Joint Research Centre - European Soil Data Centre (ESDAC)

17-November-2026 12:11:54

Temporary Dataset Download: LUCAS 2009 TOPSOIL data

ID	136374
Date - Time	Fri, 11/13/2026 - 12:46
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Type of Organization	Research Organization
-- Other	
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Purpose	This research aims to map and analyze the spatiotemporal dynamics of soil organic carbon (SOC) in the black soil region of Northeast China around 2010. The requested dataset will be used exclusively for academic, non-profit research as training and validation labels for machine learning-based SOC inversion models. Specifically, the data will support: (1) extracting multi-source environmental covariates (climate, terrain, remote sensing) at sample locations; (2) training and validating random forest / XGBoost models to predict topsoil (0–20 cm) SOC distribution at 30 m resolution; and (3) assessing the impact of environmental drivers on SOC spatial patterns. All results will be published in peer-reviewed academic journals. The data will not be redistributed, sold, or used for commercial purposes. Proper citation and acknowledgment of the data source will be provided in all resulting publications.
Notes	

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   a) Any results can be published once a proper aggregation process that prevents any

individual body (private person, private organisation) from being identified has been applied,
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b) Graphical representation of individual units on a map is permitted as far as the geographical location of the soil samples is not detectable.

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7. This agreement shall start on the date the Licencee has received the LUCAS_SOIL data from the JRC. There is no need for a signature of the present agreement by the JRC.
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9. The European Union will be formally mentioned and fully acknowledged in, but not limited to, reports, articles, publications and presentations of work resulting from the use of the LUCAS_SOIL data as follows: "The LUCAS topsoil dataset used in this work was made available by the European Commission through the European Soil Data Centre managed by the Joint Research Centre (JRC), http://esdac.jrc.ec.europa.eu/".
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19. The name LUCAS_SOIL of the data being created by the European Union, the Licencee shall not use the name of LUCAS_SOIL without prior written authorization of the JRC and shall not register the name LUCAS_SOIL as a trademark
20. Personal data retrieved from the LUCAS_SOIL database shall be processed according to

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Regulation (EC) 45/2001 of the European Parliament and of the Council of 18 December 2000 on the protection of individuals with regard to the processing of personal data by the Community institutions and bodies and on the free movement of such data

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23. This Agreement shall be governed by and construed in accordance with Belgian law. Any dispute, controversy or claim arising out of or relating to this Licence shall be settled before the competent courts of Brussels.
24. The following Annexes form an intergral part of this License Agreement: ANNEX 1: Specification of LUCAS_SOIL Database
25. **THE LICENCEE ACKNOWLEDGES TO HAVE READ, UNDERSTOOD AND AGREED TO BE BOUND BY THE ABOVE-MENTIONED TERMS AND CONDITIONS OF THE CONTRACT**

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Technical assistance concerning the use of the LUCAS data can be obtained from : ec-esdac@ec.europa.eu

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ANNEX 1: SPECIFICATION OF LUCAS_SOIL DATA

Database: The LUCAS_SOIL data are :

- In MS Excel format for the soil properties data: LUCAS_TOPSOIL_v1.xlsx
- 1 formats for Soil Multispectral data: LUCAS_TOPSOIL_v1_spectral.rdata (RDATA)

Reports (Proposed Citation): The LUCAS_SOIL data are documented in the report:

- Orgiazzi, A., Ballabio, C., Panagos, P., Jones, A. and Fernández-Ugalde, O., 2018. LUCAS Soil, the largest expandable soil dataset for Europe: a review. *European Journal of Soil Science*, **69(1)**: 140-153.
- "Toth, G., Jones, A., Montanarella, L. (eds.) 2013. LUCAS Topsoil Survey. Methodology, data and results. JRC Technical Reports. Luxembourg. Publications Office of the European Union, EUR 26102 - Scientific and Technical Research series - ISSN 1831-9424 (online); ISBN 978-92-79-32542-7; doi: 10.2788/97922"

References:

The documentation associated to the data is available from the report:

- Orgiazzi, A., Ballabio, C., Panagos, P., Jones, A. and Fernández-Ugalde, O., 2018. LUCAS Soil, the largest expandable soil dataset for Europe: a review. *European Journal of Soil Science*, **69(1)**: 140-153.

- Tóth, G., Jones, A., Montanarella, L. (eds.) 2013. LUCAS Topsoil Survey. Methodology, data and results. JRC Technical Reports. Luxembourg. Publications Office of the European Union, EUR26102 – Scientific and Technical Research series – ISSN 1831-9424 (online); ISBN 978-92-79-32542-7; doi: 10.2788/97922"

Peer-reviewed publications relevant to the data:

- Orgiazzi, A., Ballabio, C., Panagos, P., Jones, A., Fernández-Ugalde, O. 2018. LUCAS Soil, the largest expandable soil dataset for Europe: A review. *European Journal of Soil Science*, 69(1): 140-153, DOI: 10.1111/ejss.12499
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- Panagos P., Ballabio, C., Yigini, Y., Dunbar M. (2013) Estimating the soil organic carbon content for European NUTS2 regions based on LUCAS data collection *Science of The Total Environment* Volume 442, pp. 235–246.
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- Nocita, M, Stevens, A.. Toth, G., Panagos, P., van Wesemael, B., Montanarella, L. 2013. Prediction of soil organic carbon content by diffuse reflectance spectroscopy using a local partial least square regression approach. *Soil Biology and Biochemistry*. 68 , pp. 337-347, DOI: 10.1016/j.soilbio.2013.10.022
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- Panagos, P., Köninger, J., Ballabio, C., Liakos, L., Muntwyler, A., Borrelli, P. and Lugato, E., 2022. Improving the phosphorus budget of European agricultural soils. Science of The Total Environment, 853: 158706. DOI: 10.1016/j.scitotenv.2022.158706
- Tóth, G., Guicharnaud, R.A., Tóth, B. and Hermann, T. (2013) Phosphorus levels in croplands of the European Union with implications for P fertilizer use

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