CCLM2CMOR Tool

Explaining CSV-Table

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The CSV-Table, generally available in directory "CCLM2CMOR-master/src/CMORlight/Config", relative to some basic directory, belongs to the most important input part of the CCLM2CMOR Tool.

Mainly, it defines

- all variables that can (not must) be CMORized,
- the desired time-resolutions of CMORized data
- their physical units
- factors to convert the data from their physical input to the required output unit, or only to change the sign of data, if necessary
- their cell-methods with respect to time
- their CF long-and standard names
- the direction of positive fluxes, if fluxes are considered

The easiest way to create/edit such a table is to use EXCEL, and to store the final table in CSV-format, separated by a delimiter, which, in general, is a semicolon (;).

The table **MUST** have 30 columns.

The first line is a header line.

The number of lines is determined by the number of variables to be CMORIzed.

In the following it is tried to explain the meaning of each column.

Col. No.	Header	Description
1	CCLM variable name	The name of the CCLM input variable as it appears in the input directory-/filename structure
2	CCLM variable name (in model output file)	The name of the CCLM input variable as it appears in the Net CDF input file. In general, the names given in columns 1 and 2 are identical, but this must not necessarily be eh case. Especially, if variables on P- or Z-Levels are considered.
3	output variable name	The CF name of the output. This is/are the name(s) that has/have to be given via the option "-v" which tells the CMOR-tool which variable(s) is/are to be CMORized
4	to be derived from	No impact on the tool. Just a reminder to the user from which CCLM standard output variable this variable had been derived and by which equation **Note: additional non-standard CCLM input variables are not calculated by the CMOR-Tool; this step has to be carried out before the CMOR-Tool is applied**
5	Derotate (CORDEX)	Tells the tool whether a wind-component has to be de-rotated; Cell entry: derotate ➔ perform the derotation Cell is empty: ➔ no derotation
6	Level	Type of level to which the variable belongs. Possible entries: - ModelLevel (incl. near-surface and soil variables) - PressureLevel - ZLevel

7	Conversion factor	Converts the input data to the required physical units of the output Examples: from input decimals to output percent: factor=100 Geopotential heights to m: factor = 0.101971621 Just change the sign of data, if necessary: factor = -1 **Conversion to flux units (e.g. TOT_PREC = pr):** **factor =1./(CCLM storage interval in seconds); a change of sign can, of course, also be taken into account** **Example for TOT_PREC, CCLM storage intervals:** • **1hr: factor=1./3600.= 0.000277778** • **3hr: factor = 1/(3.*3600.)= 9.2592E-5** **Note: only conversion to flux units leads to a factor that depends on the respective CCLM storage interval of the CLLM input variable.** If no conversion factor has to be taken into account , simply give a 1
8	Cell Method (additional subdaily,CORDEX)	Give the cell-method with respect to time. Only necessary if respective time resolution is required. Possible are: • point • maximum • minimum • mean • sum **Important**: the entry must be left adjusted without a blank at the beginning
9	Cell Method (subdaily,CORDEX)	Give the cell-method with respect to time. Only necessary if respective time resolution is required. Possible are: • point • maximum • minimum • mean • sum **Important**: the entry must be left adjusted without a blank at the beginning
10	Cell Method (daily,CORDEX)	Give the cell-method with respect to time. Only necessary if respective time resolution is required. Possible are: • point • maximum • minimum • mean **Important**: the entry must be left adjusted without a blank at the beginning
11	Cell Method (monthly, CORDEX)	Give the cell-method with respect to time. Only necessary if respective time resolution is required. Possible are: • maximum within days time: mean over days • minimum within days time: mean over days • mean **Important**: the entry must be left adjusted without a blank at the beginning

12	Cell Method (seasonal,CORDEX)	Give the cell-method with respect to time. Only necessary if respective time resolution is required. Possible are: • maximum within days time: mean over days • minimum within days time: mean over days • mean **Important**: the entry must be left adjusted without a blank at the beginning
13	Levelvalue (height, plev)	The CMOR-file requires variables indicating the pressure level, or the z-level , or the height of a near-surface level , if variable at one of these level types has been CMORized. Here you can give the respective level value: • For pressure level in Pa • For Z-level and near-surface heights in m Furthermore, for CMOR variable "mrso" it is possible to define the number of deepest soil1_bnds level down to which soil moisture should be integrated
14	units	The physical unites of the CMORized output variable
15	Additional subdaily frq[1/day]	In addition to a required sub-daily resolution, a further one can be defined. Just give the wished number of time-stamps per day. e.g: • 8 for 3-hourly data • 4 for 6-hourly data • 2 for 12-hourlydata
16	Subdaily frq [1/day]	Define the required sub-daily resolution. Give the appropriate number of time-stamps per day e.g: • 24 for hourly data • 8 for 6-hourly data • etc.
17	ag	Indicator for aggregation of sub-daily data. Possible entries i: for instantaneous values (cell_method = point) a: for mean, or max, or min, or summed values
18	Daily frq [1/day]	If daily values are required give a 1 here
19	ag	Can be ignored; not used in tool
20	Monthly frq [1/mon]	If monthly values are required give a 1 here
21	ag	Can be ignored; not used in tool
22	Seasonal frq [1/sem]	If seasonal values are required give a 1 here **Note: calculation of seasonal values requires that CMORized daily values are already available!**
23	ag	Can be ignored; not used in tool
24	fx	Only relevant for constant fields like orog and sftlf; Give a 0 (zero) as entry in the respective cell
25	long_name	CF long name of the CMORized variable
26	Comment	Here a comment can be given that might contain useful information for a user of the data. The comment appears in the final NetCDF file as a "variable attribute"
27	standard_name	CF standard name of the CMORized variable
28	direction of positive fluxes	Defines the vertical direction in which CMORized fluxes are positive. This direction might be different to the definition in CCLM; therefore, for such a variable the conversion factor -1 is needed

29	Realm (not required, however, if included should have the value as in CMIP5)	Not used in the CMOR-Tool
30	cell-method: area (optional)	Not used in the CMOR-Tool

Final remarks:

There are certain interactions between the entries in the CSV-table and various options of the CMOR-Tool itself.

- The tool can only CMORize those variables that are defined in the CSV-table.
- If a variable is set in the "-v" option of cmorlight.py, which is not defined in the table, nothing happens except that a log file is written, telling that the variable is not supported
- On the other hand, the tool does not CMORized automatically all variables defined in the table. This can be done by the option "-all" of cmorligth.py, but this not recommended due to time-and memory constraints.
- It is recommend to CMORize variables step by step by defining one or more variables using the "-v" option of cmorlight.py
- Generally, those time resolutions/frequencies can be considered, which are defined I the CSV-table
- If a time resolution is set in the "-r " option of "cmorlight.py", which is not defined in the table, nothing happens except that a log file is written, telling that time resolution Is not declared in parameter table
- If the original CCLM storage interval of a variable allows it, it is possible to define all possible/wished time-resolutions in the CSV-table, both sub-daily frequencies, daily, monthly, and seasonal resolutions. In this case, the required resolutions for the CMORized data have to be set via the "-r" option of cmorlight.py.
  - Example: for a certain variable, all frequencies are set in the table, but only hourly and daily CMORized data are needed. Then, use the option "-r 1hr,day" when executing "cmorlight.py"
- On the other hand, if you choose the "full" "-r" option, e.g. "-r 1hr,6hr,day,mon,sem" only those frequencies are considered that are defined it the CSV-table