

# List of requested output for the C20C project on attribution

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**This document lists the model output suggested for the C20C attribution project. *It is very much still in development.***

A table of coordinate dimensions is included as Table 1. Table 2 lists time-invariant fields that could be useful, while Tables 3, 4, and 5 list monthly, daily, and 3-hourly fields that might be useful.

This list has not started from the previous output list adopted by C20C, because that only contained monthly fields and it is expected that at least daily data will be desired from this project. Instead, the starting point has been the CMIP5 list (see [http://cmip-pcmdi.llnl.gov/cmip5/docs/standard\\_output.pdf](http://cmip-pcmdi.llnl.gov/cmip5/docs/standard_output.pdf)). The “CMIP5 table” column in the tables refers to where more details about this output can be found in that CMIP5 document (the 12 January 2012 version). The list proposed here is considerably shorter than the CMIP5 list because of the absence of various model components (e.g. no dynamic ocean) and due to expected constraints related to the large number of simulations requested. Nevertheless, it still results in a substantially larger output volume than earlier C20C projects. It should be noted that it is not expected that all models will be able to output all of this data, or that it will be possible to make all of it available to the C20C project. An important rationale for a larger output though is that this C20C attribution project is going to involve a significant amount of simulation, so we may as well take advantage of this effort by archiving as much as possible.

For reference, for a  $1 \times 1$ -degree resolution model and using 2-Byte NetCDF packing, this list in its current form would correspond to 23 GB of monthly data, 164 GB of daily data, and 94 GB of 3-hourly data per 62-year simulation (i.e. 1950-2011). For the core experiment, this would total 28TB.

Output variable label	CF standard_name	Units	Required for
height	height	m	for all near-surface fields
lat	latitude	degrees_east	for all fields
lon	longitude	degrees_north	for all fields
plev	air_pressure	Pa	for all fields on pressure surfaces
time	time	days_since_??	for all time-varying fields

Table 1: List of coordinates for output fields. For the units of the time coordinate, dates should be of the form year-month-day, e.g. “days\_since\_1950-1-1” for 1 January 1950.

Output variable label	CF standard_name	Levels	Units	CMIP5 table
orog	surface_altitude	surface	m	p6-7
sftlf	land_area_fraction	surface	%	p6-7
mrsofc	soil_moisture_content_at_field_capacity	surface	kg·m <sup>-2</sup>	p6-7

Table 2: List of all of the requested time-independent fields.

Output variable label	CF standard_name	Levels	Units	CMIP5 table
clt	cloud_area_fraction	summed vertically	%	p26-27
hfls	surface_upward_latent_heat_flux	surface	W·m <sup>-2</sup>	p24-25
hfss	surface_upward_sensible_heat_flux	surface	W·m <sup>-2</sup>	p24-25
hur	relative_humidity	1000,925,850,700,600,500, 400,300,250,200,150,100, 70,50,30,20,10 hPa	%	p28-29
hurs	relative_humidity	2 m	fraction	p24-25
huss	specific_humidity	2 m	fraction	p24-25
mrso	soil_moisture_content	summed through soil layers	kg·m <sup>-2</sup>	p56-57
mrsos	moisture_content_of_soil_layer	summed through top 10 cm	kg·m <sup>-2</sup>	p56-57
pr	precipitation_flux	surface	kg·m <sup>-2</sup> ·s <sup>-1</sup>	p24-25
ps	surface_air_pressure	surface	Pa	p24-25
psl	air_pressure_at_sea_level	sea level	Pa	p24-25
rlds	surface_downwelling_longwave_flux_in_air	surface	W·m <sup>-2</sup>	p24-25
rlus	surface_upwelling_longwave_flux_in_air	surface	W·m <sup>-2</sup>	p24-25
rsds	surface_downwelling_shortwave_flux_in_air	surface	W·m <sup>-2</sup>	p24-25
rsus	surface_upwelling_shortwave_flux_in_air	surface	W·m <sup>-2</sup>	p24-25
snc	surface_snow_area_fraction	surface	%	p64-65
ta	air_temperature	1000,925,850,700,600,500, 400,300,250,200,150,100, 70,50,30,20,10hPa	K	p28-29
tas	air_temperature	2 m	K	p24-25
tasmax	air_temperature	2 m	K	p24-25
tasmin	air_temperature	2 m	K	p24-25
ua	eastward_wind	1000,925,850,700,600,500, 400,300,250,200,150,100, 70,50,30,20,10 hPa	m·s <sup>-1</sup>	p28-29
va	northward_wind	1000,925,850,700,600,500, 400,300,250,200,150,100, 70,50,30,20,10 hPa	m·s <sup>-1</sup>	p28-29
wap	lagrangian_tendency_of_air_pressure	1000,925,850,700,600,500, 400,300,250,200,150,100, 70,50,30,20,10 hPa	Pa·s <sup>-1</sup>	p28-29
zg	geopotential_height	1000,925,850,700,600,500, 400,300,250,200,150,100, 70,50,30,20,10 hPa	m	p28-29

Table 3: List of all of the requested monthly fields.

Output variable label	CF standard_name	Levels	Units	CMIP5 table
clt	cloud_area_fraction	summed vertically	%	p82-83
hfls	surface_upward_latent_heat_flux	surface	$W \cdot m^{-2}$	p82-83
hfss	surface_upward_sensible_heat_flux	surface	$W \cdot m^{-2}$	p82-83
hur	relative_humidity	850,700,500,250 hPa	fraction	p84-85
hurs	relative_humidity	2 m	%	p82-83 (rhs)
pr	precipitation_flux	surface	$kg \cdot m^{-2} \cdot s^{-1}$	p80-81
psl	air_pressure_at_sea_level	sea level	Pa	p80-81
rsds	surface_downwelling_shortwave_flux_in_air	surface	$W \cdot m^{-2}$	p82-83
ta	air_temperature	850,700,500,250 hPa	K	p84-85
tas	air_temperature	2 m	K	p80-81
tasmax	air_temperature	2 m	K	p80-81
tasmin	air_temperature	2 m	K	p80-81
ua	eastward_wind	850,700,500,250 hPa	$m \cdot s^{-1}$	p84-85
uas	eastward_wind	10 m	$m \cdot s^{-1}$	p82-83
va	northward_wind	850,700,500,250 hPa	$m \cdot s^{-1}$	p84-85
vas	northward_wind	10 m	$m \cdot s^{-1}$	p82-83

Table 4: List of all of the requested daily fields.

Output variable label	CF standard_name	Levels	Units	CMIP5 table
pr	precipitation_flux	surface	$kg \cdot m^{-2} \cdot s^{-1}$	p90-91
tas	air_temperature	2 m	K	p90-91

Table 5: List of all of the requested 3-hourly fields.