



**ISRIC**  
World Soil Information



*Always quote citation when using data!*

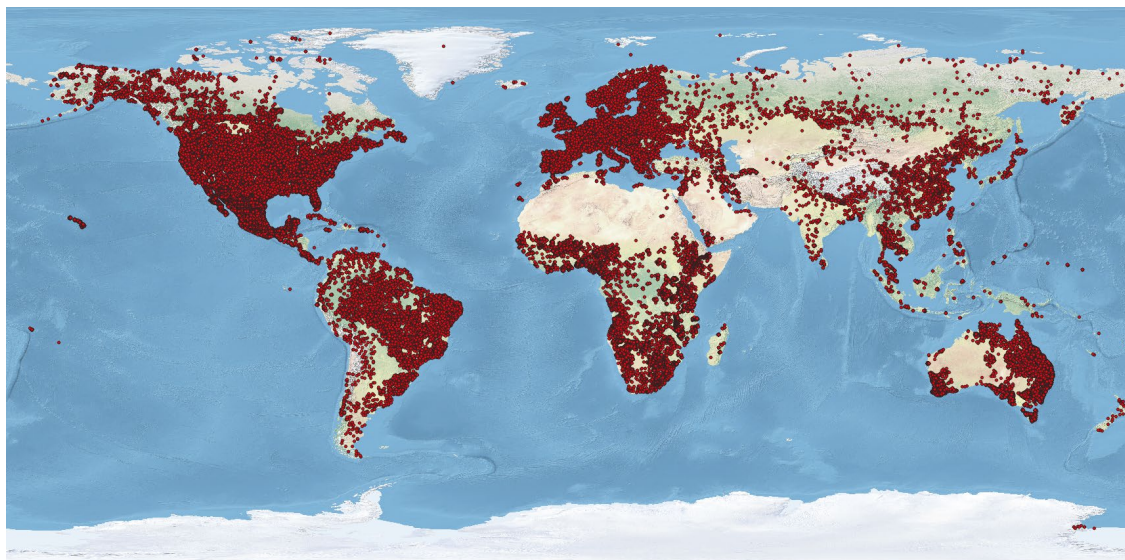
## ***ReadmeFirst: WoSIS Snapshot – September 2019***

### **Citation:**

Batjes, N.H., Ribeiro, E., van Oostrum, A., 2019. Standardised soil profile data for the world (WoSIS Snapshot – September 2019), <https://dx.doi.org/10.17027/isric-wdcsoils.20190901>

### ***Supplement to (Manuscript submitted):***

Batjes, N.H., Ribeiro, E., van Oostrum, A. WoSIS, 2019: Standardised soil profile data to support global mapping and modelling (WoSIS snapshot - 2019), *Earth Syst. Sci. Data Discuss.*, <https://doi.org/10.5194/essd-2019-164>, in review.



*Location of soil profiles provided with the WoSIS snapshot (September 2019)*

## Download data:

The ZIP file containing all data in tsv (tab separated values) format respectively as GeoPackage is available at: <http://dx.doi.org/10.17027/isric-wdcsoils.20190901>

## Description of file structure:

In order to facilitate users, the data are presented in four files:

- *wosis\_201909\_attributes.tsv*
- *wosis\_201909\_profiles.tsv*,
- *wosis\_201909\_layers\_chemical.tsv*, and
- *wosis\_201909\_layer\_physicals.tsv*.

*wosis\_201909\_attributes.tsv*: This file lists the four to six letter code for each attribute, whether the attribute is a site or horizon property, the unit of measurement, the number of profiles respectively layers represented in the snapshot, and a brief description of each attribute, as well as the inferred uncertainty for each property (Appendix A in paper).

*wosis\_201909\_profiles.tsv*: This file contains the unique profile ID (i.e. primary key), the source of the data, country ISO code and name, accuracy of geographical coordinates, latitude and longitude (WGS 1984), point geometry of the location of the profile, maximum depth of soil described and sampled, as well as information on the soil classification system and edition. Depending on the soil classification system used, the number of fields will vary. For example, for the World Soil Reference Base (WRB) system these are: *publication\_year* (i.e. version), *reference\_soil\_group\_code*, *reference\_soil\_group\_name*, and the name(s) of the prefix (primary) qualifier(s) respectively suffix (supplementary) qualifier(s). The terms principal qualifier and supplementary qualifier are currently used (IUSS Working Group WRB, 2015); earlier WRB versions used prefix and suffix for this (e.g. IUSS Working Group WRB, 2006). Alternatively, for USDA Soil Taxonomy, the version (year), order, suborder, great group, and subgroup can be accommodated (Soil Survey Staff, 2014b). Inherently, the number of records filled will vary between (and within) the various source databases.

The corresponding field names are listed below:

<i>profile_id</i>	Primary key and Foreign key that refers to table 'profile'
<i>dataset_id</i>	Identifier for source data set
<i>country_id</i>	ISO code for country name
<i>country_name</i>	Country name (in English)
<i>geom_accuracy</i>	Accuracy of the geographical coordinates in degrees. Example: If degree, minutes and seconds are provided in the source then <i>geom_accuracy</i> is set at 0.01, if seconds are missing at 0.1, and if seconds and minutes are missing at 1.
<i>latitude</i>	Latitude in degrees (WGS84)
<i>longitude</i>	Longitude in degrees (WGS84)
<i>geom</i>	Point geometry of the location of the profile
<i>dsds</i>	Maximum depth of soil described and sampled (calculated)
<i>cfao_version</i>	Version of FAO Legend (e.g. 1974 or 1988)

<code>cfao_major_group_code</code>	Code for major group (in given version of the Legend),
<code>cfao_major_group</code>	Name of major group
<code>cfao_soil_unit_code</code>	Code for soil unit
<code>cfao_soil_unit</code>	Name of soil unit
<code>cwrp_version</code>	Version of World Reference Base for Soil Resources
<code>cwrp_reference_soil_group_code</code>	Code for WRB group (in given version of WRB)
<code>cwrp_reference_soil_group</code>	Full name for reference soil group
<code>cwrp_prefix_qualifier</code>	Name for prefix (e.g. for WRB1988) resp. principal qualifier (e.g. for WRB2015)
<code>cwrp_suffix_qualifier</code>	Name for suffix (e.g. for WRB1988) resp. supplementary qualifier (e.g. for WRB2015)
<code>cstx_version</code>	Version of USDA Soil Taxonomy (UST)
<code>cstx_order_name</code>	Name of UST order
<code>cstx_suborder</code>	Name of UST suborder
<code>cstx_great_group</code>	Name of UST greatgroup
<code>cstx_subgroup</code>	Name of UST subgroup

*wosis\_201909\_layer\_chemical.tsv* and *wosis\_201909\_layer\_physical.tsv*: The layer (horizon) data are presented in two separate file in view of their size, one for the chemical and one for the physical soil properties. The file structure, however, is identical:

<code>profile_id</code>	identifier for profile, links to file 'wosis_201909_profiles'
<code>profile_layer_id</code>	unique identifier for layer for given profile (primary key)
<code>upper_depth</code>	upper depth of layer (or horizon)
<code>lower_depth</code>	lower depth of layer
<code>layer_name</code>	name of the horizon, as provided in the source data
<code>litter</code>	flag (Boolean), indicating whether this is considered a surficial litter layer

Subsequently, the following items are listed sequentially per attribute ('xxxx') as defined under 'code' in file *wosis\_201909\_attributes.tsv*:

<code>xxxx_value</code>	array listing all measurement values for soil property 'xxxx' for the given layer. In some cases, more than one observation is reported for a given horizon (layer) in the source, for example 4 values for TOTC: [1:5.4, 2:8.2, 3:6.3, 4:7.7 ]
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xxxx _value_avg	average, for above (it is recommended to use this value for 'routine' modelling)
xxxx _method	array listing the method descriptions for each value. The nature of this array varies with the soil property under consideration as described in the option tables for each analytical method. For example, in the case of electrical conductivity (ELCO), the method is described using: sample pretreatment (e.g. sieved over 2 mm size, solution (e.g. water), ratio (e.g., 1:5), and ratio base (e.g. weight /volume). Details for each method are provided in the WoSIS Procedures Manual (Appendix D, E and F in Ribeiro et al., 2018).
xxxx _date	array listing the date of observation for each value
xxxx _dataset_id	abbreviation for source data set (e.g. WD-ISCN)
xxxx _profile_code	code for given profile (provides the link to profile_id in <i>wosis_201909_profiles.tsv</i> )
xxxx _license	licence for given data, as indicated by the data provider (e.g. CC-BY)
(... )	as above, but for the next attribute (for full list see Appendix A)

All fields in the above files are tab-delimited, with double quotation marks as text delimiters. File coding is according to the UTF-8 unicode transformation format.

### Using the data:

The above tsv files can easily be imported into an SQL database or statistical software such as R, after which they may be joined using the unique **profile\_id**.

Guidelines for handling and querying the data are provided in the WoSIS Procedures Manual (Ribeiro et al. 2018, p. 45-48, [click here](#); see also the detailed tutorial by David Rossiter (2019, [click here](#)).

### Licence:

The licence for each specific property is given in the dataset (see: name\_license, above). This may either be a CC BY or CC BY-NC Creative Commons licence, in compliance with the terms specified by each [data provider](#). These terms should be respected when using the standardised data. Additional information may be found in the [ISRIC Data Policy](#).

### Procedures Manual:

Full details about the methodology, database structure and coding conventions as used in the central WoSIS server database are provided in:

Ribeiro E, Batjes NH and Van Oostrum AJM 2018. *World Soil Information Service (WoSIS) - Towards the standardization and harmonization of world soil data. Procedures Manual 2018*. ISRIC Report 2018/01, ISRIC - World Soil Information, Wageningen, 166 p.  
<http://dx.doi.org/10.17027/isric-wdcsoils.20180001>

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