

# **Characteristics, availability and quality control of geo-spatial data for spatially distributed modelling**

**(data available at the European Soil Data Centre)**

**Marc Van Liedekerke  
European Commission  
Joint Research Centre**

## Joint Research Centre of the European Commission - JRC

- Directorate General (like DG ENV, DG SANTE, DG AGRI, EUROSTAT, ...), not an agency (like EEA, EFSA)
- European Commission's science and knowledge service which employs scientists to carry out research in order to provide **independent** scientific advice and support to EU policy.
- 6 sites in five EU countries (Brussels, Geel, Ispra, Karlsruhe, Petten, Seville) – 3,000 people
- €330 million annually for direct support to EU institutions



COMMISSIONER  
**Tibor Navracsics**

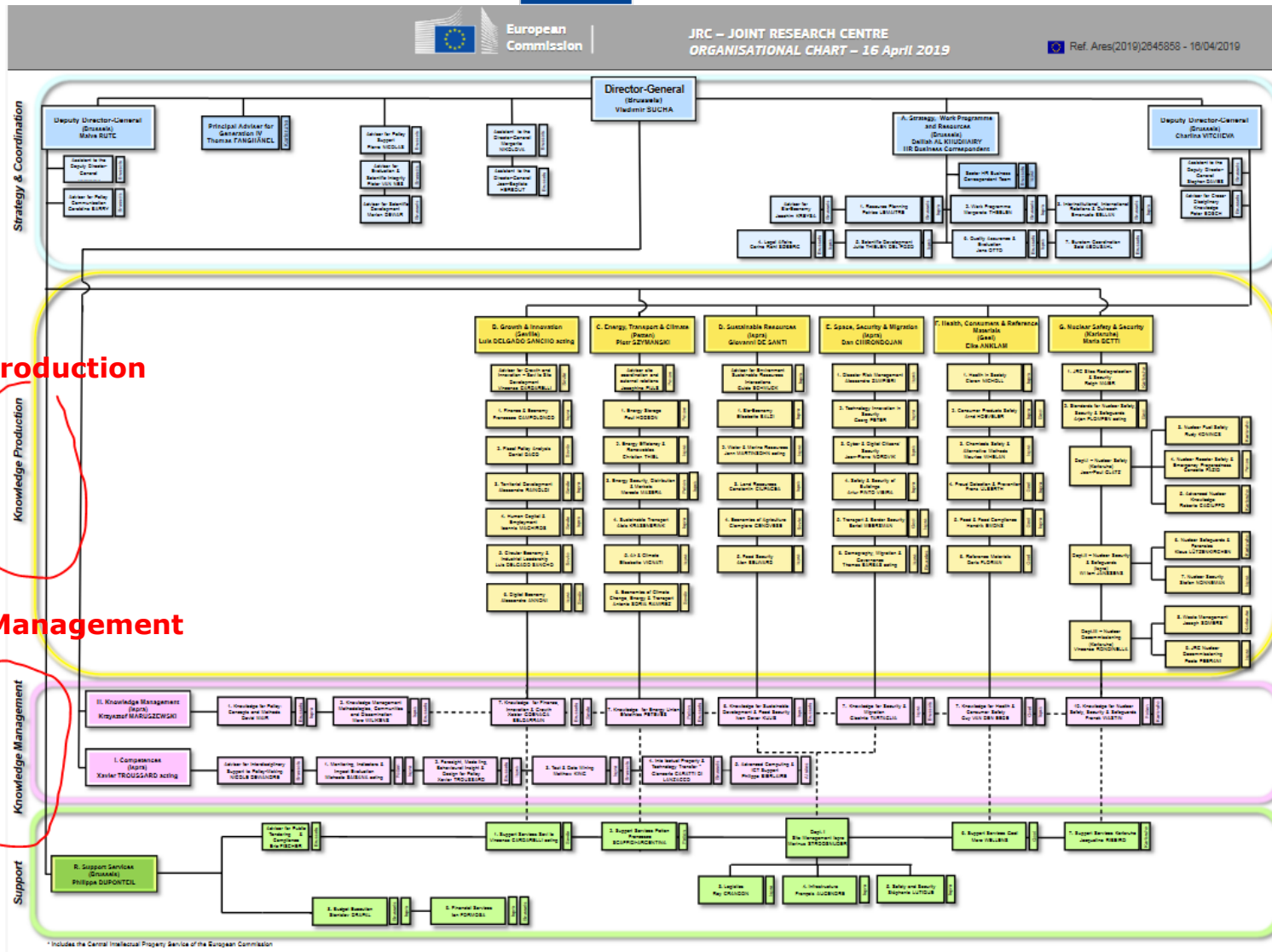


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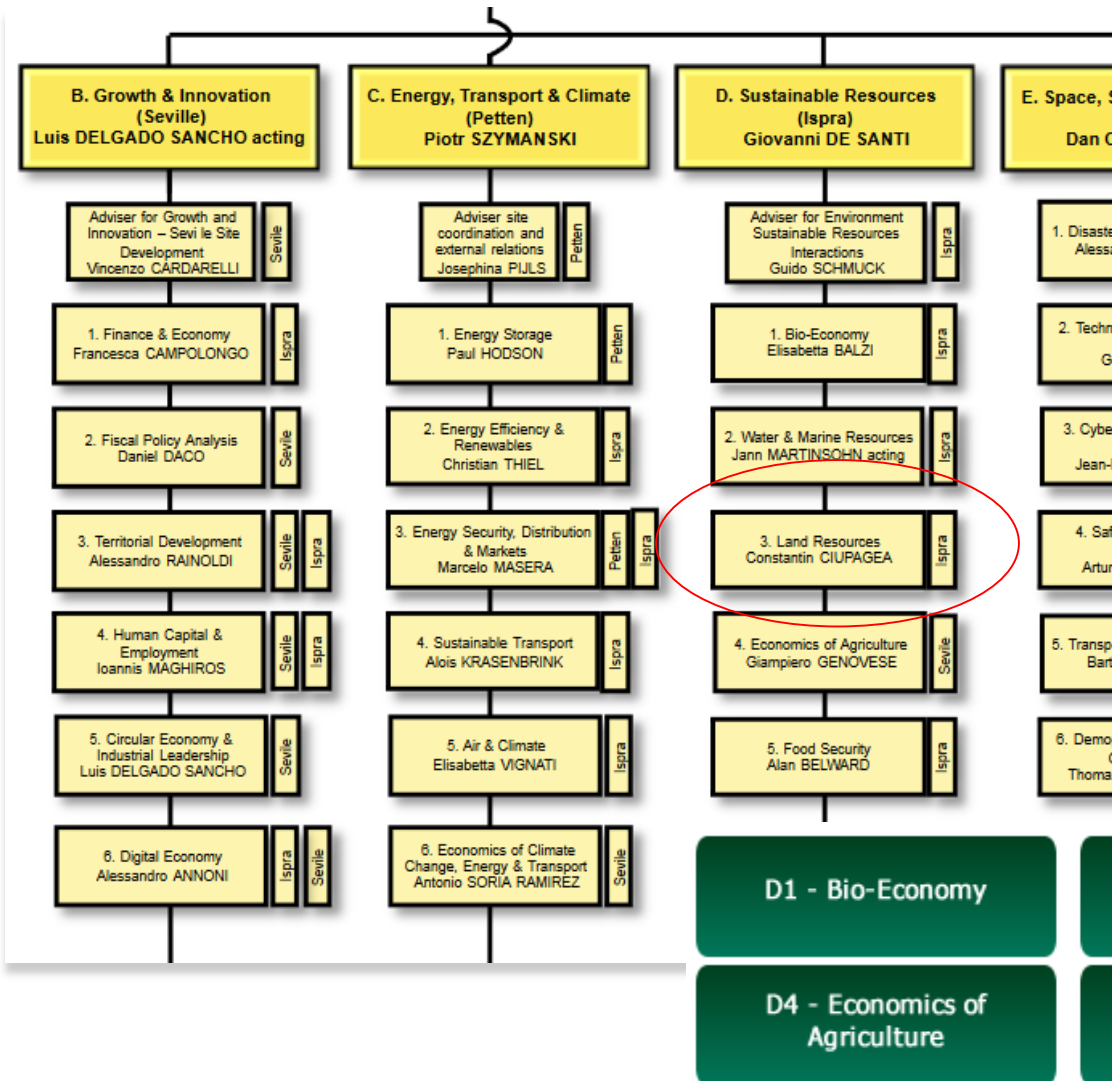


## Joint Research Centre of the European Commission - JRC

- Complex structure with knowledge production and knowledge management units and thematic **directorates**
- **Directorate "Sustainable resources"**: produces knowledge for EU policies related to the sustainable use of resources, encompassing environmental, economic and social dimensions.
  - focuses on **land, soil, forests, water, marine resources, raw materials, biodiversity and related ecosystem services**, and supports the development of a sustainable **bioeconomy**;
  - monitors and analyses **agriculture** and **food production**, consumption and trade, including the macro- and micro-economic aspects, their impact on **food security**, public goods and the environment;
  - highlights the threats to our existing resources and explores alternatives and future perspectives using advanced biophysical and economic analyses, including geospatial technologies, modelling and supply-chain analyses.
  - Ca 400 staff



## Directorates are organized in Units



### Land Resources Unit

- Soil
- Ecosystem Services
- Raw Materials
- "Soil" as thematic area in JRC around for more than 20 years
- **SOIL\_NACA: Securing SOIL as Natural Capital**
- European Soil Data Centre is around for 12 years



## SOIL\_NACA: Securing SOIL as NATural Capital

SOIL\_NACA provides the soil-centric framework required to support the **EU's Soil Thematic Strategy** while contributing to related policy areas (e.g. **CAP, Climate and Energy Strategy, SDGs, EU Biodiversity Strategy, UNCDB, UNCCD**) that depend on the cross-sectorial aspects of soil and the land-based services it sustains.

SOIL\_NACA assesses **soil functions** (e.g. food production, water regulation, carbon sequestration) in relation to **pressures** (e.g. erosion, pollution, sealing) due to competition for land and climate change.

SOIL\_NACA contributes to **policy development** through its support to the **EU Soil Expert Group**, the **European Soil Partnership** (Secretariat, and involvement in technical working groups), the **Global Soil Partnership** and Intergovernmental Technical Panel on Soils (**ITPS**), the Common Forum on Contaminated Land, the Global Soil Biodiversity Initiative and through high interaction with Member State institutions (both scientific and policy making) through **networking** at European and global levels (ESBN, EIONET-SOIL, ENSA, ELSA, EU Danube Strategy).

SOIL\_NACA generates value-added knowledge for assessments of the security of soil as a resource, by generating novel data that underpin **policy-relevant indicators** (e.g. EU SDG Core, Contaminated Sites) while supporting scenario and trend analyses. Data are derived through the harmonisation of national sources (both EU and internationally), from in-house modelling and the analysis of primary data (e.g. **LUCAS**).

In response to formal requests from DG ENV, SOIL\_NACA delivers policy-relevant reports on soil condition based on LUCAS data and contribute to the MAES Soil Pilot regarding ecosystem services provided by soil.



## **SOIL\_NACA: Securing SOIL as NATural Capital** (continued)

SOIL\_NACA provides active support to **soil awareness-raising initiatives**, by developing strategies to better communicate soil-related issues to policymakers and the wider community through mechanisms such as targeted policy briefings, the continued collaboration in Asia (SINAPEC, SEPLS, CRAES, Asia Soil Atlas) and EC public engagement events where soil is a major theme.

There is high demand for **collaboration** from several **EC agencies** (EEA – e.g. State of European Environment Report, EFSA – e.g. pesticide residue assessment) and **UN bodies** (FAO – Global Soil Partnership, CBD/IPBES – Regional Assessments, UNCCD – land degradation).

SOIL\_NACA contributes to the soil organic carbon indicator to the EU SDG Core Indicator Set.

**European Soil Data Centre (ESDAC) is part of SOIL\_NACA**

## SOIL\_NACA

- Not in isolation; Well-connected/networked
- First place in the European Commission for scientific/technical advice concerning soil Well defined Support to DG ENV, DG CLIMA, DG AGRI
- Collaboration with EEA (State and Outlook of the Environment – Land and Soil Chapter; soil contamination (local))
- EIONET National Reference Centers for Soil
- Concrete support to the FAO's Global Soil Partnership (Secretariat of the European Soil Partnership) with final objective to implement Sustainable Soil Management
- Areas SOIL NACA works in :
  - Soil Erosion
  - Soil Organic Carbon
  - Soil Biodiversity
  - Landslides
  - #Soil Atlases (most recent Global Soil Biodiversity Atlas)
  - LUCAS soil component
  - Soil Contamination (local, not diffuse)
  - European Soil Data Centre.
- Fairly small group of people; mix scientific officers (7), contract agents (4), externals (2)
- Outstanding publication record (including papers in Nature and Science)



## SOIL\_NACA

- At this moment: not into leaching modelling as study area
- Other teams in JRC are: contact Alberto Pistocchi



## European Soil Data Centre (ESDAC) is part of SOIL\_NACA

On demand of DG ENV: Established 2006 under a technical agreement between DG ENV, JRC, Eurostat and European Environment Agency; other Datacentres are at EEA and Eurostat

**Purpose:** to be the thematic centre for **soil related data in Europe**. Its ambition is to be the single reference point for and to host all relevant soil data and information **at European level**.

Interface to the public: **esdac.jrc.ec.europa.eu**: Number of resources that are organized and presented in various ways: **datasets**, services/applications, maps, documents, events, projects and external links.

ESDAC: European level data

ISRIC and FAO: Global level data

No national data; according to INSPIRE, data should stay where generated and managed

Historical archive

Datasets origin:

- Mostly from JRC work in collaboration with European funded projects, with networks and stakeholders
- No data from external parties in which there was no involvement of JRC
- Make available whatever can be made available legally

Users get 'controlled' access to datasets; semi-autonomous; almost a 24/7 service

- Ask for Name, organization, purpose for which the data will be used; ask for feedback
- Ca 60 datasets
- Help Desk



## **European Soil Data Centre (ESDAC)**

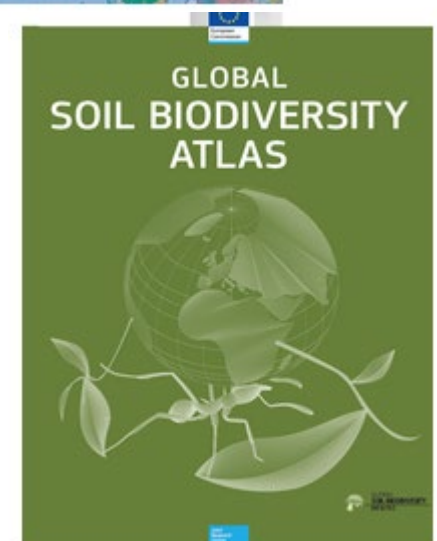
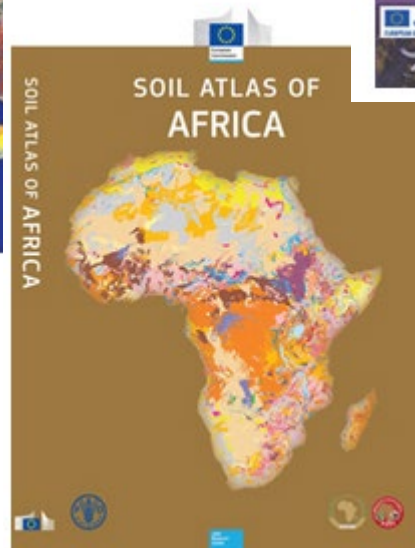
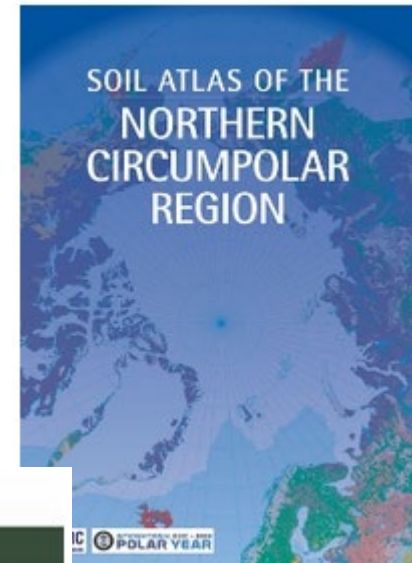
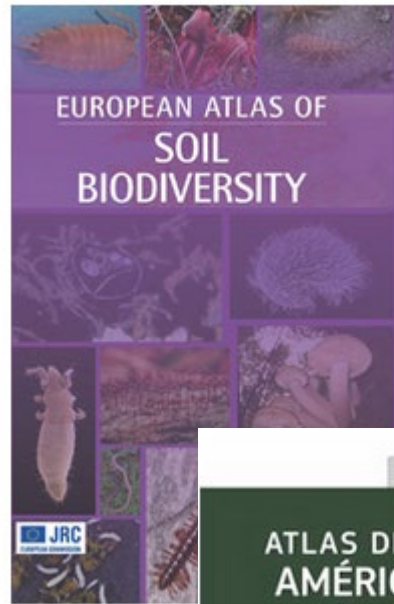
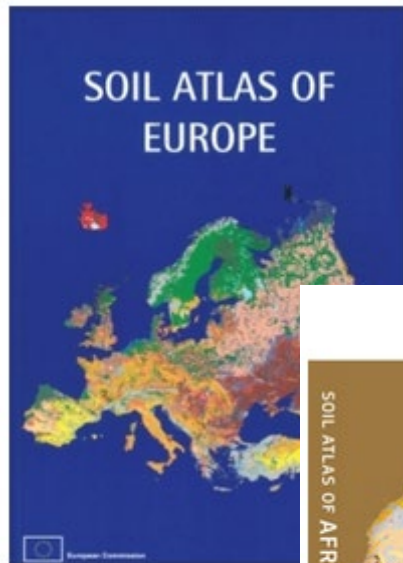
Quite popular website when studying the statistics  
Ca 1,000 unique visitors per day

Request for datasets: 5,000/year and increasing  
Ca 20-30 per working day

ESDAC and its datasets widely cited in literature

Google for anything 'European', 'soil', 'data' in it and first results point to ESDAC

## Soil Atlases



In collaboration with ISRIC, high resolution scans of > 5400 paper maps from all continents




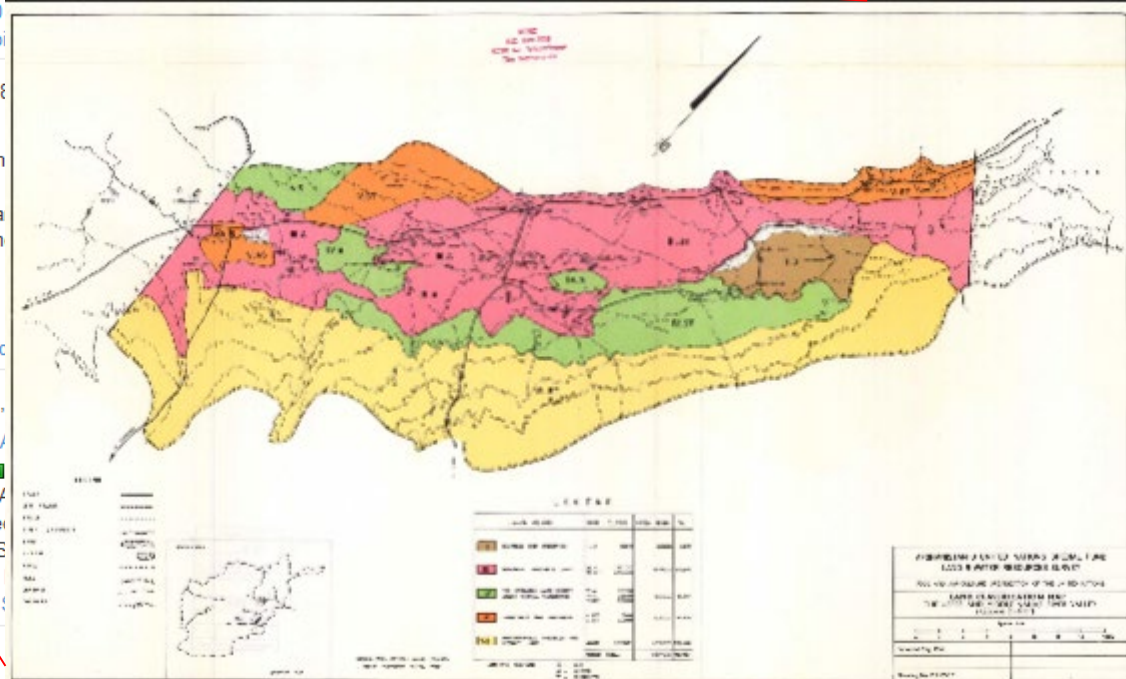
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Language: [En](#)  
Scale: 200000  
Keywords: [Soi](#)



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Survey.  
Language: En  
Scale: 30000  
Keywords: Geolc



**Continent:** Africa  
**Country:**   
**Publisher:** African Nations Special Resources  
**Language:** English  
**Keywords:** Africa, Eritrea, African Nations Special Resources





## FOCUS DG SANTE - in support of EFSA and DG SANTE

ESDAC corner for FOCUS: the FORum for Co-ordination of pesticide fate models and their USE.

currently approved versions of **FOCUS simulation models** and FOCUS scenarios, that are used to calculate the concentrations of plant protection products in groundwater and surface water in the EU review process according to Regulation (EC) No 1107/2009.

contains links to the reports of all FOCUS workgroups.

referred to by the EC website on Food Safety under "Guidelines on Active Substances and Plant Protection Products" - Fate and Behaviour.

JRC as interface between users and EFSA/developers

Help Desk (immediate response)

Downloads are not monitored

Contact at EFSA: Mr Chris Lythgo

English

European Commission > Food, farming, fisheries > Food Safety > Plants > Pesticides > Approval of active substances >

Plants

PESTICIDES

- EU Pesticides database
- Sustainable use of pesticides
- Approval of active substances
  - Application & report
  - Guidelines
  - EFSA procedure
  - Renewal of approval
  - EU legislation on PPPs
- Authorisation of Plant Protection Products
- Maximum Residue Levels
- REFIT Evaluation

← ALL TOPICS

Guidelines on Active Substances and Plant Protection Products

Technical guidance  
[Expand All]

- Phys-chem analytical methods
- Efficacy
- Toxicity
- Residues
- Fate and behaviour
- Ecotoxicology
- Crop specific

Procedural guidance  
[Expand All]

QUICK LINKS

- GMO register
- EU Pesticides database
- Procedure to apply for authorisation of a PPP
- Plant variety database
- Community Plant Variety Office (CPVO)
- Health and food audits and analysis
- Access to documents project
- European Food Safety Authority (EFSA)
- E-news
- Press Releases
- Infographics and factsheets
- Food Fraud

## EFSA Data and PERSAM tool

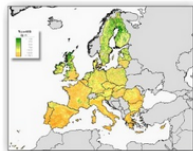
prepared in the context of the collaboration agreement between JRC and EFSA.

It contains **soil, weather and crop data** collected by JRC and organised by EFSA for the purpose of this website. The site also hosts the **software tool PERSAM** for Predicting Environmental Concentrations in soil in support of the: "EFSA Guidance Document for predicting environmental concentrations of active substances of plant protection products and transformation products of these active substances in soil". EFSA was asked by the European Commission to prepare this Guidance Document.

### European Food Safety Authority (EFSA) Data & PERSAM software tool

[View](#) [Edit](#)

*Data and software made public as the result of a collaboration between JRC and EFSA. It contains soil, weather and crop data collected by JRC and organised by EFSA for its purpose. The site also hosts the software tool PERSAM for Predicting Environmental Concentrations in soil in support of the: "EFSA Guidance Document for predicting environmental concentrations of active substances of plant protection products and transformation products of these active substances in soil" which EFSA was asked by the European Commission to prepare. The data/maps are provided as rasters (ASCII gnd).*



Resource Type: [Datasets](#)  
[Soil Projects Data](#)

Registration is requested: Yes

Publisher: EFSA and JRC

Year: 2015

Scale: 1km

Projects: [Completed Projects](#) > [EFSA Data & Tools](#)

Keywords: [EFSA](#) | [food safety](#) | [ECOREGION](#) | [FATE](#) |

Description

[Request Form](#)

[Dataset](#)

#### Introduction

This webpage was prepared in the context of the collaboration agreement between JRC and EFSA. It contains **soil, weather and crop data** collected by JRC and organised by EFSA for the purpose of this website. The site also hosts the **software tool PERSAM** for Predicting Environmental Concentrations in soil in support of the: "EFSA Guidance Document for predicting environmental concentrations of active substances of plant protection products and transformation products of these active substances in soil". EFSA was asked by the European Commission to prepare this Guidance Document.

*(new 24 January 2018) The new data set on 'permanent crops' was made available by the EFSA working group on PECs in soil in alignment with the EFSA guidance document for predicting environmental concentrations of active substances of plant protection products and transformation products of these active substances in soil. See [documentation](#). These data and all other are available after filling in the Request Form.*

Contact at EFSA: Mr Mark Egsmose

## EFSA Data and PERSAM tool

Downloads are monitored

From 2011 to now (8 years): **939** downloads by known persons and organizations (name and type)

In the purpose for use:

- 130 'pesticide'
- 40 'PPP'
- 89 'plant protection'
- 7 'leaching'
- 10 'risk assessment'
- 57 'modeling'

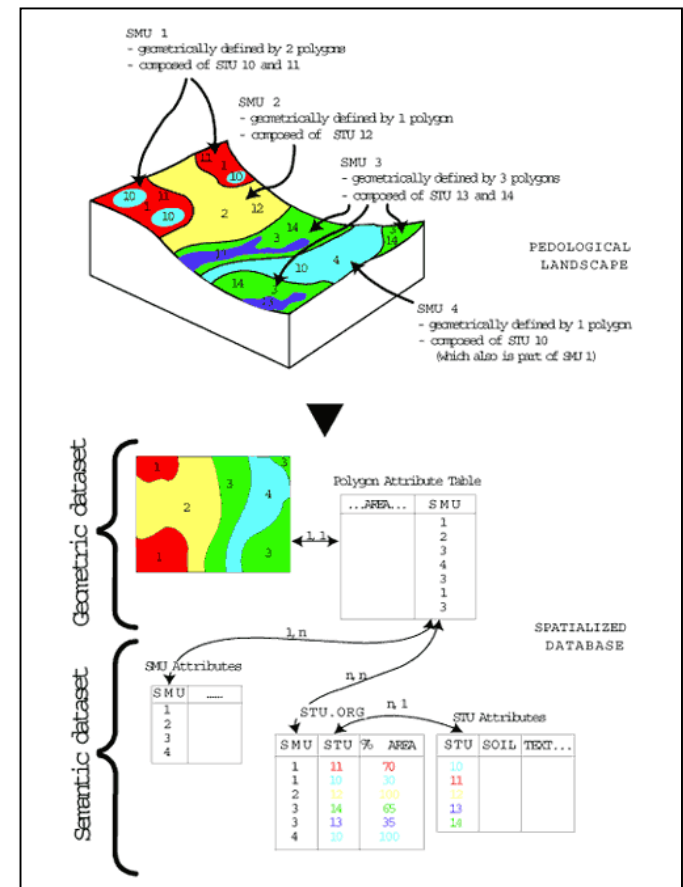
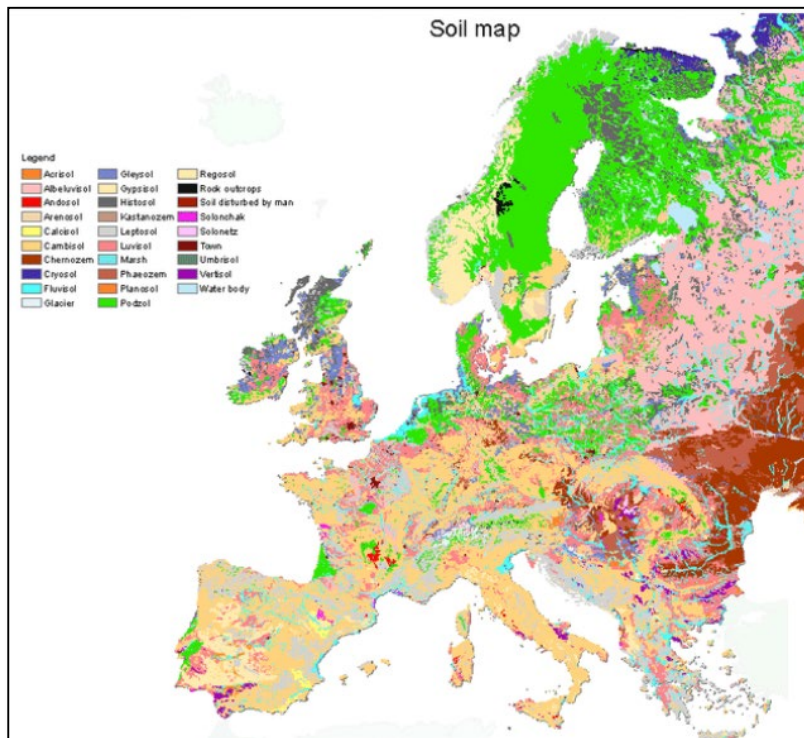


## Datasets in ESDAC

### European Soil Database

- Around since year 2000
- Scale 1:1,000,000
- Vector and rasterized (1km; interpretation)
- **Many properties, but classified values**
- For continental or regional use

Polygons: Soil Mapping Units (SMU)  
SMU consist of one or many Soil Typological Unit (STU)  
Each STU: typical properties for a particular type



## Datasets in ESDAC

### European Soil Database attributes

- FAO soil type
- WRB soil type
- Surface texture
- Limitation to agricultural use
- Presence of Impermeable Layer
- Parent Material
- **Depth of an obstacle to roots**
- Depth to textural change
- Slope class
- Texture at surface
- Texture at subsurface
- Land use
- Water Management
- Soil water regime

### ROO

- 0 No information
- 1 No obstacle to roots between 0 and 80 cm
- 2 Obstacle to roots between 60 and 80 cm depth
- 3 Obstacle to roots between 40 and 60 cm depth
- 4 Obstacle to roots between 20 and 40 cm depth
- 5 Obstacle to roots between 0 and 80 cm depth
- 6 Obstacle to roots between 0 and 20 cm depth

### Derived attributes (Pedo Transfer Rules)

Inferred Parent Material  
Topsoil Organic Carbon Content  
Peat  
Parent material hydro-geological type  
**Depth to a gleyed horizon**  
Depth to an impermeable layer  
Hydro-geological class  
Cation exchange capacity (topsoil and subsoil)  
Base saturation (topsoil and subsoil)  
Depth to rock  
Volume of stones  
Structure (topsoil and subsoil)  
Etc.

*S(hallow): 0-40 cm*  
*M(oderate): 40-80 cm*  
*D(eep): 80-120 cm*  
*V(ery deep): > 120 cm*

## Datasets in ESDAC

### European Soil Database (ESDB)

- Contains also a **Soil Profile Database**
  - Measured soil profiles (only 500 for whole of Europe) (numeric values)
  - Estimated soil profiles (connected to STU) (numeric values); not well covered, but there is SPAD14

**Interpretations of the ESDB**, possibly in conjunction with other data sources have been made to produce a number of property maps (with values instead of classes)

**OCTOP** (topsoil soil organic carbon content in %) (1km)

**Natural susceptibility to soil compaction** in Europe (class) (1km)

- 0 - no soil. This represents water bodies, glaciers and rock outcrops
- 1 - low susceptibility to compaction
- 2. - medium susceptibility to compaction
- 3. - high susceptibility to compaction
- 4. - very high susceptibility to compaction
- 9. - no evaluation possible.

**Saline and Sodic Soils** in European Union (1km)

- 1 - Saline > 50% of the area
- 2 - Sodic > 50% of the area
- 3 - Saline < 50% of the area
- 4 - Sodic < 50% of the area
- 5 - Potentially salt affected soils.

## Datasets in ESDAC

**"European Soil Database Derived data"** – 1km rasters – numeric values – input ESDB / HWSD

Depth available to roots	(cm)
Clay content	(%)
Sand content	(%)
Silt content	(%)
Organic carbon content	(%)
Bulk density	(g cm <sup>-3</sup> )
Coarse Fragments	(%)
Total available water content	(mm)

## Soil pH in Europe (5km)

A quantitative map of estimated soil pH values across Europe from a compilation of 12,333 soil pH measurements from 11 different sources, and using a geo-statistical framework based on Regression-Kriging.

## Datasets in ESDAC

### EFSA Spatial Data set (together with PERSAM):

- General datasets (6): EFSA Data Mask, EFSA European Union Cover, EFSA Regulatory Zones, EFSA Corine Land Cover Data, EFSA Generalized Land Use Map, FOCUS Zones
- **Meteorological** datasets (27): Mean monthly temperature (12 maps, each per month), Mean annual temperature, Arrhenius weighted mean annual temperature, Mean monthly precipitation (12 maps, each per month), Mean annual precipitation
- **Soil** datasets (5):
  - Topsoil Organic Matter content,
  - Topsoil pH water,
  - Topsoil Bulk Density,
  - Topsoil Texture Class,
  - Topsoil Water Content at Field Capacity
- CAPRI2000 **Crop** Datasets (24): EFSA-CAPRI Common Mask, Barley, Common wheat, Durum wheat, Fallow land, Floriculture, Maize, Oats, Other cereals, Other annual crops, Fodder other on arable land, Other non permanent industrial crops, Other root crops, Other fresh vegetables, Potatoes, Dry pulses, Rape and turnip rape, Rye, Soya, Sugar beet, Sunflower, Fibre and oleaginous crops, Tobacco, Tomatoes

All rasters at 1km

## Datasets in ESDAC

"**LUCAS 2009 Topsoil data**" – ca 20,000 points

Part of the 2009 LUCAS campaign organized by Eurostat (Land Use/Cover Area Frame Survey; 200,000 points)

Ca **20,000** soil samples (20cm depth) for 23 EU countries

Analyzed central laboratory

2012: Bulgaria and Romania (ca **2,000** samples); analyzed same laboratory

coarse	soil sample	coarse fragments	in %
clay	soil sample	clay content	in %
silt	soil sample	silt content	in %
sand	soil sample	sand content	in %
pH_in_H <sub>2</sub> O	soil sample	pH measured from water solution	-
pH_in_CaCl	soil sample	pH measured from CaCl solution	-
OC	soil sample	organic carbon content	g/kg
CaCO <sub>3</sub>	soil sample	CaCO <sub>3</sub> content	g/kg
N	soil sample	Nitrogen content	g/kg
P	soil sample	Phosphorus content	mg/kg
K	soil sample	Potassium content	mg/kg
CEC	soil sample	Cation Exchange Capacity	cmol(+)/kg

Multispectral spectroscopy data

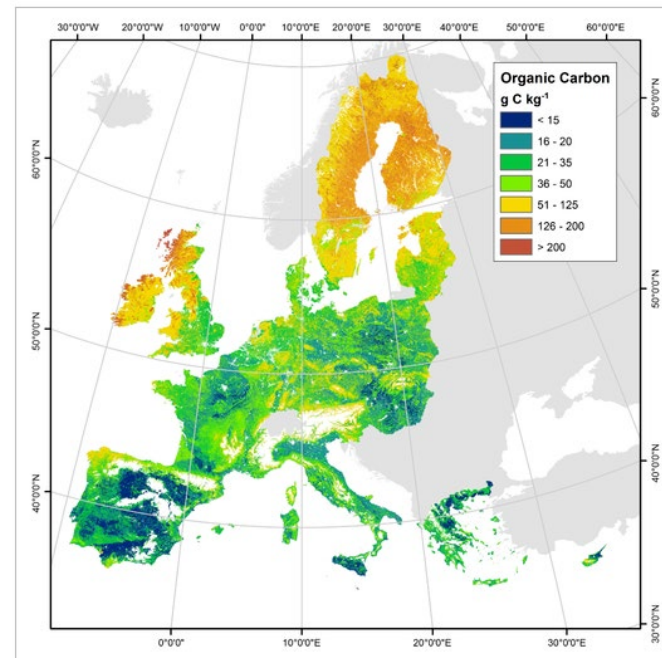
Heavy metals data (As, Cd, Cr, Cu, Hg, Pb, Mn, Sb, Co and Ni )

## Datasets in ESDAC

On the basis of the 2009 **LUCAS soil data**, maps have been created using advanced techniques;

### **Topsoil Soil Organic Carbon (LUCAS)** - 1km raster- (g C kg<sup>-1</sup>)

produced by fitting a generalised additive model between organic carbon LUCAS measurements and a set of selected environmental covariates; namely slope, land cover, annual accumulated temperature, net primary productivity, latitude and longitude.





## Datasets in ESDAC

On the basis of the 2009 **LUCAS soil data**, maps have been created using advanced techniques;

### Topsoil physical properties - 500m rasters

Clay (%)  
Sand (%)  
Silt (%)  
Coarse Fragments (%)  
Bulk Density (T m<sup>-3</sup>)  
Available Water Capacity (volume fraction)  
USDA Texture

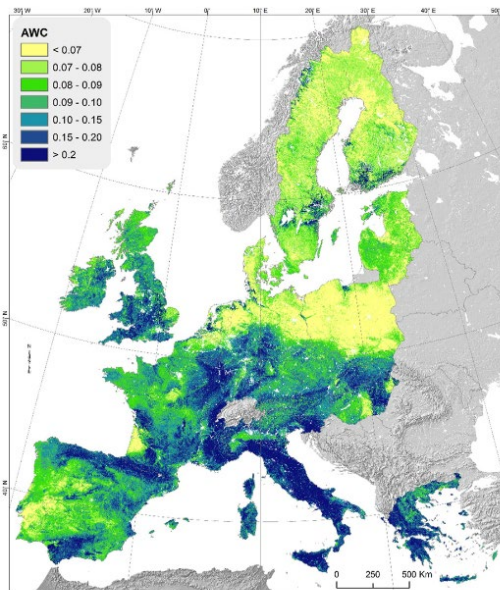


Fig. 11. Map of Available Water Capacity for the topsoil fine earth fraction.

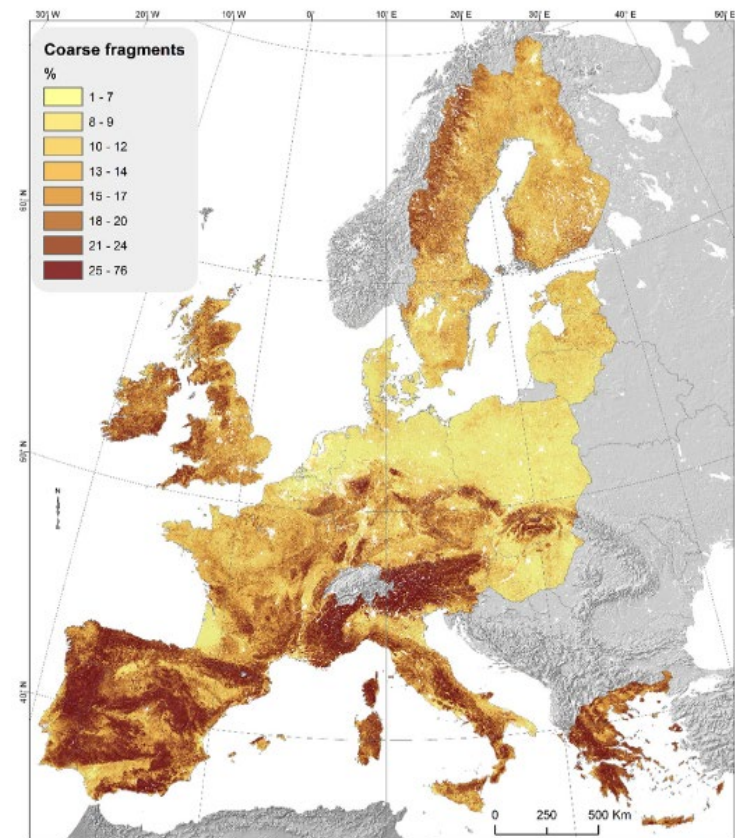


Fig. 6. Topsoil (0-20 cm) coarse fragments (%) content modelled by Multivariate Additive Regression Splines.



## Datasets in ESDAC

On the basis of the 2009 **LUCAS soil data**, maps have been created using advanced techniques;

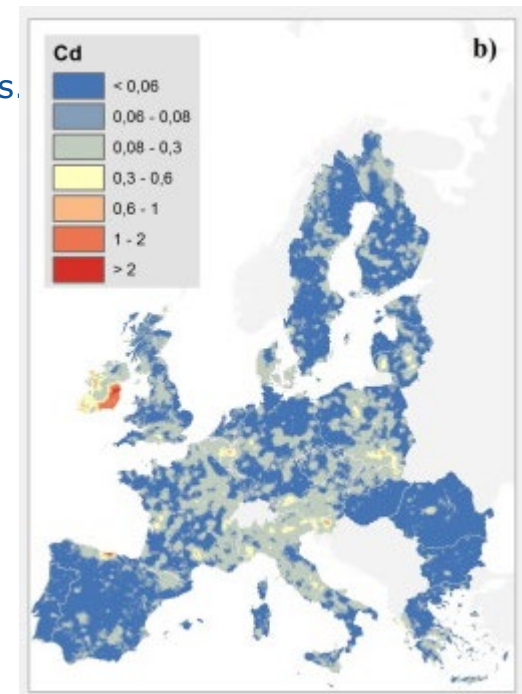
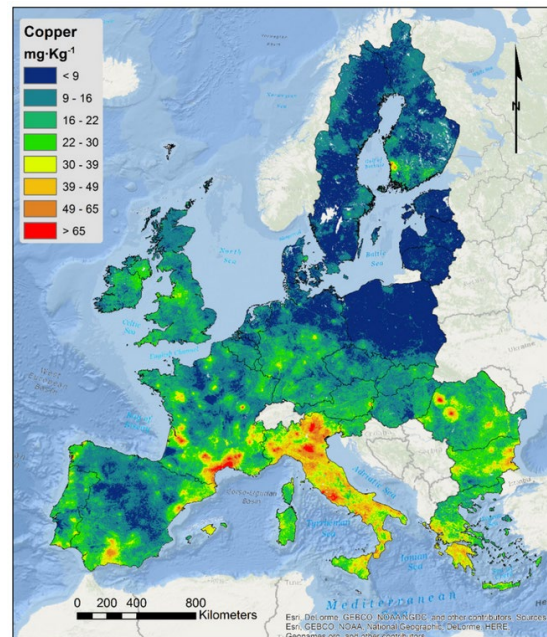
Heavy Metal data: not available to the public

**"Maps of heavy metals in the soils of the European Union and proposed priority areas for detailed assessment"** - 1km raster- mg/kg - As, Cd, Cr, Cu, Hg, Pb, Mn, Sb, Co and Ni

Regression kriging (RK) spatial prediction method; covariates: topography, geology, vegetation, meteorology, as well as anthropogenic factors.

### "Copper distribution in topsoils in the European Union"

Gaussian Process Regression (GPR) combined with kriging



## LUCAS soil campaigns: 2009/2012 ; 2015 ; 2018

LUCAS 2009/2012	LUCAS 2015	LUCAS 2018
<p>22,000 samples from 27 EU MS</p> <ul style="list-style-type: none"> <li>✓ Basic soil parameters <ul style="list-style-type: none"> <li>Coarse fragments</li> <li>Particle-size distribution</li> <li>Organic carbon</li> <li>N, P, K</li> <li>Carbonates</li> <li>pH</li> <li>Cation exchange capac.</li> </ul> </li> <li>✓ Multispectral spectroscopy</li> <li>✓ Heavy metals</li> </ul> <p><b>DONE (available)</b></p>	<p>22,325 samples from 28 EU MS 1,122 samples in Balkan countries and Switzerland</p> <ul style="list-style-type: none"> <li>✓ Basic soil parameters (like LUCAS 2009/2012)</li> <li>✓ Multispectral spectroscopy (like LUCAS 2009/2012)</li> <li>✓ <b>New parameters</b> <ul style="list-style-type: none"> <li>✓ Electrical conductivity (EC) (all samples)</li> <li>✓ Clay mineralogy (400 samples)</li> </ul> </li> </ul> <p><b>DONE (but not available yet)</b></p>	<p>26,000 samples from 28 EU MS</p> <ul style="list-style-type: none"> <li>✓ Basic soil parameters, including EC</li> <li>✓ Heavy metals</li> <li>✓ <b>New parameters</b> <ul style="list-style-type: none"> <li>• Bulk density (9000)</li> <li>• Soil biodiversity (700)</li> <li>• <b>Pesticides</b> (3000 points) and antibiotics (in agricultural land and grassland)</li> <li>• Thickness organic horizon (histosols)</li> <li>• Erosion (all)</li> </ul> </li> </ul> <p><b>IN THE LAB</b></p>

## LUCAS soil campaign 2018

Abamectin	Endosulfan alpha	Pentachlorobenzene
Aldrin	Endosulfan beta	Pendimethalin
AMPA	Endosulfan sulphate	Phthalimide
Atrazine	Endrin	Pinoxaden
Atrazine-deisopropyl	Epoxiconazole	Pirimiphos-methyl
Atrazine-desethyl	Ethion	Prochloraz
Azoxystrobin	Fenpropimorph	Procymidone
Boscalid	Fluometuron	Propiconazole
Carbaryl	Fluopicolide	
Carbofuran	Fluroxypyr	Prothioconazole
Carbofuran, 3-hydroxy	Fluzinam	Pyraclostrobin
Carbofuran, -keto	Folpet	Quinoxifen
Chlordane alpha	Glyphosate	Simazine
Chlordane gamma	Heptachlor	Tebuconazole
Chlordecone	Heptachlor epoxide	Terbutylazine
Chlorfenvinphos	Hexachlorobenzene	Terbutylazine-desethyl
Chlorpyrifos	Hexachlorocyclohexane, alpha	Thiamethoxan
Chlorpyrifos-methyl	Hexachlorocyclohexane, beta	Triadimenol
Clothianidin	Hexachlorocyclohexane, gamma	Trifloxystrobin
Cymoxanil	Imazalil	<i>Antibiotics</i>
Cyproconazole	Imidacloprid	Colistin
Cyprodinil	Isoproturon	Enrofloxacin
DDD op	Linuron	
DDD pp	Malathion	Quinoxifen
DDE op	Metalaxyl	Dimoxystrobin
DDE pp	Metamitron	Fludioxonil
DDT op	Metconazole	Fluquinconazole
DDT pp	Myclobutanil	Myclobutanil
Deltamethrin	Parathion	Diquat
Diazinon	Parathion-methyl	Imazamox
Dieldrin	Penconazole	Lenacil
Difenoconazole		
Diflufenican		
Dimethomorph		
Diuron		

## PESTICIDES & ANTIBIOTICS

Analyse the presence and quantify the concentrations of

- **PPPs** (2500-3000 soil samples taken in natural and semi-natural environments (mineral and organic soils in agricultural land and grassland)
- **alphahexachlorocyclohexane, betahexachlorocyclohexane and gammahexachlorocyclohexane** (maximum of 500 soil samples) taken in targeted areas (production sites, waste deposits, landfills and stockpiles) across Europe.
- **Antibiotics** (700 soil samples)

**Under CALL for TENDER**

## Datasets in ESDAC

Soil functions data:

### Maps of indicators of soil hydraulic properties for Europe

Water retention of topsoil

- saturated water content (cm<sup>3</sup>/cm<sup>3</sup>)
- water content at field capacity (cm<sup>3</sup>/cm<sup>3</sup>)
- water content at wilting point (cm<sup>3</sup>/cm<sup>3</sup>)

Hydraulic conductivity of topsoil

- saturated hydraulic conductivity (cm/day)

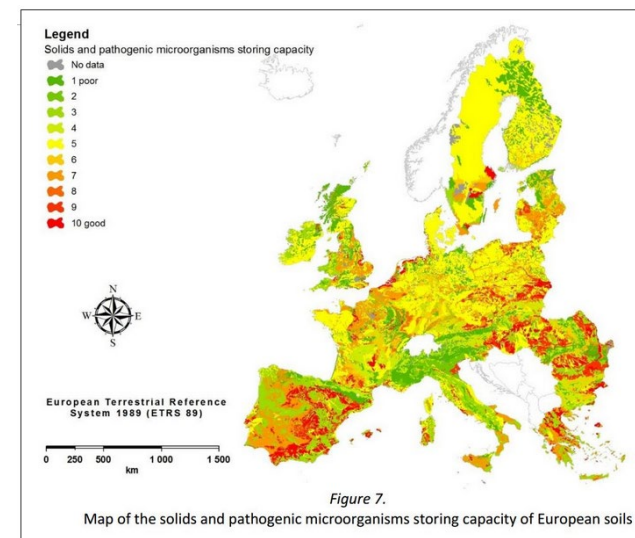
Use of ESDB and hydraulic Pedo-Transfer-Functions  
Geometry of the ESDB / vector

### Maps of the Storing and Filtering Capacity of Soils in Europe

10 maps that relate to the soil's storing and filtering capacity the EU:

- cation storing and filtering capacity
- anion storing and filtering capacity
- solids and pathogenic microorganisms storing and filtering capacity
- non-polar organic chemicals storing and filtering capacity
- nonaqueous Phase Liquids (NAPL) storing and filtering capacity.

As input, variables from the European Soil Database have been used  
Geometry of the ESDB / vector



## Datasets in ESDAC

Soil functions data:

**Maps (2016) that indicate the preservation capacity of cultural artefacts and buried materials in soils in the EU,**

bones, teeth and shells  
organic materials (  
metals (Cu, bronze and Fe)  
stratigraphic evidence

### **European map of soil suitability to provide a platform for most human activities (EU28)**

presents the suitability of soil as a platform for most human activities in the EU. Calculation of suitability was done using various properties of the European Soil database (soil type, soil water regime, limitation to agricultural use, depth to rock, land use) and slope of the terrain.

### **Maps indicating the availability of Raw Material from soils in the European Union.**

indicates the availability of Raw Material  
(organic soil material and soil material for constructions) from soils in the EU

### **Soil Biomass Productivity maps of grasslands and pasture, of croplands and of forest areas in the European Union (EU27)**

*All maps: Use of ESDB and hydraulic Pedo-Transfer-Functions  
Geometry of the ESDB / vector*





## Datasets in ESDAC

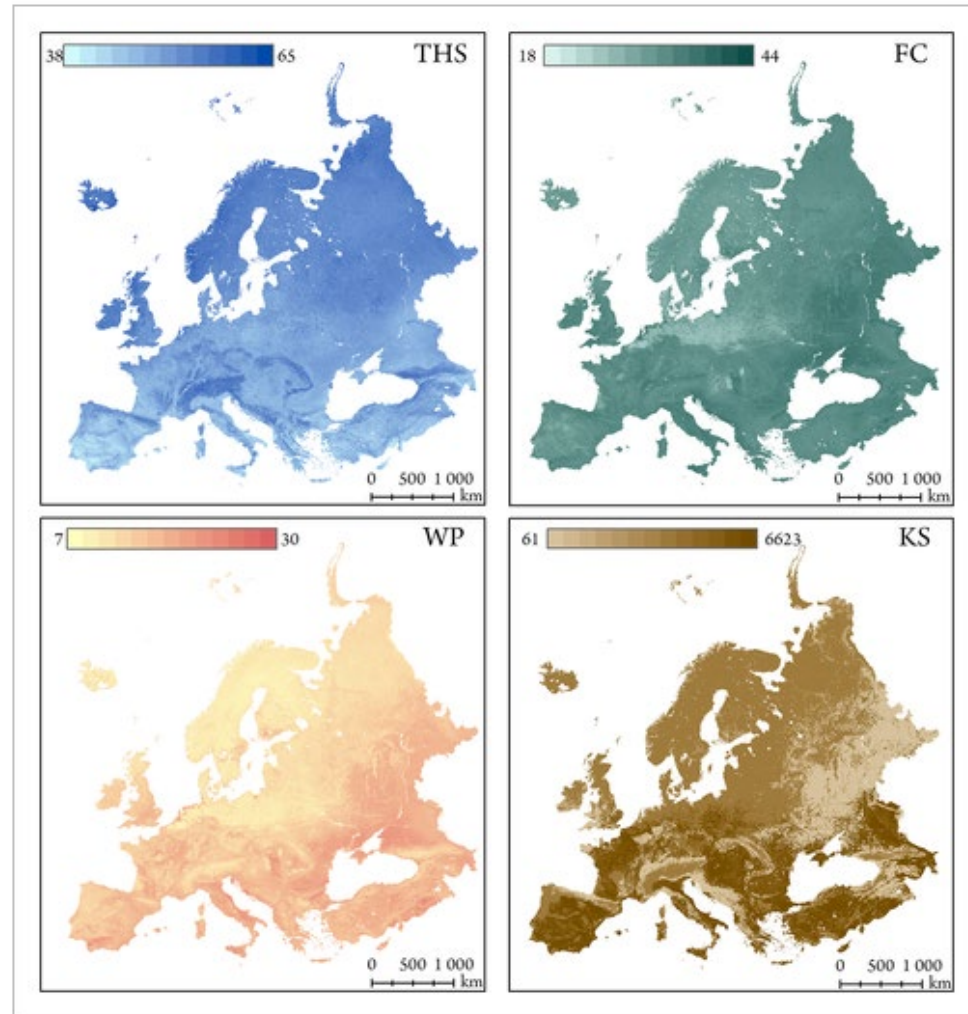
### 3D Soil Hydraulic Database of Europe at 1 km and 250 m resolution

A consistent spatial soil hydraulic database at 7 soil depths up to 2 m calculated based on (ISRIC) SoilGrids250m and 1 km datasets and pedotransfer functions trained on the European Hydropedological Data Inventory.

- saturated water content,
- water content at field capacity and wilting point,
- saturated hydraulic conductivity and Mualem-van Genuchten parameters for the description of the moisture retention, and
- unsaturated hydraulic conductivity curves

To be used for environmental modelling purposes at catchment or continental scale in Europe.

Currently, only EU-SoilHydroGrids provides information on the most frequently required soil hydraulic properties with full European coverage up to 2 m depth at 250 m resolution.



## Datasets in ESDAC

### Groundwater Resources maps of Europe

GIS Maps related to Groundwater resources in Europe,

covering 3 themes:

- Inventory of aquifers;
- Hydrogeology of aquifers;
- Groundwater abstraction;

for 9 European countries (Belgium, Federal Republic of Germany, Denmark, France, Ireland, Italy, Luxembourg, Netherlands and United Kingdom)



## Datasets in ESDAC

Many Soil Erosion related data:

**Soil Erodibility** (K- Factor in RUSLE) High Resolution dataset for Europe (using ESDB+LUCAS) (500m)  
Susceptibility of a soil to erode; is related to soil properties such as organic matter content, soil texture, soil structure and permeability

**Rainfall Erosivity** in the EU and Switzerland (R-factor in RUSLE) (500m)  
(based on detailed weather data 1,675 weather stations)

**LS-factor** (Slope Length and Steepness factor in RUSLE) for the EU  
based on 25m DEM  
maps at resolutions of 25m (per country) and 100m (Europe).

**Support Practices factor** (P-factor in RUSLE) for the EU (1km)  
accounts for control practices that reduce the erosion potential of runoff; expression of the overall effects of supporting conservation practices – such as contour farming, strip cropping, terracing, and subsurface drainage – on soil loss at a particular site

**Cover Management factor** (C-factor in RUSLE) for the EU (100m)  
estimated for

- arable lands based on crop composition and for
- all other land uses (non-arable)

based on the vegetation density and land cover type.

The management practices (reduced tillage/no till, plant residues and winter cover crops) were taken into account in estimating C-factor in arable lands.

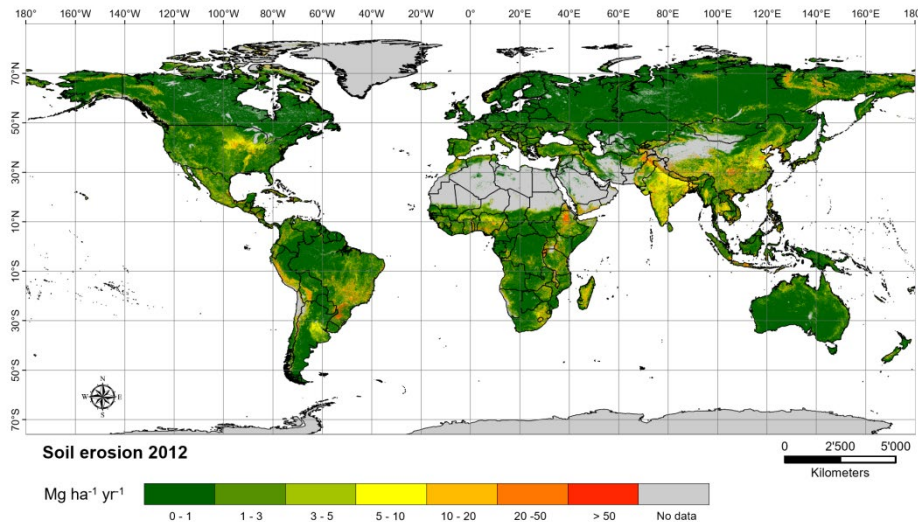
→ **Soil erosion by water for EU** (RUSLE2015) (100m)



## Datasets in ESDAC

### Other Soil Erosion related data

- **Global Rainfall Erosivity**
- **Biodiversity factor in soil erosion.**
- **Soil erosion by wind**
- **Soil erosion in forestland in Europe (using RUSLE2015)**
- **Global Soil Erosion**



- **Pan European Soil Erosion Risk Assessment - PESERA**
- **Soil Erosion Risk Assessment in Europe data (MESALES model)**
- **G2 soil erosion model data**

# Conclusion

Many soil data at European scale available

Various characteristics

Varying quality

Always backed-up by sufficient documentation

From this workshop, we hope to receive some specific requirements for geo-spatial data used in the area of

Thank you for listening.

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