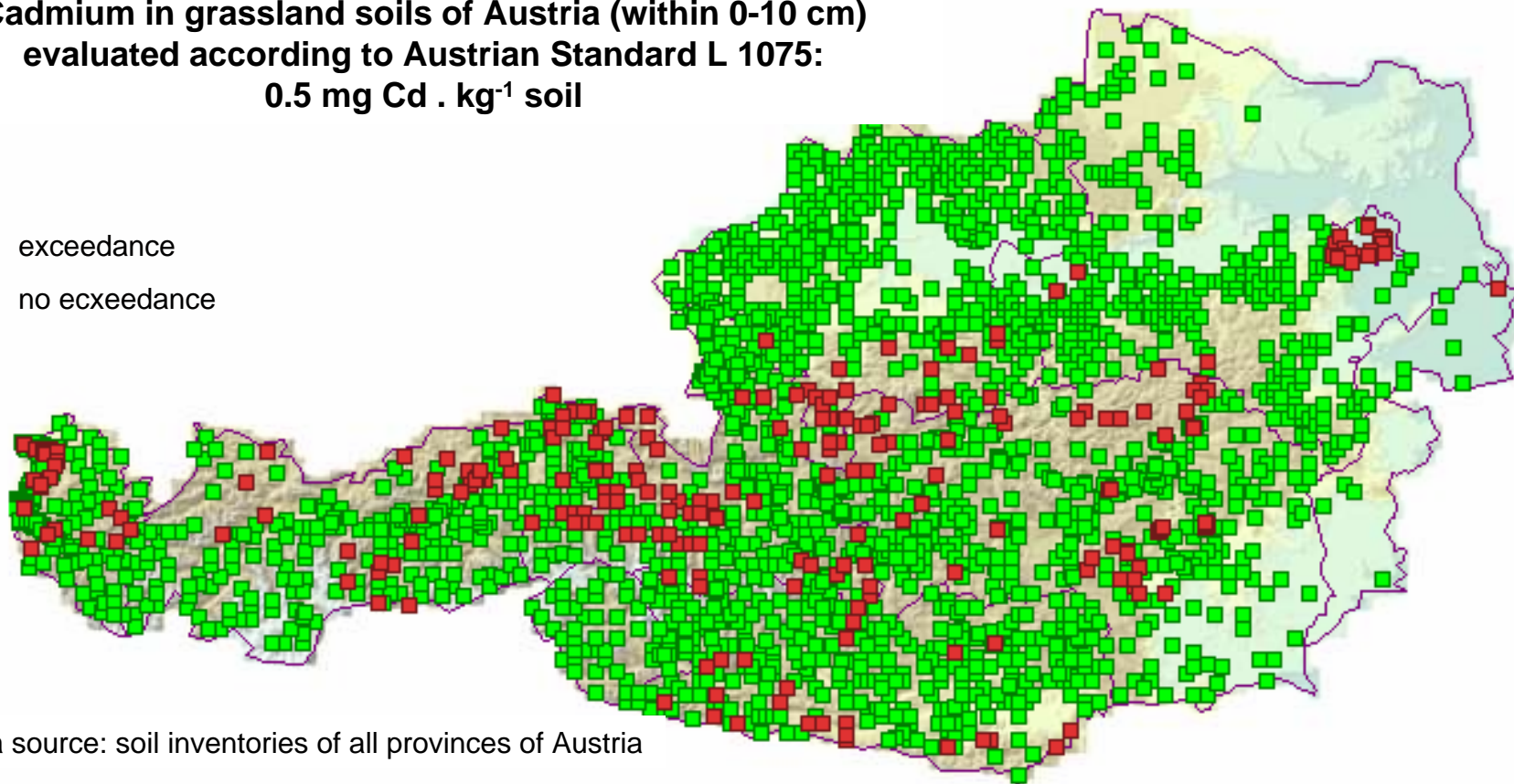
Data source: soil inventories of all provinces of Austria

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Critical load for lead

CL Pb effect-based (5th percentile – Minimized for effect)

unit: g ha⁻¹ a⁻¹
- < 5
- 5 - 10
- 10 - 20
- 20 - 30
- > 30

MNP/CCE

Indicators for diffuse soil pollution

Status of soil pollution

- Inorganic pollutants in soils
- Content of inorganic pollutants in soils in relation to soil background values
- Enrichment of inorganic pollutants in soils
- Organic pollutants in soils (e.g. PAH)
- (Metal) fluxes in agricultural soils
- Biological activities in soils

Inputs of pollutants

- Inputs (deposition) of pollutants into soils
- Development of loads of heavy metals in soils
- Bioindication with soil fauna

Indicator example
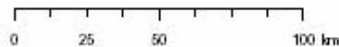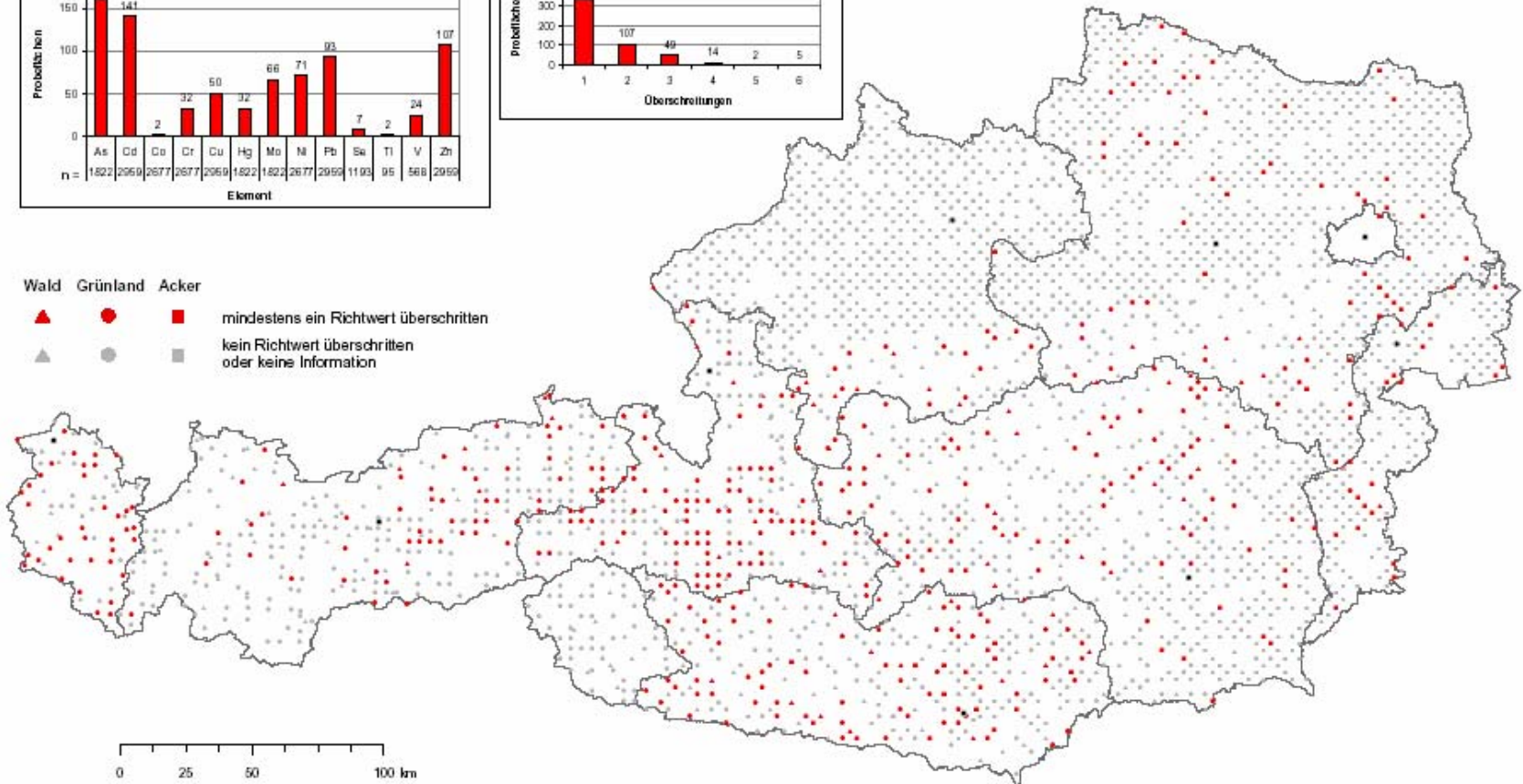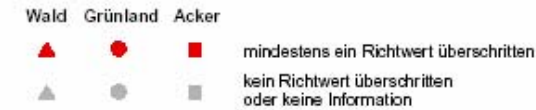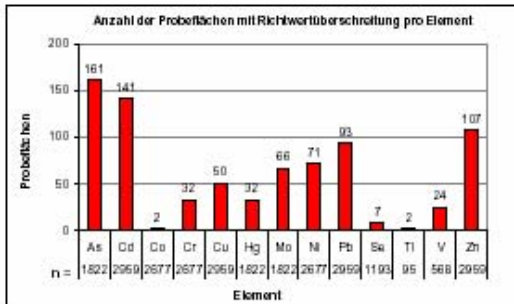
Challenges related to assessment of soil pollution by heavy metals

- Methodological differences (design, sampling, determination, frequency) ➜ comparability?

- Majority of systems investigate only "total" contents of heavy metals ➜ bioavailability?

- Scarce link between topsoil, subsoil and parent material at the site

- Link between site-specific information and spatial information (extrapolation, scale, combination of data sources)

- Link to monitoring of other media at site level (air, water, plants, biota)

- Access to data, data compilation

Conclusions for assessment

➢ **Cross linking of soil relevant data**
  - **Further development of interfaces of soil and soil relevant databases**

➢ **Further soil investigations**
  - **Investigation of organic pollutants**
  - **Repetion of soil inventories, implementation of permanent soil monitoring to provide time series**

➢ **Comparability of soil information**
  - **Good documentation of soil data**
  - **Standardisation of data recording**
  - **Transformation functions to convert different methods**
  - **Soil information system has to be flexible**

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Policy questions

- ➢ **Common policy framework**
  - Is this necessary? Which structure?

- ➢ **Precaution & Risk**
  - Prevention of soil contamination should protect the multifunctionality of soils, or the different types of land uses according to their sensitivity?
  - Is accumulation of substances in soil an adverse effect or only if there is sufficient scientific evidence about their risk?

- ➢ **The waste debate**
  - Public perception and marketing issues to be taken more seriously?
  - Optimal level of intervention for quality and application rates of products used on soils?