

Database Report

Report on technical changes in 2022

ICP Forests Database Report under the UNECE Convention
on Long-range Transboundary Air Pollution (Air Convention)

United Nations Economic Commission for Europe (UNECE)
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<http://icp-forests.net>



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INTRODUCTORY REMARKS

This document is supposed to give a quick overview of relevant database changes in year 2022 (up to November), as well as changes in the online documentation. Editorial changes (e.g. language improvements) are not mentioned here.

For content-related issues and decisions which require specialist knowledge decisions were made in agreement between the PCC of ICP Forests and corresponding Expert Panel chairs.

Please take into consideration, that this report can represent just an intermediate status.

The current specifications are always documented under: <https://icp-forests.org/documentation>.

ONLINE DOCUMENTATION

<https://icp-forests.org/documentation>

Display of tests

- Tests are displayed now in a more compact and intuitive way: the test rules and messages are not in separated tables anymore, but stand in one table and in one row. Furthermore, there is a new column 'ACTIVE' added, which gives info for which survey_years the test is active, see example below:

temporal tests

RULE_ID	TEST	ERROR_TYPE	ACTIVE
100017	Message: longitude VALUE does not match with value VALUE from previous year SQL: where NOT (longitude = longitude_t-1)	warning	since 1984
100050	Message: latitude VALUE does not match with value VALUE from previous year SQL: where NOT (latitude = latitude_t-1)	warning	since 1984

Display of conditions for mandatory attributes

- Some attributes are mandatory under certain conditions only. Until now this information was rather hard to find and these attributes could be easily mistaken as optional. Now it is more eye-catching: attributes are marked with "(M)" and also there is a new line in the description called "Mandatory for", explaining the conditions, see example below:

5	repetition M K	Remarks: E.g. '1, 2, 3, 4' in case of four cores, '1' in case of a single core or a stem disc analysis Format: I
6	layer_superior (M)	DB Column: layer_limit_superior Description: Layer limit superior Mandatory for: organic layers Format: F Explanatory Item: 128
7	layer_inferior (M)	DB Column: layer_limit_inferior Description: Layer limit inferior Mandatory for: organic layers Format: F Explanatory Item: 128

Added Introduction years

- All form descriptions now display at the top the website the year of their introduction to the Manual. Furthermore, quite often, some attributes were added later on to the programme. In these cases, the 'later' attributes include the line 'Introduction:' in their description, displaying the year of their implementation. This helps to understand why some attributes are empty in earlier years.

Surveys > GR > PLI

GR - Estimation of Growth and Yield

Form: PLI - Contents of reduced plotfile to be used for increment

Form introduced: 1993

Last change: 2011

4	gr_plot_id M K	Description: Growth plot ID Format: I Explanatory Item: 39 Introduced: 2011
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Introduction tidied up

- The menu item 'Introduction' is now arranged in a more comprehensible and better structured way, in order to provide a better support to beginners and third-party users to understand the online documentation.

GROWTH (LEVEL II)

Form IPM (Periodic growth data on tree level)

<https://icp-forests.org/documentation/Surveys/GR/IPM.html>

New attribute, new primary key

- **date_observation** is a new attribute in IPM and is also part of primary key. Similar to IRP and PLI, it is now possible to insert several measurements for a tree per year. This is helpful, e.g. in case of thinnings, now it is possible to submit inventory data of trees before and after the thinning, if available.

Form IRP (Diameter measurements)

<https://icp-forests.org/documentation/Surveys/GR/IRP.html>

Primary key extended

- **dendrometer** is part of the primary key now. This allows to submit data from several dendrometer devices installed at the same tree.

Data type changed

- **diameter_time** changed from integer to char. The reason is that an integer does not take a leading 0. When submitting a time like e.g. 094553 (for 09:45:53), it was saved as 94553 only. Already submitted data was checked and corrected if the leading 0 was missing.

Attribute renamed

- **date_assessment** was renamed to **date_observation** for the sake of harmonization with PLI and IPM.

METEOROLOGICAL MEASUREMENTS (LEVEL II)

Form MEM (Meteorological measurements) and MEH (Hourly measurements)

<https://icp-forests.org/documentation/Surveys/MM/MEM.html> | <https://icp-forests.org/documentation/Surveys/MM/MEH.html>

Plausible ranges adapted

- **Soil Moisture Matric potential (MP)**: Instead of having different ranges among the countries, it is physically more reasonable to have one unique range. This is now **-100 to 2000 kPa** (values outside this range create a warning). In addition, values above 100000 kPa provoke an error. The new ranges refer equally to the values min, max and mean_sum in MEM, and to hour_min, hour_max and hour_mean_sum in MEH.

SOIL (LEVEL I AND II)

Form PRF (Profile description)

<https://icp-forests.org/documentation/Surveys/SO/PRF.html> | <https://icp-forests.org/documentation/Surveys/S1/PRF.html>

Attributes recoded

- **code_wrb_soil_group, code_wrb_qualifier_1 (Level II)**: At early assessments the soil-type was stored in the attribute code_soil_type in form PLS only as 3-digit number. The soil_types were recoded now in respect to FAO88 classifications and stored in PRF, e.g. code_soil_type 101 (Eutric Fluvisols) was transformed to code_wrb_soil_group 'FL' and code_wrb_qualifier_1 'e'. Afterwards the attribute code_soil_type was removed from PLS.
- **code_wrb_qualifier_1 (Level I)**: Some of the qualifiers with FAO88 reference were stored with the full soil-type-name and not as symbol, e.g. 'Chromic Cambisols' instead of 'x'. This was recoded so that all qualifiers are in line now with the specification requirements.

New Column

- **classification_full_name**: As it can be quite laborious to reconstruct the full name of the soil classification from the soil group and the qualifiers, a new column is introduced, where countries can optionally report the full name, e.g. Lixic Vetic Ferralsol (Ferric, Rhodic). Please take note, that it will not be possible to check the full name for plausibility during the submission.

Columns joined

- **rooting_depth, rock_depth and obstacle_depth**: These three columns have been replaced by one new column called **eff_soil_depth** (effective soil depth). It expresses the depth from top of mineral soil to the continuous rock. It expects a value range of 0 and 250 cm. Please use "999" to report depths known to be deeper than 100cm without knowing the exact depth. The columns rooting_depth, rock_depth and obstacle_depth cannot be submitted anymore, but they remain in the database and can be downloaded.

Dictionary changed

- **d_soil_adjective**: A comparison of official WRB publications with qualifiers in the ICP Forests dictionary revealed some discrepancies. Now, qualifiers are in line again with all WRB publications and are correctly documented online and used for submission tests. Following changes were made:
 - corrected validity and code discrepancies of about 40 qualifiers
 - added new qualifiers:
 - WRB 98: Hypersalic (szh)
 - WRB 06/07: Nudiargic (nua – it is originally coded as 'na', but this is also used by Natric)
 - WRB 14/15: Archaic (ah), Anthromollic (am), Greyzemic (gz), Mineralic (mi), Nudiargic (ng), Plinthofractic (pf), Raptic (rp), Someric (si), Somerimollic (sm), Hyposulfidic (ws)

Dictionary: https://icp-forests.org/documentation/Dictionaries/d_soil_adjective.html

Mandatory status changed

- **soil_group**: To be in line with the Manual, the status of these attributes changed from optional to mandatory.

Old data shifted from PLS to PRF

- **code_soil_type (Level II)**: Formerly it was not mandatory to report the profile description information as today, only the soil type (as a code) in the plot file was obligatory. This 'FAO 1988 soil type' was now transferred to PRF and converted, so that it goes with the fields PRF.code_wrb_soil_group, PRF.code_wrb_qualifier_1 and PRF.code_wrb_publication.

These shifted data records can be recognized by following comment in PRF.other_obs: 'moved code_soil_type [here comes the origin soil_type code] from PLS'.

In case that there was no equivalent plot or profile in PRF, where the data could be moved to, then the data was shifted to a new 'dummy' profile named '999'.

Form PFH (Profile horizons)

<https://icp-forests.org/documentation/Surveys/SO/PFH.html> | <https://icp-forests.org/documentation/Surveys/S1/PFH.html>

New tests

- **The sum of clay + silt + sand** is tested from now on, rule-id: 20220010 (SO) and 20220011 (S1). The sum of all three fractions needs to be between 97 and 103%. For more details, please read [EI 220](#).
- Values of **code_horizon_master** and **code_horizon_subordinate** until now were verified by dictionaries (d_hori_master and d_hori_sub). This was not sufficient any longer as it is impossible to cover all combinations of horizons on behalf of a dictionary.

Therefore, these dictionaries were replaced by tests which verify that the submitted characters are valid (rule-id: 20220012 – 20220021). The tests are described in more detail in EI 131 (https://icp-forests.org/documentation/Explanatory_Items/131.html). Here a short summary:

- **horizon_master**: Valid characters are: H, O, A, E, B, C, R, I, L, W, /, OL, OF, OFH, OLF, HF, HM, HS
- **horizon_subordinate**:
In case of mineral master horizon, valid characters are: a, b, c, d, f, g, h, i, j, k, l, m, n, o, p, q, r, s, t, u, v, w, x, y, z
In case of organic master horizon, valid characters are: a, c, d, e, f, g, i, j, k, l, m, n, o, p, q, r, u, v, y, z, @
- **Blank characters** are not allowed in horizon notations
- **Double characters** are not valid in the subordinate horizon
- **code_soil_structure, colour_moist and colour_dry** are mandatory for mineral layers, rule-id: 20220028 (SO only).

Dictionaries removed

- **d_hori_master** and **d_hori_sub**: Replaced by new tests (as described before)

Mandatory status changed (SO only)

- **horizon_master**: To be in line with the Manual, the status of this attribute changed from optional to mandatory in level II.

Form SOM (Soil analysis)

<https://icp-forests.org/documentation/Surveys/SO/SOM.html> | <https://icp-forests.org/documentation/Surveys/S1/SOM.html>

New tests (for Level II only)

See: <https://icp-forests.org/documentation/Tests/SO.html>

- `clay`, `silt`, `sand`, `texture`, `reactive_Al` and `reactive_Fe` are mandatory for mineral layers, rule-id: 20220058-20220059.
- `pH_CaCl2`, `total_organic_carbon`, `total_nitrogen`, `exchange_Ca`, `exchange_K`, `exchange_Mg`, `exchange_Na` are mandatory for all layers except OL, rule-id: 20220060-20220066.
- `layer_superior`, `layer_inferior` and `organic_layer_dry_weight` are mandatory for organic layers (not OL), rule id: 20220029.
- `bulk_density_dry_fine_earth` and `coarse_fragments_vol` are mandatory for mineral fixed depth layers 0-10, 10-20 and 20-40 cm, rule id: 20220030.
- `carbonates` is mandatory for calcareous soils (`pH_CaCl2` > 5.5) in forest floor, 0-10 or 10-20 cm depth layer, rule id: 20220031.
- `exchange_acidity`, `exchange_Al`, `exchange_Fe`, `exchange_Mn` and `Free_H_acidity` are mandatory for non-calcareous soils (`pH_CaCl2` <= 5.5), except OL layer, rule id: 20220032.
- `extract_Ca`, `extract_K`, `extract_Mg`, `extract_Mn` and `extract_P` are mandatory in forest floors, rule id: 20220033.
- `extract_Cd`, `extract_Cu`, `extract_Pb` and `extract_Zn` are mandatory in forest floor or in 0-10 cm depth layers, rule id: 20220034.

New tests for Level I are in planning.

New dictionary category

- `d_depth_level_soil`: This dictionary holds the layers that can be submitted to SOM. Now the layer 'OLF' was added, this is the combination of OL+OF. Because 'OLF' is valid as master horizon in PFH, it is necessary to allow also chemical submissions for this layer. https://icp-forests.org/documentation/Dictionaries/d_depth_level_soil.html

Code	Description	From_year	To_year
E	Not conform. Mineral depth var.(SW, E)	1984	
H	Organic layers saturated with water for prolonged periods	1984	
...
OLF	Not saturated organic layer, fermented plus litter horizon	1984	

Tests temporarily deactivated

- `clay`, `sand`, `silt` and `texture`: Here tests were checking if submitted values were roughly equivalent to values from the previous submission. These tests did not work correctly, because they compared wrong values. As a result, a lot of wrong warnings were produced. We cannot repair the tests by ourselves, therefore we inactivated them temporarily.

SYSTEM INSTALLATION (LEVEL I AND II)

Forms PL1 / PLT (Plot description)

<https://icp-forests.org/documentation/Surveys/Y1/PL1.html> | <https://icp-forests.org/documentation/Surveys/SI/PLT.html>

Columns removed

- **x_coord** and **y_coord**: The attributes x_coord and y_coord were old remains which are not needed anymore and therefore have been removed.

Forms ST1 / STA (Stand description)

<https://icp-forests.org/documentation/Surveys/Y1/ST1.html> | <https://icp-forests.org/documentation/Surveys/SI/STA.html>

Mandatory status changed

- **canopy_closure**: In level II, this attribute is not mandatory anymore in general but only mandatory for plots with inhomogeneous canopy closure. This is in line with the Manual.

New tests / test adapted

- **canopy_closure**: In level II, in case that canopy closure is empty, a warning will now show up with a hint, that this attribute is mandatory for plots with inhomogeneous canopy closure, rule-id: 13140.
- **code_tree_species**: In case that submitted code_tree_species is beech (=20), then a test expects that the forest type is beech forest (=6). Now also mountain beech forest (=7) will be accepted, rule-id: 822. In level I, this test has been newly introduced, rule-id: 20220024.

Column splitted up

- **code_status_protect**: It is possible to have several protection classes for a plot at one time. Therefore, the attribute code_status_protect was split up into three attributes, one for each class:
 - **code_status_mcpfe_class1**: Main Management Objective "Biodiversity"
 - **code_status_mcpfe_class2**: Main Management Objective "Protection of Landscapes and Specific Natural Elements"
 - **code_status_mcpfe_class3**: Main Management Objective "Protective Functions"

New attributes are filled with values basically such as yes/no/unknown (see 'New dictionaries'). With the introduction of the new attributes, the already existing data in code_status_protect was converted once to the new format. As an example, if class 2 was submitted in code_status_protect, then the new attributes will look like this

code_status_mcpfe_class1	code_status_mcpfe_class2	code_status_mcpfe_class3
99 (= unknown)	1 (= MCPFE Class 2)	99 (= unknown)

New dictionaries

- **d_status_mcpfe_class1**: Protection status MCPFE class 1 (Biodiversity) for code_status_mcpfe_class1 https://icp-forests.org/documentation/Dictionaries/d_status_mcpfe_class1.html

Code	Description	From_year	To_year
1	MCPFE Class 1.1: Main Management Objective “Biodiversity”- “No Active Intervention”	1984	
2	MCPFE Class 1.2: Main Management Objective “Biodiversity”- “Minimum Intervention”	1984	
3	MCPFE Class 1.3: Main Management Objective “Biodiversity”- “Conservation Through Active Management”	1984	
9	No protection status	1984	
99	Unknown	1984	

- **d_status_mcpfe_class2**: Protection status MCPFE class 2 (Landscapes) for code_status_mcpfe_class2 https://icp-forests.org/documentation/Dictionaries/d_status_mcpfe_class2.html

Code	Description	From_year	To_year
1	MCPFE Class 2: Main Management Objective “Protection of Landscapes and Specific Natural Elements”	1984	
9	No protection status	1984	
99	Unknown	1984	

- **d_status_mcpfe_class3**: Protection status MCPFE class 3 (Functions) for code_status_mcpfe_class3 https://icp-forests.org/documentation/Dictionaries/d_status_mcpfe_class3.html

Code	Description	From_year	To_year
1	MCPFE Class 3: Main Management Objective “Protective Functions”	1984	
9	No protection status	1984	
99	Unknown	1984	

Dictionary removed

- **d_protection_status**: Replaced by three new dictionaries: d_status_mcpfe_class1, d_status_mcpfe_class2 and d_status_mcpfe_class3

Form TCO (Tree coordinates - Level II only)

<https://icp-forests.org/documentation/Surveys/SI/TCO.html>

New columns

- azimuth and distance:** Tree coordinates should no longer be reported as metric coordinates, but as polar coordinates (azimuth and distance). The azimuth has to be reported in gon (range: 0-400 gon).
More details in EI 6: https://icp-forests.org/documentation/Explanatory_Items/6.html
These new attributes replace the previously designated attributes 'x_coordinate' and 'y_coordinate' in SI-TCO.

Form EVE (Forest events - Level II only)

<https://icp-forests.org/documentation/Surveys/SI/EVE.html>

Primary key extended

- code_target_plant** and **code_seedl_tree_species:** It turned out that sometimes in the event table there is the need to list several plant species for one and the same event (at same plot and same day). This could be the case for chemical treatments of different plants, or if planting of different tree species is made. In order to allow several rows for the same event, the columns **code_target_plant** and **code_seedl_tree_species** became part of the key. Please take note that now they are not allowed to be empty anymore!
But in case, you still need to leave them empty (e.g. not relevant for the event), please report a **null value**:
 - for **code_target_plant** it is '000.000.000'
 - for **code_seedl_tree_species** it is -9

New dictionary category

- d_logging_method:** In case of tree girdling (common in Flandern), the event should be stated as event type 'Cleaning' (N2) and 'tree girdling' in **code_logging_method**
https://icp-forests.org/documentation/Dictionaries/d_logging_method.html

Code	Description	From_year	To_year
1	Trees are cut into pieces where they have fallen down (before extraction)	1984	
2	Whole trees are extracted from the area, then cut into pieces outside	1984	
3	Tree girdling: remove a ring of bark, phloem and cambium all around the trunk, to make a tree die	1984	
99	Unknown	1984	