Implementing Soil and Biodiversity in the EU Forest Focus Monitoring Programme

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Overview and 1st results

National Programmes 2005/2006

(Art 6 of (EC)No 2152/2003)

Forest Focus Mandate

- Continuation of Regulation 3528/86

- Implement forest monitoring:
  - protection against atmospheric pollution;
  - prevention of fires and their causes and effects;
  - **biodiversity**, climate change, carbon sequestration, **soils** and protective functions of forests;
  - continuous evaluation of monitoring activities

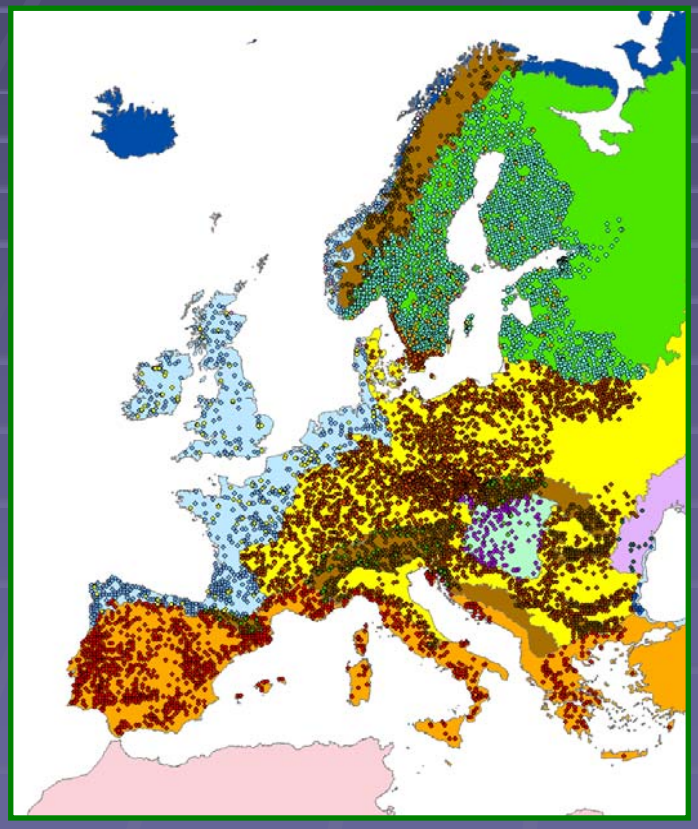
http://europa.eu.int

BioSoil

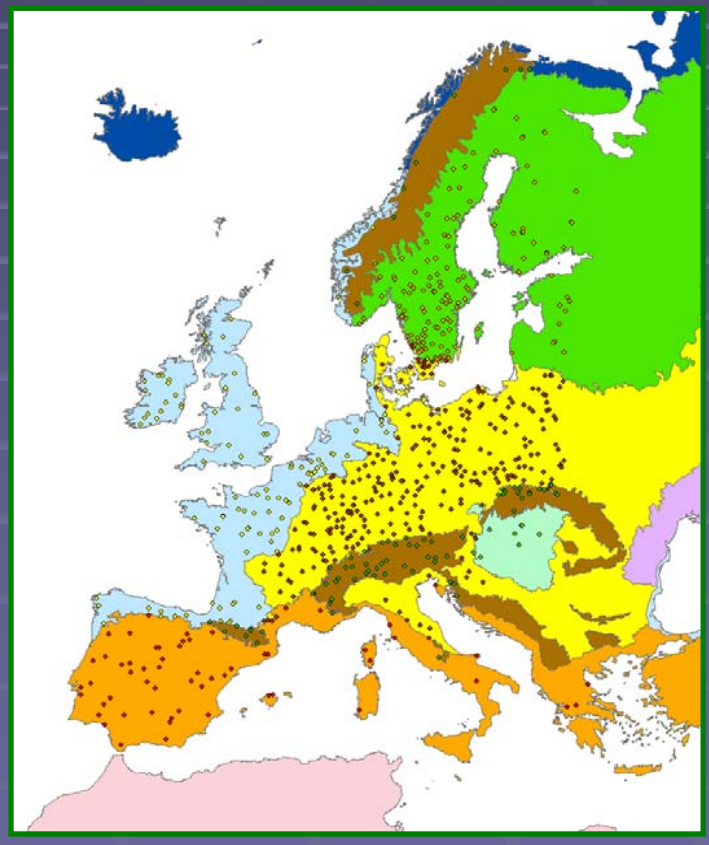
- Use of the Level I network and Level II for new issues in a joint & harmonised way
- Study of soils ~ **Level I and II**
- Study of forest biodiversity ~ at **Level I**
- Demonstration projects !

BioSoil

To compliment different levels of forest monitoring



Level 1 plots



Level 2 plots

BioSoil Biodiversity and Soil demonstration projects

- Is the proposed manual of procedures applicable at EU scale?
- Are the methods reproducible?
- Can results be compared across EU Member States?
- Are results relevant in the EU context?
- Can results be integrated into a wider European Biodiversity Information System?

Objectives for soil module

- Common **European baseline** of forest soils for environmental applications
- Common **European methodology for (forest) soil monitoring**
- To upgrade the quality of the **existing forest soil database**
- **Spatial variability**
- **Temporal changes** in forest soils.
- **Statistical analysis**
- **Applicability of the methodology**
- **QA/QC strategy** for European forest soil condition survey.

Objectives for the biodiversity module

- To establish the first common **European platform** of forest biodiversity for environmental applications
- To finalise a common **European methodology for (forest) biodiversity monitoring**
- To build up a common **forest biodiversity database**
- To quantify **spatial variability** on the basis of information available
- To evaluate the **applicability of the methodology** adopted by the European forest biodiversity monitoring programme.

Organisation

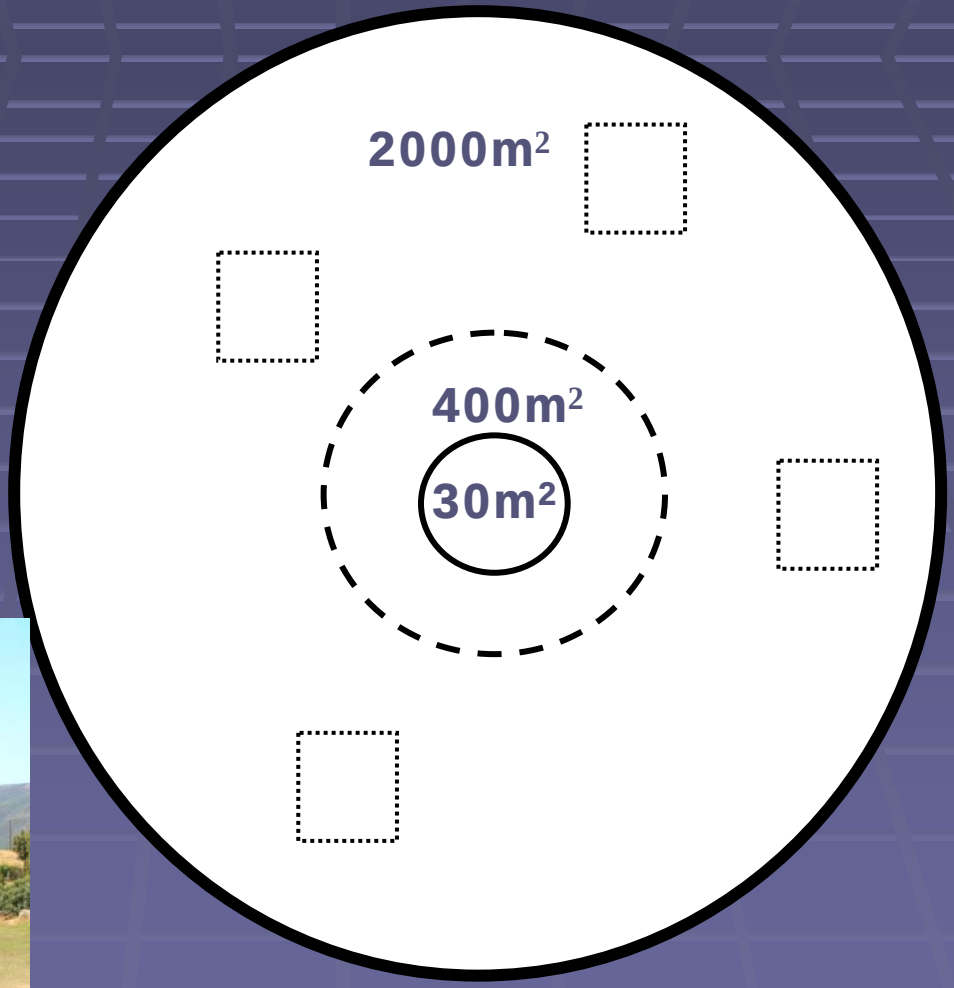
- Sampling, analysis, data management including data evaluation at national/regional level:
  - MSs/Regions under NP 2005/2006
- Data management at European level and central laboratory : JRC (open procedure)

BioSoil Soil sampling

- **Full soil profile description (FAO-1990)**
- **Classification according to WRB-1998).**
- **5 sampling depths:**
  - **Ol, Of/Oh/Ofh 0-10 cm, 10-20 cm, 20-40 cm and 40-80 cm**
- **Analysis on all mandatory and optional soil parameters**

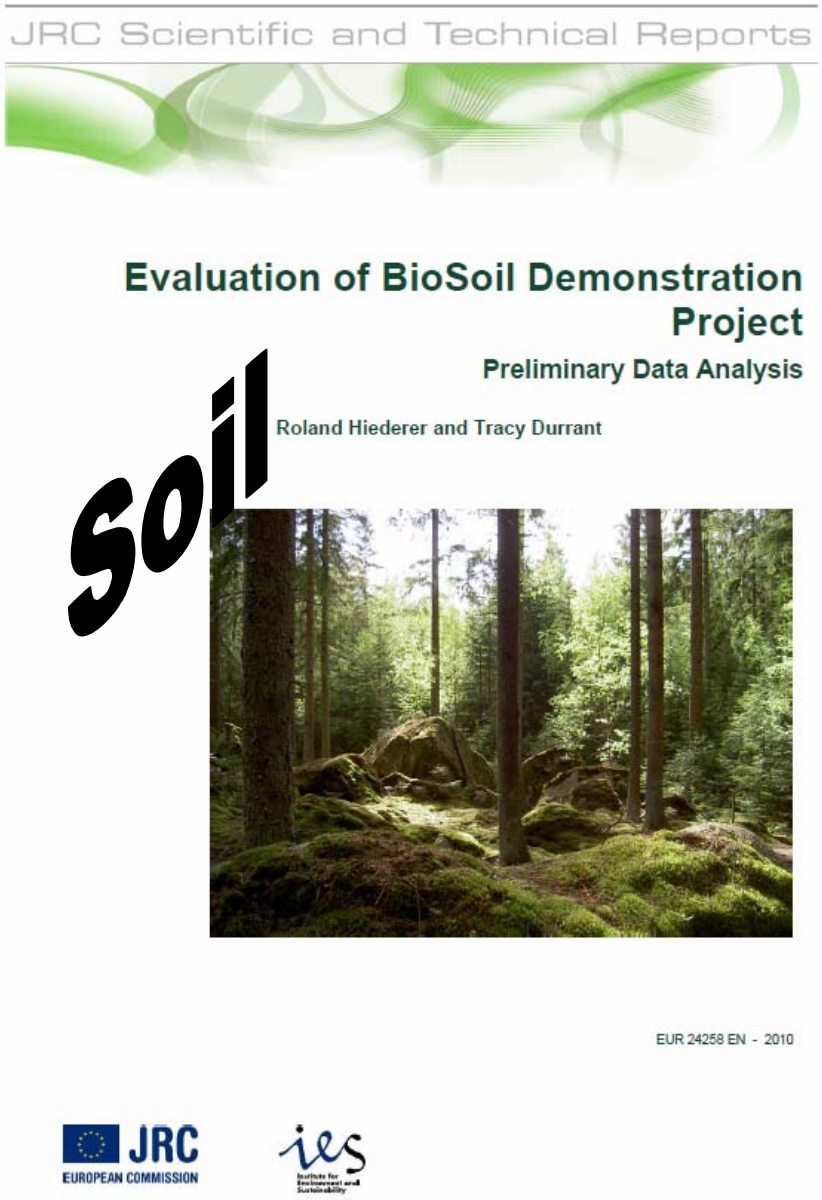
From points to georeferenced plots

BioSoil Plot



BioSoil parameters

- Forest type classification
- Structural forest diversity
  - DBH
  - Coarse woody debris, standing dead trees and snags, stumps
  - Canopy closure and layering
- Compositional forest diversity
  - Woody species composition
  - All vascular species list

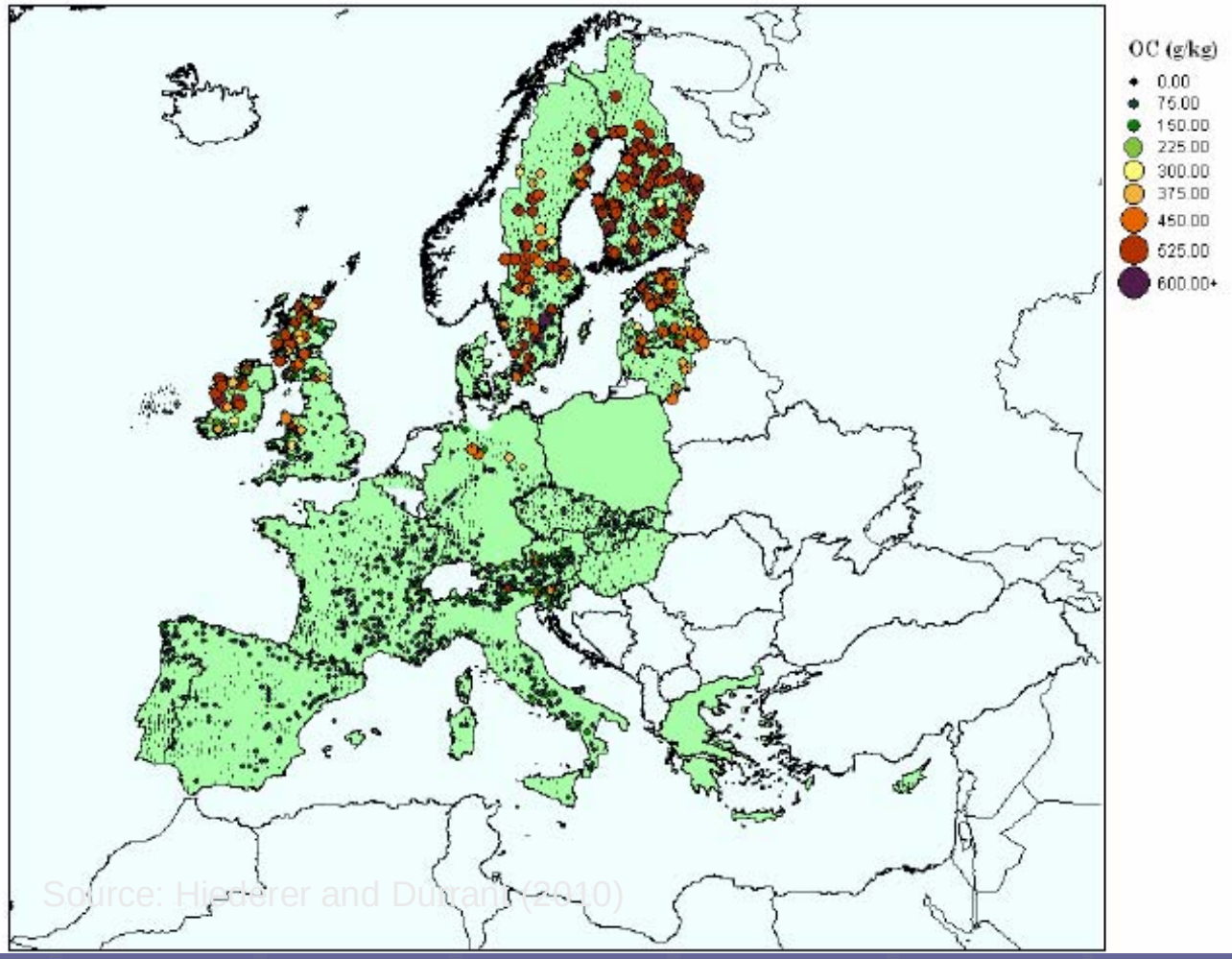


First analysis

- Assess the consistency of selected constant parameters (soil and site) between data from the previous soil survey and BioSoil data
- Determine temporal change for soil organic carbon content and density between data from the previous soil survey data to BioSoil data
- Assess the spatial variability of soil organic carbon at country level

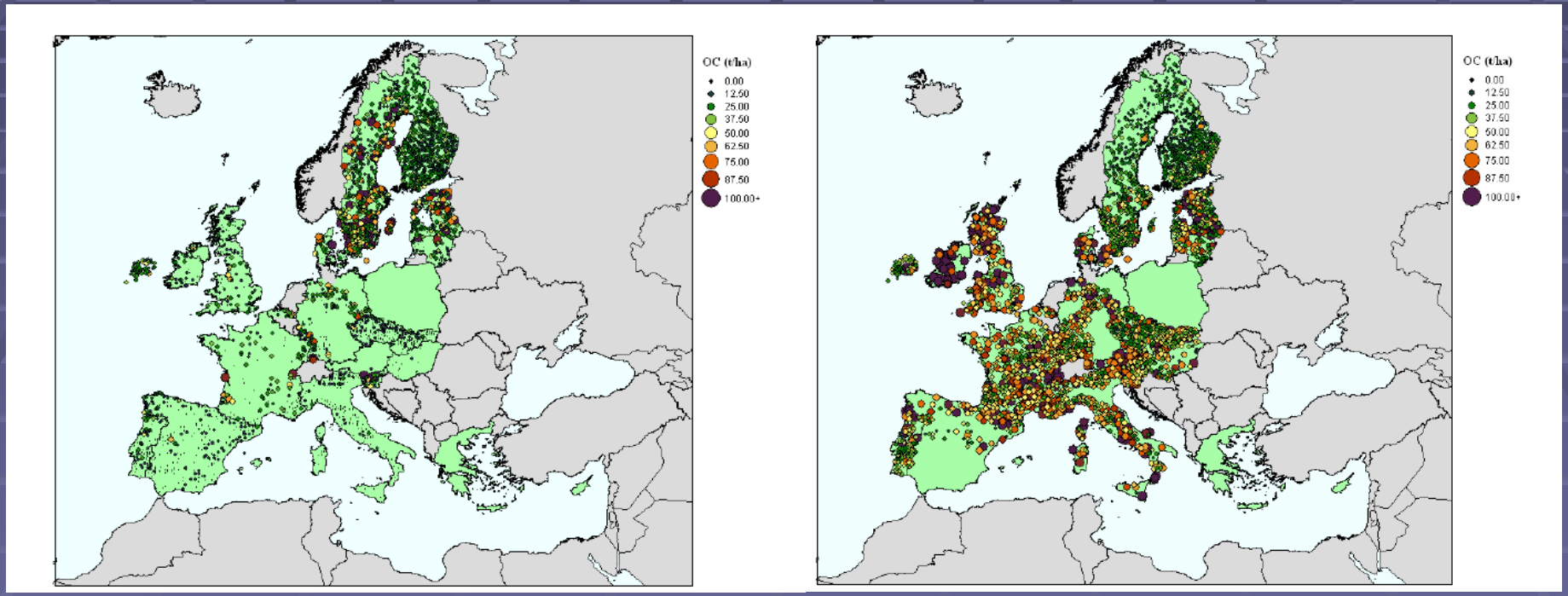
- QA procedures
- Parameters used during data validation
- Review the methodologies

Soil organic content



Source: Hiederer and Durrant (2010)

Soil carbon quantity

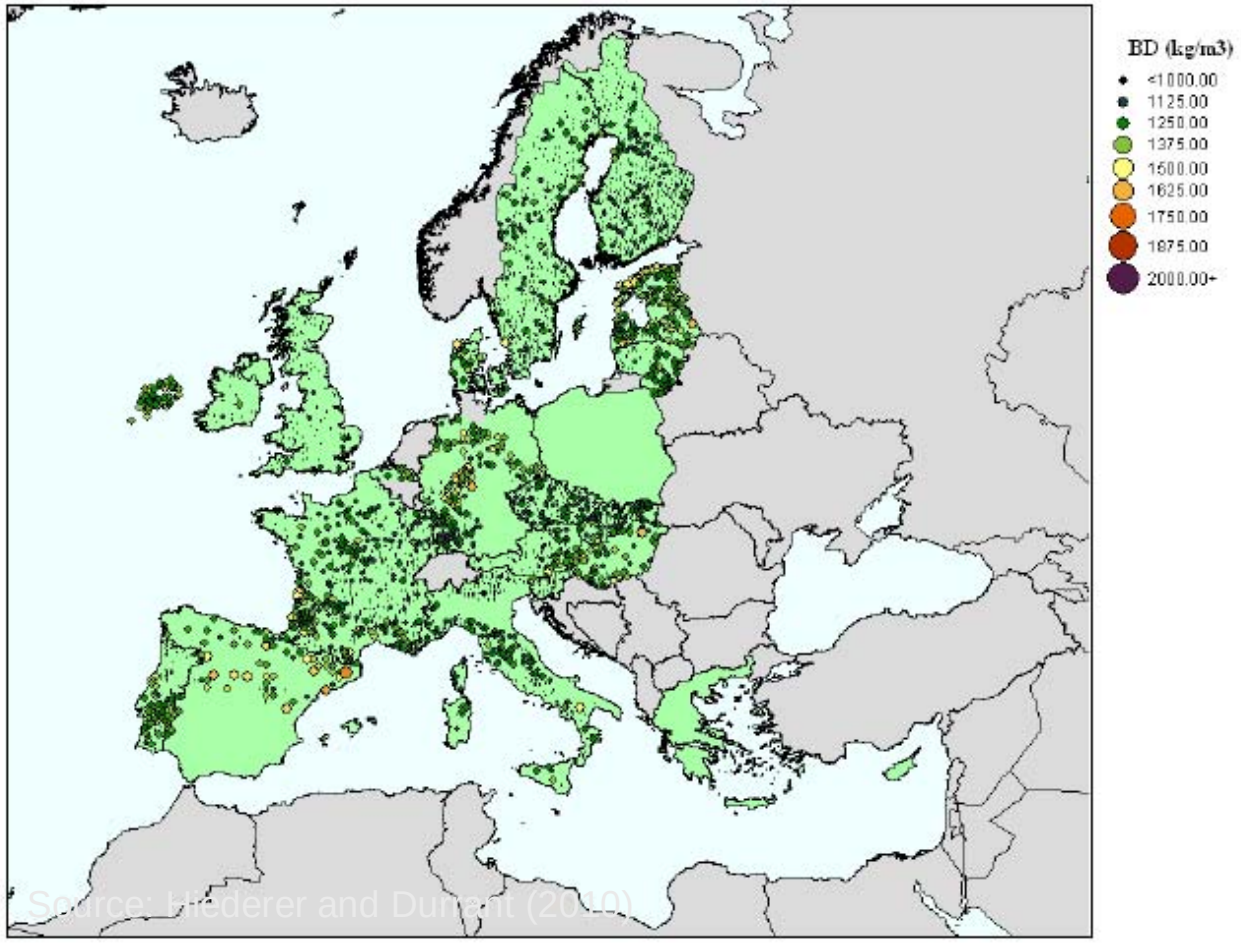


Organic layer

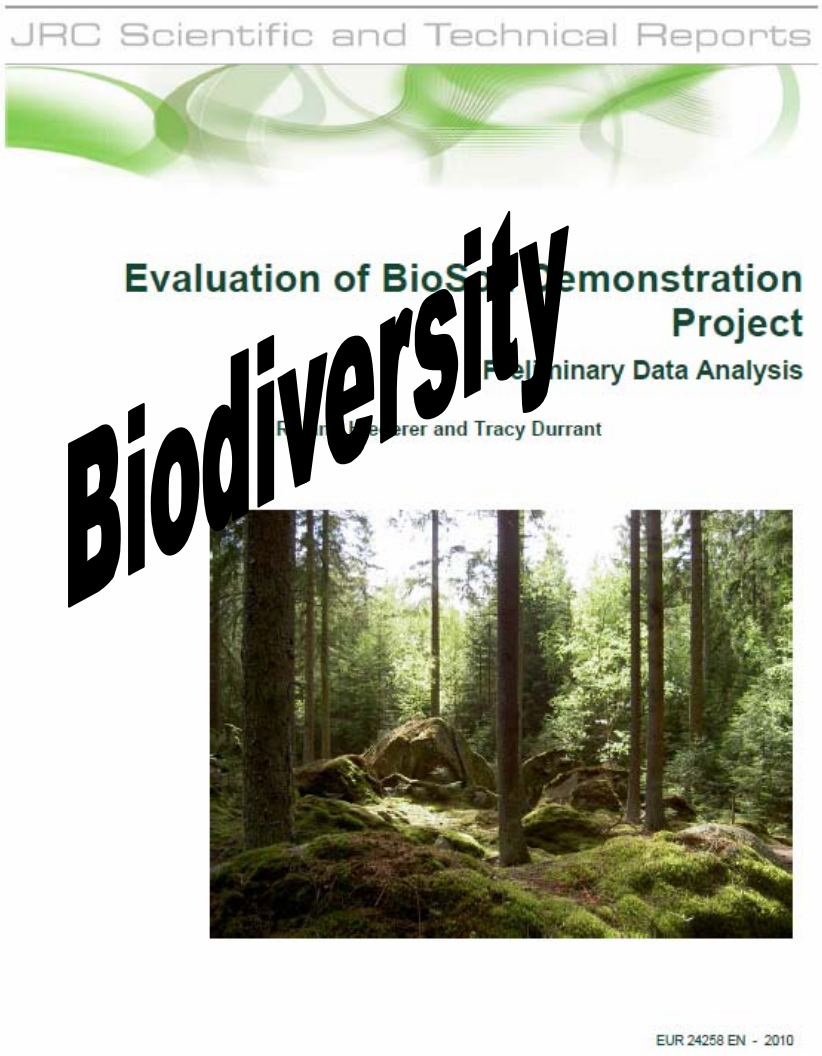
Mineral layer

Source: Hiederer and Durrant (2010)

Soil bulk density 0-20cm



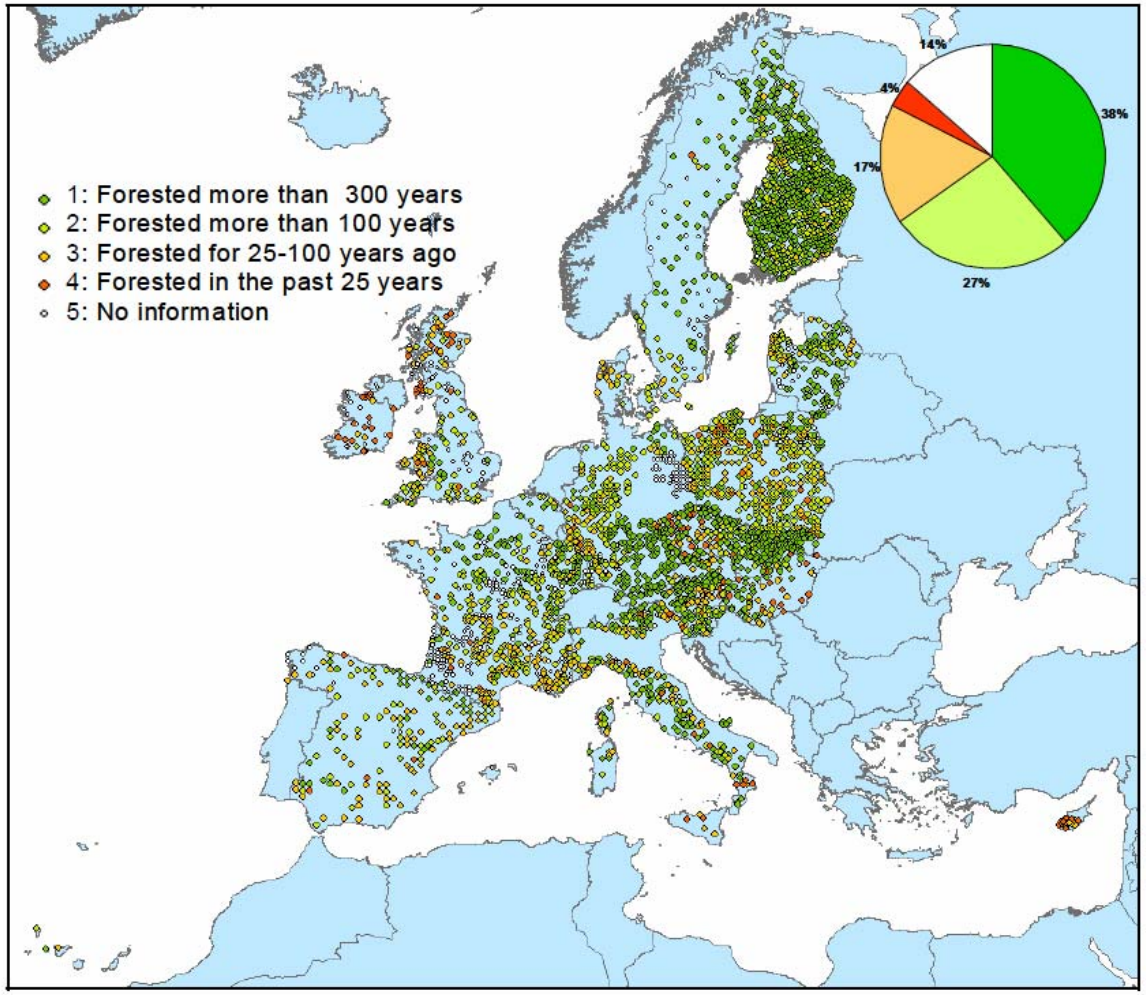
Source: Hiederer and Durrant (2010)



First analysis

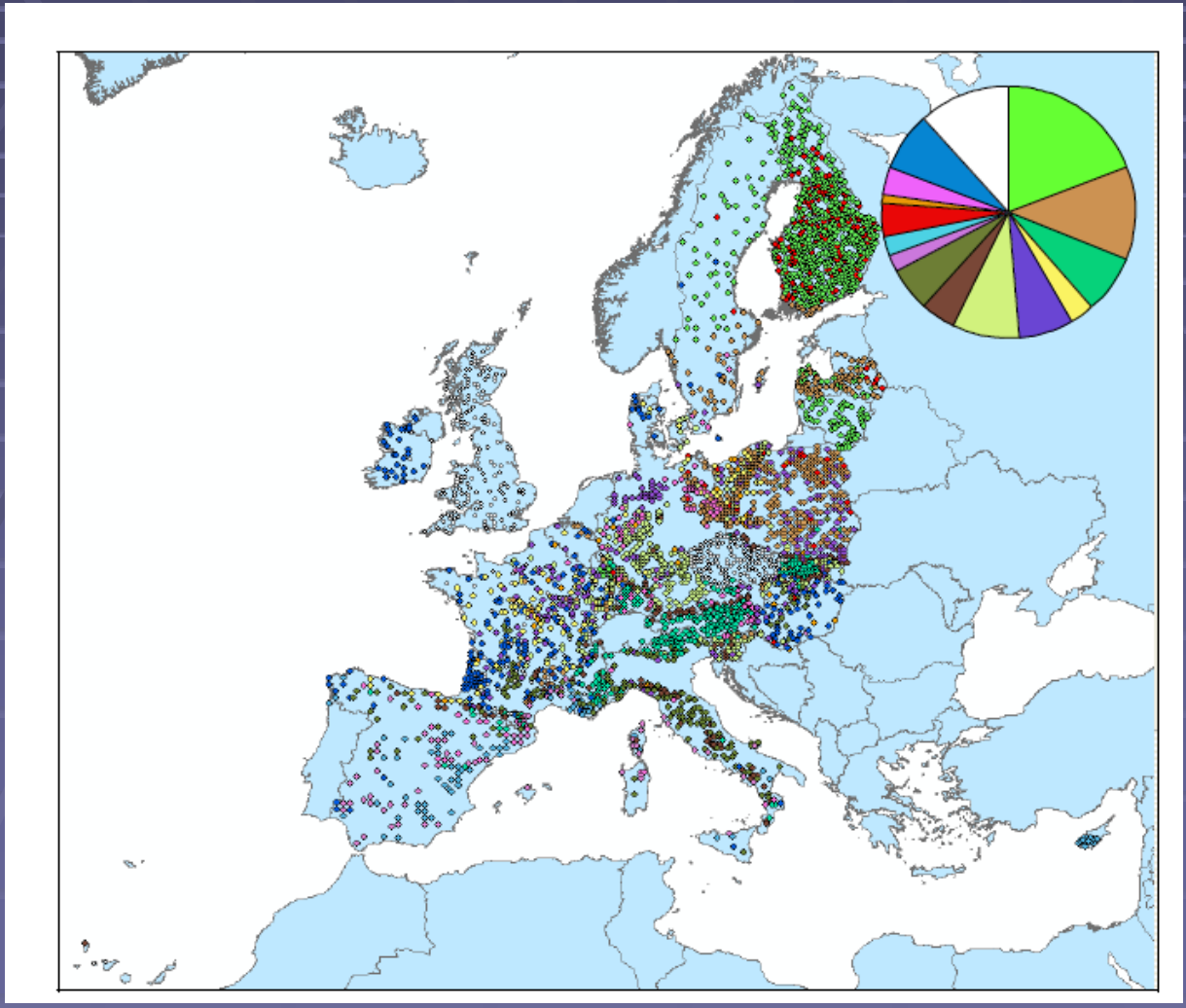
- Exploring and summarising the data in preparation for the more detailed analyses

Previous land use



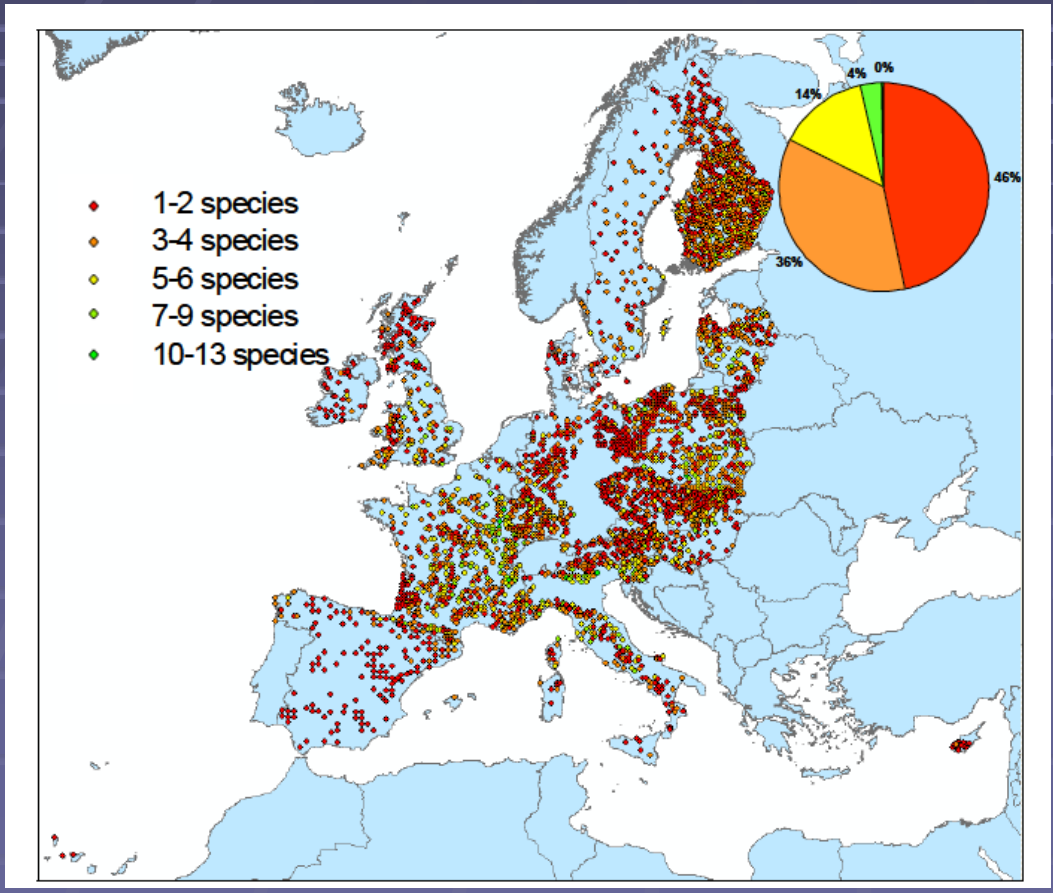
- 65% more than 100 years forests
- 50% of stands natural regeneration

European forest classification

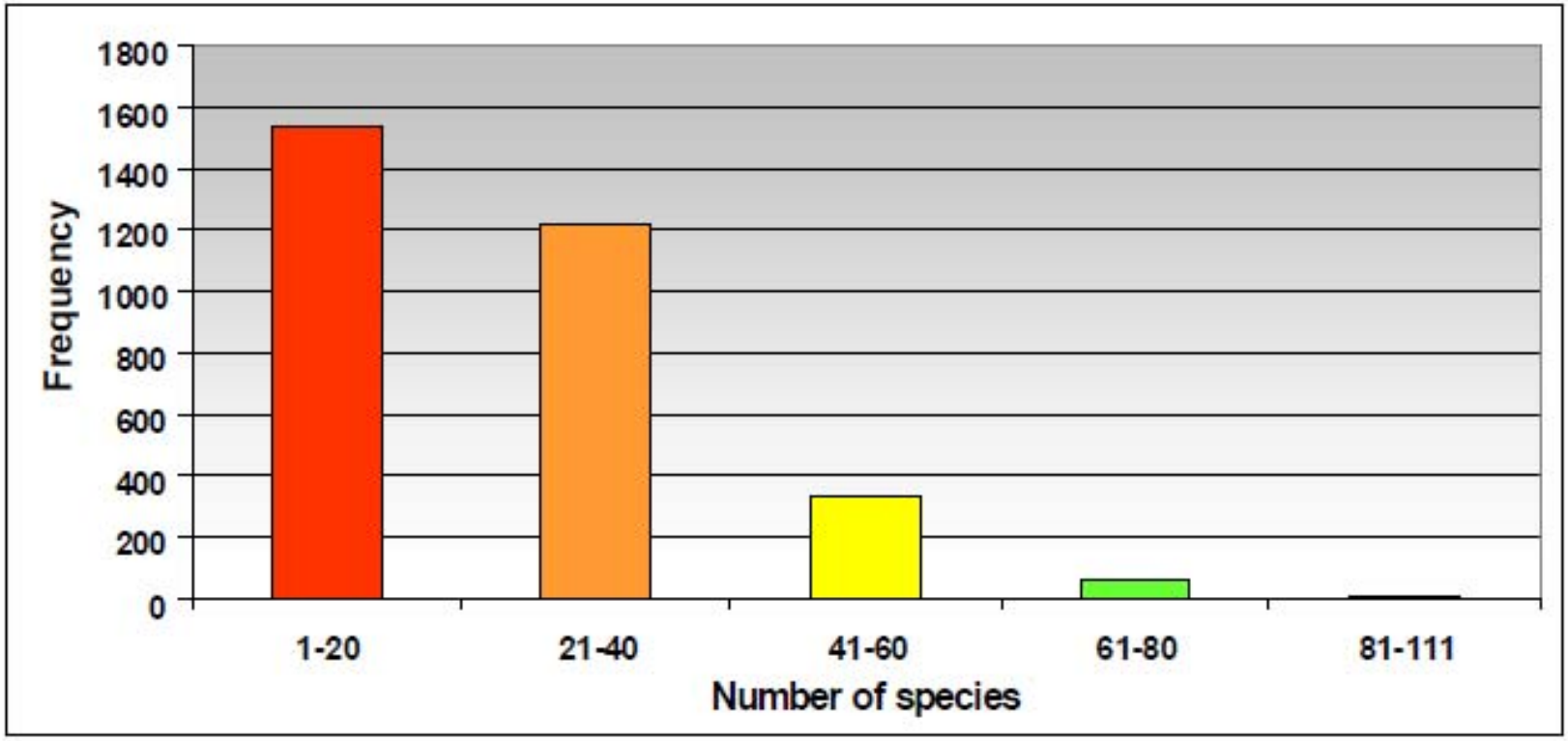


- Boreal Forest (18% of plots)
- Hemiboreal and nemoral Scots Pine forest (12% of plots)

Species richness



Frequency distribution of ground vegetation



Recommendations Soil

- focus the range of parameters, simplify the procedure and provide coherent specifications
- Revise and possibly reduce the number of physical and chemical soil parameters

Recommendations BioDiversity

- Successful for test of practical indicators of forest biodiversity
- Recommended to clarify and simplify procedures wherever possible.
- local interpretation (which trees to count, what classes to use for cover) affect the comparability of the data at European level.

Acknowledgments

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- All 23 participating countries and NFCs
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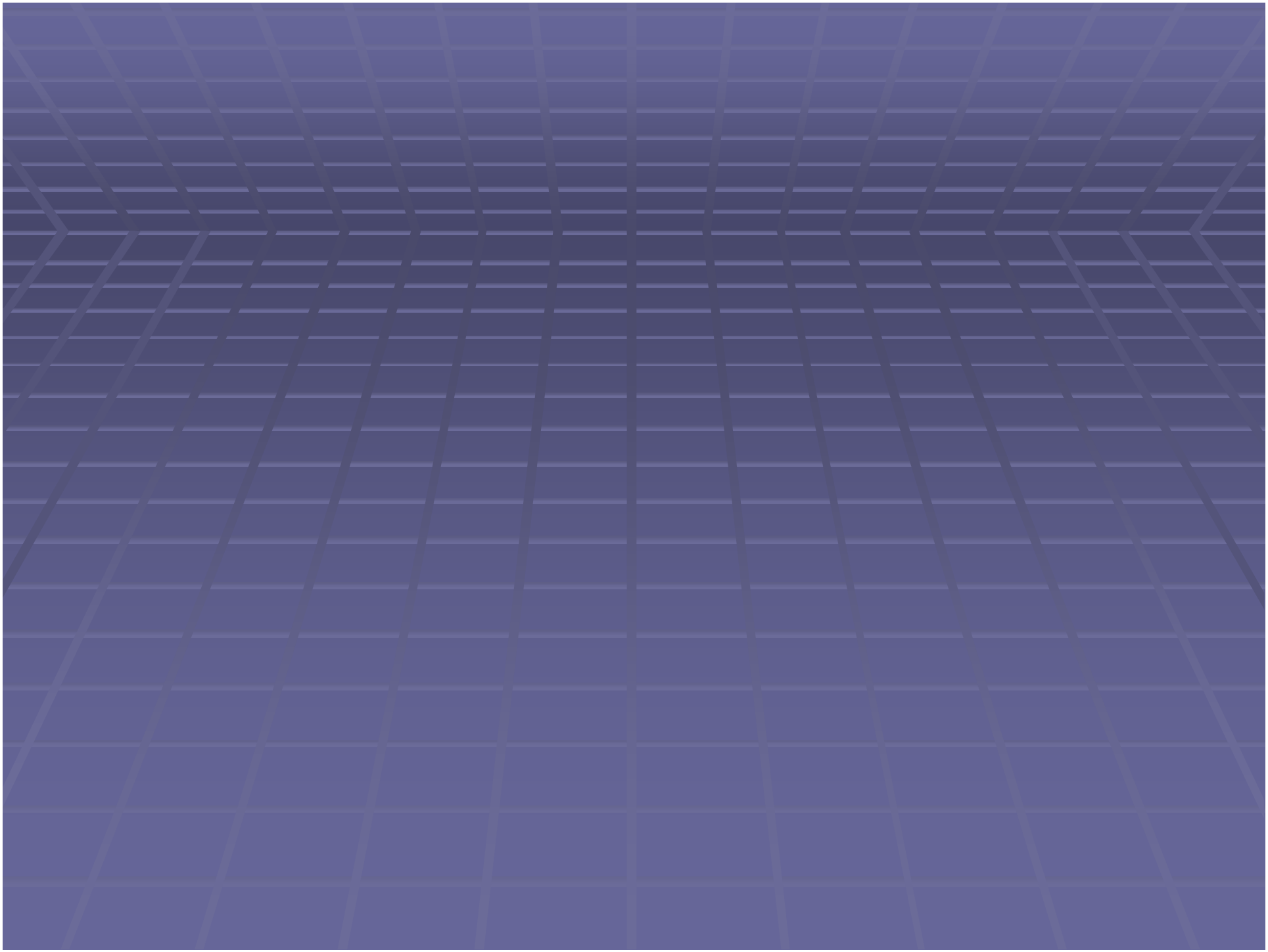
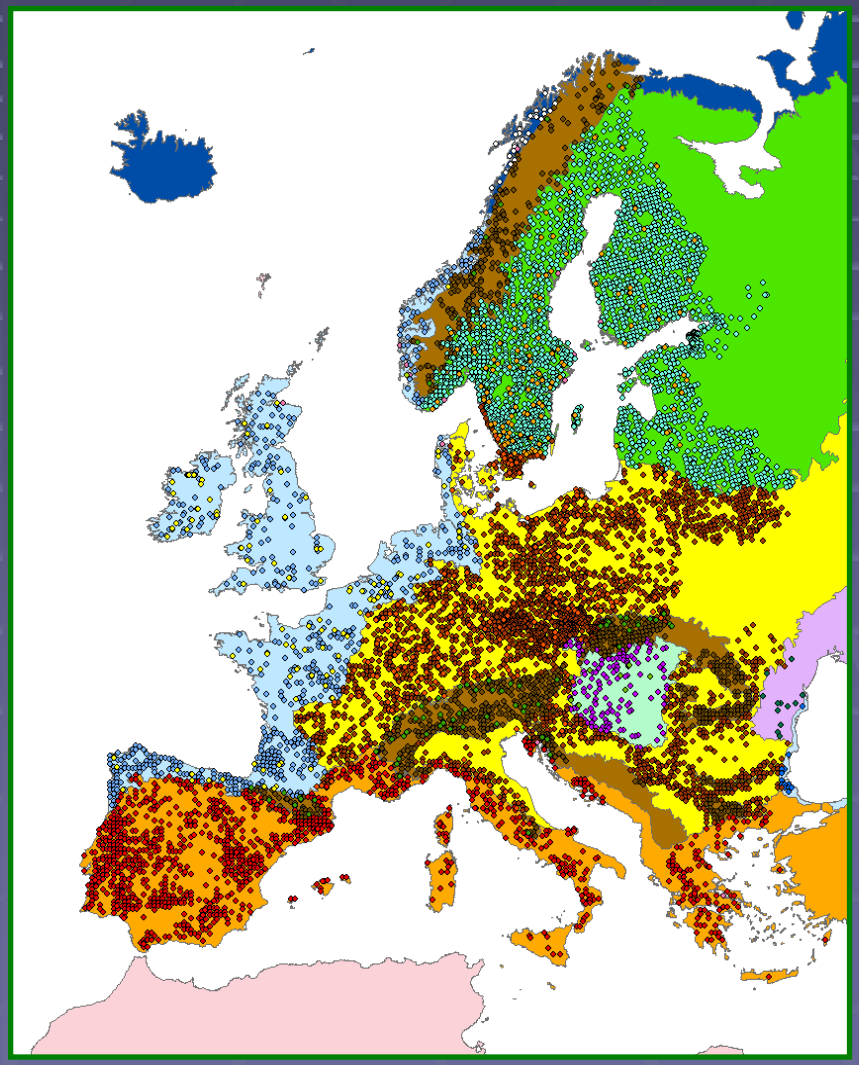
- The European Commission JRC, Ispra with special thanks to Jesus San-Miguel Ayanz, Luca Montanarella, Roland Hiederer and Tracy Durrant



Forest Ecosystems Monitoring at 2 levels

- **Extensive** network of observation points ~ 6,000 (16 km x 16 km grid)
- Annual surveys of crown condition
- Surveys of soil & foliage



Forest Ecosystems Monitoring at 2 levels

- **Intensive** network of ~ 900 plots
  - Crown condition
  - Air quality
  - Deposition
  - Meteorology
  - Soil & soil waters
  - Foliage
  - Growth
  - Ground vegetation