



## CDP Theme

### Soil science and land use change

#### Background on the JRC research

The JRC is a leading institution in Europe and in the world for the development of policy relevant soil data and information systems. As the technical and scientific service of the European Commission, it provides the necessary scientific data, information and knowledge for supporting the numerous EU policies relevant to soils and land use. JRC scientists involved in soil and land use research combine expertises in soil sciences, modelling, spatial analysis, geography, agronomy, just to name a few, within a highly multi-cultural and multi-disciplinary team<sup>1</sup>. The JRC's recognition as the leading institution for soil science and soil information system is reflected in the numerous high-level scientific publications<sup>2</sup> as well in its leadership of the major European and Global scientific networks<sup>3</sup> on soil science and soil data: The JRC is chairing the Intergovernmental Technical Panel on Soils (ITPS) of the Global Soil Partnership (GSP) as well as the Land Degradation and Restoration Assessment of the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES). Furthermore, the JRC is hosting the secretariat of the European Soil Bureau Network (ESBN), the European Soil Partnership (ESP) and the European Soil Data Centre (ESDAC).

#### Ongoing key projects and research

The **European Soil Data Centre** (ESDAC, <http://esdac.jrc.ec.europa.eu>) is 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. It contains a number of resources that are organized and presented in various ways: datasets, services/applications, maps, documents, events, projects and external links. It provides a unique opportunity for research on pan-European data and their use within models and assessments. It includes soil data and information relevant to the European Commission activities and the soil related EU policies.

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1 <http://esdac.jrc.ec.europa.eu/TeamSOIL>

2 <http://esdac.jrc.ec.europa.eu/resource-type/documents>

3 (<http://esdac.jrc.ec.europa.eu/content/esdac-networks-cooperations>)

The ESDAC has been organizing on a regular basis summer schools on soil survey and mapping and has hosted ca. 20 PhD students over the past years of activity. Recently completed PhD studies:

Bampa, Francesca (2014) Options for climate change mitigation in agricultural soils and impact on crop and grassland production: a multi-scale study. [Ph.D. thesis] Available at: <http://paduaresearch.cab.unipd.it/7000/>

de Brogniez, Delphine (2014) Quantification of topsoil organic carbon in Europe : a statistical approach combining harmonised soil and land cover point data with spatial layers. Prom. : van Wesemael, Bas ; Montanarella, Luca. Available at: <http://hdl.handle.net/2078.1/158816>

Nocita, Marco (2014). The contribution of diffuse reflectance spectroscopy to soil organic carbon analysis : from laboratory to airborne spectroscopy . Prom. : van Wesemael, Bas ; Montanarella , Luca. Available at: <http://hdl.handle.net/2078.1/162118>

## Selected output for science and policy

### Policy reports:

- Global Soil Biodiversity Atlas, 2016, Orgiazzi, A., Bardgett, R.D., Barrios, E., Behan-Pelletier, V., Briones, M.J.I., Chotte, J-L., De Deyn, G.B., Eggleton, P., Fierer, N., Fraser, T., Hedlund, K., Jeffery, S., Johnson, N.C., Jones, A., Kandeler, E., Kaneko, N., Lavelle, P., Lemanceau, P., Miko, L., Montanarella, L., Moreira, F.M.S., Ramirez, K.S., Scheu, S., Singh, B.K., Six, J., van der Putten, W.H., Wall, D.H. (Eds.), 2016, Global Soil Biodiversity Atlas. European Commission, Publications Office of the European Union, Luxembourg. 176 pp.
- JRC, 2015. Remediated sites and brownfields. Success stories in Europe; EUR 27530 EN; doi 10.2788/406096

### Peer reviewed papers:

- Montanarella, L. (2015). Agricultural policy: Govern our soils. *Nature*, 528(7580), 32–3. <http://doi.org/10.1038/528032a>
- Nocita, M., Stevens, A., van Wesemael, B., Brown, D. J., Shepherd, K. D., Towett, E., ... Montanarella, L. (2015). Soil spectroscopy: An opportunity to be seized. *Global Change Biology*, 21(1), 10–11. <http://doi.org/10.1111/gcb.12632>
- De Brogniez, D., Ballabio, C., Stevens, A., Jones, R. J. A., Montanarella, L., & van Wesemael, B. (2015). A map of the topsoil organic carbon content of Europe generated by a generalized additive model. *European Journal of Soil Science*, 66(1), 121–134. <http://doi.org/10.1111/ejss.12193>

- Milne, E., Banwart, S. A., Noellemeyer, E., Abson, D. J., Ballabio, C., Bampa, F., Bationo A, Batjes N, Bernoux M, Bhattacharyya T, Black H, Buschiazzo D, Cai Z, Cerri C, Cheng K, Compagnone C, Conant R, Coutinho H, De Brogniez D, Baliero F, Duffy C, Feller C, Fidalgo E, Figueira Da Silva C, Funk R, Gaudig G, Gicheru P, Goldhaber M, Gottschalk P, Goulet F, Goverse T, Grathwohl P, Joosten H, Kamoni P, Kihara J, Krawczynski R, La Scala N, Lemanceau P, Li L, Li Z, Lugato E, Maron P, Martius C, Melillo J, Montanarella L, Nikolaidis N, Nziguheba G, Pan G, Pascual U, Paustian K, Pineiro G, Powlson D, Quiroga A, Richter D, Sigwalt A, Six J, Smith J, Smith P, Stocking M, Tanneberger F, Termansen M, Van Noordwijk M, Van Wesemael B, Vargas R, Luiz Victoria R, Waswa B, Werner D, Wichmann S, Wichtmann W, Zhang X, Zhao Y, Zheng, J. (2015). Soil carbon, multiple benefits. *Environmental Development*, 13, 33–38.  
<http://doi.org/10.1016/j.envdev.2014.11.005>
- Stockmann, U., Padarian, J., McBratney, A., Minasny, B., de Brogniez, D., Montanarella, L., ... Field, D. J. (2015). Global soil organic carbon assessment. *Global Food Security*, 6, 9–16. <http://doi.org/10.1016/j.gfs.2015.07.001>
- Nocita, M., Stevens, A., Toth, G., Panagos, P., van Wesemael, B., & Montanarella, L. (2014). Prediction of soil organic carbon content by diffuse reflectance spectroscopy using a local partial least square regression approach. *Soil Biology and Biochemistry*, 68, 337–347. <http://doi.org/10.1016/j.soilbio.2013.10.022>
- Lugato, E., Bampa, F., Panagos, P., Montanarella, L., & Jones, A. (2014). Potential carbon sequestration of European arable soils estimated by modelling a comprehensive set of management practices. *Global Change Biology*, 20(11), 3557–67.  
<http://doi.org/10.1111/gcb.12551>
- Kibblewhite, M. G., Miko, L., & Montanarella, L. (2012). Legal frameworks for soil protection: Current development and technical information requirements. *Current Opinion in Environmental Sustainability*.
- Montanarella, L., & Vargas, R. (2012). Global governance of soil resources as a necessary condition for sustainable development. *Current Opinion in Environmental Sustainability*.
- Nocita, M., Stevens, A., van Wesemael, B., Aitkenhead, M., Bachmann, M., Barthès, B., Ben Dor E., Brown D., Clairotte M., Csorba A., Dardenne P., Dematte J., Genot V., Guerrero C., Knadel M., Montanarella L., Noon C., Ramirez-Lopez L., Robertson J., Sakai H., Soriano-Disla J., Shepherd K., Stenberg B., Towett E., Vargas R., Wetterlind, J. (2015). Soil Spectroscopy: An Alternative to Wet Chemistry for Soil Monitoring. In *Advances in Agronomy* (Vol. 132, pp. 139–159). Academic Press Inc.  
<http://doi.org/10.1016/bs.agron.2015.02.002>

## Hosting Directorate

Directorate: [Sustainable Resources \(DIR D\)](#)