

Readme file for the LUCAS 2018 Topsoil dataset

This is the main data package containing the LUCAS Topsoil data of the 2018 LUCAS soil survey. In the future, more LUCAS SOIL 2018 data (e.g. DNA, biodiversity data) will be provided as separate data files.

This data package contains:

- **1 CSV file [LUCAS-SOIL-2018](#)** (with the soil analytical data of samples that passed the data evaluation); there are 18,984 records.
- **ESRI shapefile [LUCAS-SOIL-2018](#)** that shows the 18,984 LUCAS Master Grid sampling points for which there are data in the CSV file.
- **1 CSV file [LUCAS2018_EROSION](#)** (with the Erosion assessment: information recorded on erosion evidences for 879 LUCAS points).
- **1 CSV file [LUCAS2018_ORG](#)** (with the Assessment of organic soils: measurements of depth of organic horizon from 1,050 LUCAS points).
- **1 CSV file [BulkDensity_2018_final-2](#)** (with the bulkdensity data for 6,269 points).

The [LUCAS-SOIL-2018](#) CSV file contains the identification code “PointID” of the sample points and data of physical and chemical properties for each sample. This “PointID” is unique for the 2018 LUCAS soil survey, as documented in <https://ec.europa.eu/eurostat/web/lucas/data/primary-data/2018>

A detailed description of the evaluation of the soil data in this file is documented in the report [JRC_Report_2018-LUCAS_Soil_Final.pdf](#) that is part of this distribution package.

Explanation of the records and the fields in the CSV file [LUCAS-SOIL-2018](#)

Description of the soil fields in the CSV file [LUCAS-SOIL-2018](#)

Field	Description	Units/ Values	Limit of detection (LOD)/ Measurement range
Depth	Value indicating the depth of the sample (see below for explanation)	-	-
PointID	Unique identifier of the LUCAS survey point	8 digits number	–

pH(CaCl ₂)	pH measured in a CaCl ₂ solution	–	2 – 10
pH(H ₂ O)	pH measured in a suspension of soil in water	–	2 – 10
EC	Electrical conductivity	mS/m	0.1
OC	Organic carbon content (at depth 0-20cm)	g/kg	2
CaCO ₃	Carbonates content (at depth 0-20cm)	g/kg	1
P	Phosphorus content	mg/kg	10
N	Total nitrogen content	g/kg	0.2
K	Extractable potassium content	mg/kg	10
OC (20-30 cm)	Organic carbon content at the depth 20-30cm	g/kg	2
CaCO ₃ (20-30 cm)	Carbonates content at the depth 20-30cm	g/kg	1
Ox_Al	Al Oxylate	(mg/kg)	-
Ox_Fe	Fe Oxylate	(mg/kg)	-

Note that this data file does **not** contain textural information (coarse fragments, sand, clay, silt). These textural data will be provided in a separate file that also takes into account values that were measured in previous LUCAS SOIL campaigns (2009, 2015).

Values below the LOD were set to '<LOD' for all but CaCO₃.

Empty cells mean that no measurement was made.

Al and Fe Oxylate were measured for 2510 samples.

For the field Depth:

- 0_10: (for 232 samples): record contains values for samples collected by the bulk density core method from a depth of 0-10 cm. No deeper samples (i.e. 10-20 cm, 20-30 cm) are associated with these data. The implication is that these represent shallow soils but this is not certain, as the related samples may have been lost before they were analysed.
- 10_20: (for 8 samples): record contains values for samples collected by the bulk density core method from a depth of 10-20 cm. No shallower (0-10 cm) or deeper samples (20-30 cm) are associated with these data. The implication is that the samples collected from the 0-10 cm layer have been lost.
- 20_30: there is only one sample at depth 20 – 30cm, that has only one value (for field *CaCO₃ (20-30cm)*)

- Note that there are 141 samples collected by the bulk density core method from a depth of 20-30 cm. These samples are all from Portugal, and it was used to test the process to collect deeper bulk density data. Only organic carbon and carbonates were analysed in these samples, and values are found in the columns *OC (20-30 cm)* and *CaCO3 (20-30 cm)*. There are corresponding laboratory data for the depth 0-20 cm (same Point-ID).

For the field CaCO3:

- If CaCO3 is absent (value=0) and pH<7; then we put the value NA in the CSV
- If CaCO3 is absent (value=0) and pH>=7; then we put the value <LOD in the CSV
- If CaCO3 is not absent (value <> 0) then we just put the value, which will be >=1 (as there are no values >0 and <1)

Additional non-soil information

Detailed information on land cover and land use, irrigation management, structural elements in the landscape and crop residues for the LUCAS 2018 campaign is available from the website of Eurostat: <https://ec.europa.eu/eurostat/web/lucas/data/primary-data/2018>

In order to find the connection between the LUCAS 2018 topsoil data (in the CSV file) and general LUCAS 2018 campaign data, you need to use the **PointID** values.

For the convenience of the user, we added in the CSV file a number of fields that may be useful. The field values were taken from the official Eurostat LUCAS 2018 campaign microdata.

NUTS_0	NUTS code for the country where the sample was taken
NUTS_1, NUTS_2, NUTS_3	NUTS 1, 2 and 3 codes for the actual location where the sample was taken (thus based on GPS coordinates)
TH_LAT, TH_LON	Theoretical Coordinates in decimal degrees
SURVEY_DATE	Date of Survey
Elev	Elevation (in meter) from surveyor GPS
LC	LUCAS Land Cover Code
LU	LUCAS Land Use Code
LC0_Desc	Main Land Cover class description
LC1_Desc	Detailed Land Cover class description
LU1_Desc	Detailed Land Use class description

The possible class values for LC, LU, and descriptions can be found from the Eurostat page; see link <https://ec.europa.eu/eurostat/web/lucas/data/primary-data/2018>

[LUCAS-SOIL-2018.shp](#)

This point shapefile has been derived using the ***theoretical coordinates*** for the 18,984 validated soil sampling points; these coordinates are explicitly part of the Eurostat LUCAS 2018 campaign microdata. Note that from the microdata at Eurostat, you can also retrieve the GPS coordinates of the points where the sample was actually taken. The attribute table of the shapefile contains only the LUCAS 2018 POINTID.

[LUCAS2018_EROSION](#) and [LUCAS2018_ORG](#) CSV files columns are explained in the report [JRC_Report_2018 LUCAS_Soil_Final.pdf](#).

[BulkDensity_2018_final-2](#) CSV files columns are explained in the report [JRC_Report_2018 LUCAS_Soil_Final.pdf](#).