

Temporary Dataset Download: LUCAS 2009 TOPSOIL data

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-- Other	
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Purpose	The dataset will be used for non-commercial research and development during an artificial intelligence engineering internship. The study aims to develop and evaluate machine learning and deep learning models for predicting total nitrogen, available phosphorus and available potassium from near-infrared soil spectra. The data will be used internally for research and proof-of-concept purposes.
Notes	

Notifications:

1. The LUCAS_SOIL data are the property of the European Union , represented by the European Commission, represented by the Directorate General-Joint Research Centre (hereafter referred to as the JRC), which is allowed to authorize third parties to use these data free of charge.
2. The LUCAS-SOIL data have been generated with a harmonised methodology for the production of statistics on soil characteristics at European level and are not meant to provide any any information as to personal or land properties character. Furthermore, given the relatively limited number of points analysed and their spatial distribution, data contained in LUCAS_SOIL cannot be considered representative of local conditions and certainly not of field conditions.
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4. The Licensee shall take all the necessary regulatory, administrative, technical and organisational measures to ensure that the data are used only in accordance with the pprinciples specified in Article 2 and for the purposes specified in Article 3 and that there will be no attempt to identify by any means whatsoever, any individual statistical unit other than the geo-referenced coordinates of the points. In particular, owners of the land to which the points belong shall not be identified.
5. In any reports, including all publications and unpublished papers, the following rules should be applied: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.
6. The present licence is granted free of charge.
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.
8. The LUCAS_SOIL database will be accessible only to the Licensee and staff working for the

Licensee's Organization and on a need-to-know basis. The Licencee undertakes to inform the authorized persons of the existence of the present licence agreement and of its obligations that they will also have to respect.

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/>".
10. The Licensee can obtain information concerning the LUCAS_SOIL database from the JRC by e-mail (ec-esdac@ec.europa.eu) The Licencee undertakes to communicate on a regular basis to the JRC any errors or omissions discovered
11. Neither the European Union, nor any person acting on its behalf, is responsible for the use which might be made of LUCAS-SOIL database.
12. Whereas every effort has been made to ensure the quality of the LUCAS_SOIL data, the European Commission does not give any warranty as to the completeness or accuracy of the LUCAS_SOIL data, nor that it is error free or of a satisfactory quality or appears precisely as described in any documentation related to the data. All other such warranties are expressly disclaimed.
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17. In the event of any claim, suit or proceeding for infringement from third parties, the European Union shall have the right, at its option, to assume defence of such action.
18. The Licencee shall not use any trademarks of the European Union, the European Commission or JRC
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 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
21. Licensee is informed that its personal data may be used by the European Union and automatically processed. The identifying data that Licensee may submit (The Data) will be treated in accordance with the policy on "protection of individuals with regard to the processing of personal data by the European Union institutions", based on Regulation (EC) NÂ° 45/2001. It may occur that you are requested to provide certain Data such as your name,

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22. The Licensee agrees to maintain in confidence and not to disclose to any natural or legal person and to use its best effort to prevent and protect the data and documentation and reports therefore, and all other material, know-how, information from disclosure by its agents or employees to any person, organisation or company.
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**

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

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
- Toth G., Jones A., Montanarella L. (2013) [The LUCAS topsoil database and derived information on the regional variability of cropland topsoil properties in the European Union](#). *Environmental Monitoring and Assessment*, 185 (9), pp. 7409-7425.
- 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.
- Panagos, P., Meusburger, K., Alewell, C., Montanarella, L. (2012) [Soil erodibility estimation using LUCAS point survey data of Europe](#), *Environmental Modelling & Software*, Volume 30, Pages 143-145, doi:10.1016/j.envsoft.2011.11.002
- 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
- Stevens, A., Nocita, M., Toth, G., Montanarella, L., Van Wesemael, B. (2013) [Prediction of Soil Organic Carbon at the European Scale by Visible and Near InfraRed Reflectance Spectroscopy](#). *PLoS ONE*, 6: pp. xx-xx.
- 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