Global Soil Data Task
- part of Earth Data Sets (IN-02-C2)

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Task Point of Contact
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What is GEO / GEOSS?

- The Group on Earth Observations (GEO) is coordinating efforts to build a Global Earth Observation System of Systems, or GEOSS.
- GEO is a voluntary partnership of governments and international organizations.
- As with the Internet, GEOSS will be a global and flexible network of content providers allowing decision makers to access an extraordinary range of information at their desk. GEOSS will provide decision-support tools to a wide variety of users.
- The GEOPortal offers a single Internet access point for users seeking data, imagery and analytical software packages relevant to all parts of the globe. It connects users to existing data bases and portals and provides reliable, up-to-date and user friendly information.
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- GEOSS is simultaneously addressing nine areas of critical importance to people and society. It aims to empower the international community to protect itself against natural and human-induced disasters, understand the environmental sources of health hazards, manage energy resources, respond to climate change and its impacts, safeguard water resources, improve weather forecasts, manage ecosystems, promote sustainable agriculture and conserve biodiversity.
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Why are we doing this task?

• Global soil information is mostly available in the form of area-class maps.
• Digital soil mapping (DSM) techniques offer great opportunities to enhance existing soil information.
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What are the global drivers?

• Improvement of food security, mitigation of greenhouse gas emissions to curtail climate change, maintenance of biodiversity, supply of water and production of energy crops are heavily dependent on soils.
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**Expected benefits:**

- harmonized and policy-relevant soil information to users at the global, regional and national level.
- Web-based services on soil information.
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Main activities:

• *Global area-class soil data*
  Soil area-class datasets at scale 1:1 million based Harmonized World Soil Database: about 20 soil attributes for top and subsoil will be made available as a web service. The e-SOTER methodology and other new data will allow improvement of older sections of the HWSD.

• *Global soil property data surfaces*
  GlobalSoilMap.net is developing such products with a 100 x 100 m resolution.
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*Global area-class soil data*

Harmonized World Soil Database
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Harmonized World Soil Database Viewer
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ISRIC proposal for web-mapping services of HWSD

Slide Credit: Hannes Reuter
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*Global soil property data surfaces*

- An international initiative to make soil property maps (7+3) at six depths at 3 arcsecs (100 m).
- The objective is to assemble, collate, and rescue as much of the worlds existing soil data
Specifications – Soil properties (not classes)

Key soil properties

1. Organic Carbon (g/kg)
2. Sand (g/kg), Silt (g/kg), Clay (g/kg) 
   coarse fragments (g/kg)
3. pH
4. Depth to bedrock or restricting layer (cm)

Pedo-transfer functions:

5. Bulk Density (Mg/m³)
6. Available Water Capacity (given in mm/m)
7. ECEC (Cations plus exchangeable acidity mmol/kg)
8. EC (Electrical conductivity mS/m)

Slide Credit: Alfred Hartemink
products status 12.03.2012

Slide Credit: Hannes Reuter
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Key players:
- ISRIC (Point of Contact: Vincent.vanEngelen@wur.nl)
- JRC (LucaMontanarella@jrc.ec.europa.eu)
- USDA-NRCS (Jon.Hempel@lin.usda.gov)
- FAO (Ronald.Vargas@fao.org)
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Technical developments

- Within the European FP7 project ‘e-SOTER’, following recognised harmonisation principles, we developed an XML schema to serve as an exchange format for soil and terrain data derived from e-SOTER methodologies (SoTerML) Computers and Geosciences (in press), Available online 12 January 2012.

- It encompasses existing SOTER database conceptual modelling as well as the WRB (World Reference Base of soil resources) and the FAO soil data structures and classifications, therefore covering major soil and terrain databases such as the European Soil Database.
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Platform developments

- ISRIC has made available FTP directories for GlobalSoilMap.net nodes for uploading raster data (soil property surfaces)
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Schema developments

- SOTER-ML
- http://schema.isric.org/stml/5.0/SoilClassification.xsd
- http://schema.isric.org/stml/5.0/AttributeReference.xml
- http://schema.isric.org/stml/5.0/SoTerMLsample.xml
- http://schema.isric.org/stml/5.0/SoTerML.xsd
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Specific issues

Scientific or technology (or other) barriers and/or gaps

• Data from local organizations are currently mostly not provided in an OGC compliant interoperable way.
• In certain continents (e.g. Africa) no capacity is available to provide this services to the international user community.
• The system should allow the local organization either to host their data in a consistent way locally, or at a continental node.
• A common Data Exchange Protocol for soil data should be defined under the Open Archive Initiative, allowing for exchange across the globe.
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Specific issues

Continuity

• Task co-leads have either a global, regional or national mandate as a data centre: ISRIC is an ICSU World Data Centre for Soils, JRC is the European Soil Data Centre of the European Union. Participants from USA, China, FAO are part of long-term entities.
• Soil science is receiving limited funding, which makes the loss of data (often on paper and in human knowledge) common.