General information

Except as otherwise noted near each table and summarized in the last two spreadsheets ("CFMIP output" and "other output"), each output field should be saved for the entire duration of each and every run.

The specifications for archiving model output, as described in the following tables, assume the following (please advise us if the assumptions are incorrect):

1. Sea ice fields and ocean biogeochemistry fields will be archived on the same grid as ocean fields.

2. Land fields (including ice and snow on land) and land biogeochemistry fields will be archived on the same grid as the atmosphere.

The following rules and recommendations for how to calculate quantities should be followed unless a different method is explicitly indicated in the notes that appear in the following tables.

1. It is recommended that ocean and sea-ice output (including Oclim, Oyr, Omon, and OImon) be reported on the ocean's native grid. Unless noted otherwise in the tables, all other output should be reported on the atmospheric grid.

2. Unless otherwise specified, the ocean and sea-ice output (including Oclim, Oyr, Omon, and OImon) represents a mean over only the sea portion of each grid cell (i.e., it is interpreted as "where ocean over ocean"), and a value of 0.0 should be reported where the sea fraction is 0.

3. Unless otherwise specified, the land output (in the Lmon and LImon tables) represents a mean over only the land portion of each grid cell (i.e., it is interpreted as "where land over land"), and a value of 0.0 should be reported where the land fraction is 0.

4. The default interpretation of a OImon field is that the quantity is averaged over the entire ocean portion of each grid-cell (with a value of zero applying anywhere the quantity is absent in this portion of the cell) and then averaged in time.

4. The default interpretation of a LImon field is that the quantity is averaged over the entire land portion of each grid-cell (with a value of zero applying anywhere the quantity is absent in this portion of the cell) and then averaged in time.

A note on priorities.

The priorities noted in the tables have been largely set by scientists who have participated in model intercomparison activities and have needed these variables in their own research. Since the priorities in different tables were set by different groups of scientists, the priorities in one table may have a different meaning from the priorities in another table. We hope that the vast majority of fields listed in all the tables will be archived by all the modeling groups, but in many cases where a group has not saved a particular field in the past, this may require non-trivial effort. The priorities listed here, along with the participating group's expert judgement should be considered when deciding which fields to save. Please make every effort to save as many of the fields as possible. For lower priority variables, if you can't save them for all the experiments and realizations, please consider saving them for a subset that you think might be of most interest.

Key	
	questions
	need standard name
	modified since 16 June 2009
	modified since 26 November 2009

CMOR Dimensions

CMOR table(s)	CMOR dimension	output dimension name	description	standard name	long name	axis	units	index axis?	coords_ attrib	bounds?	stored direction	valid_ min
fx, Amon, Lmon, LImon, OImon, aero, da, 6hrLev, 6hrPlev, 3hr, Oclim, Oyr, Omon, cfMon, cfOff, cfDa, cf3hr	longitude	lon		longitude	longitude	X	degrees_e ast			yes	increasing	0
fx, Amon, Lmon, LImon, OImon, aero, da, 6hrLev, 6hrPlev, 3hr, Oclim, Oyr, Omon, cfMon, cfOff, cfDa, cf3hr	latitude	lat		latitude	latitude	Y	degrees_n orth			yes	increasing	-90
Amon	plev17	plev		air_pressure	pressure	Z	Pa			no	decreasing	
da	plev8	plev		air_pressure	pressure	Z	Pa			no	decreasing	
6hrPlev	plev3	plev		air_pressure	pressure	Z	Pa			no	decreasing	
cfMon, cfDa	plev7	plev	7 pressure layers defined by ISCCP simulator	air_pressure	pressure	Z	Pa			yes	decreasing	
cfDa	p500	plev	500 hPa	air_pressure	pressure	Z	Pa			no	decreasing	
cfDa	p700	plev	700 hPa	air_pressure	pressure	Z	Pa			no	decreasing	
cfMon, cfOff, cf3hr	p220	plev	pressure layer of high-level cloud in ISCCP simulator	air_pressure	pressure	Z	Pa			no	decreasing	
cfMon, cfOff, cf3hr	p560	plev	pressure layer of mid-level cloud in ISCCP simulator	air_pressure	pressure	Z	Pa			no	decreasing	
cfMon, cfOff, cf3hr	p840	plev	pressure layer of low-level cloud in ISCCP simulator	air_pressure	pressure	Z	Pa			no	decreasing	
Amon, aero, 6hrLev, cfMon, cfDa, cf3hr, cfSites	alevel	lev	generic atmospheric model vertical coordinate (nondimensional or dimensional)		atmospheric model level	Z		ok		yes		
Amon, cfMon, cfDa, cf3hr, cfSites	alevbnds	lev	atmospheric model "half" level		atmospheric model half-level	Z		ok		no	increasing	
aero	alev1	lev	atmospheric model's lowest level		lowest atmospheric model level	Z		ok		yes	increasing	
cfMon, cfOff, cfDa, cf3hr	alt40	alt40	CloudSat vertical coordinate heights	altitude	altitude	Z	m			yes	increasing	
Oyr, Amon, Lmon, LImon, OImon, aero, da, 3hr, Omon, cfMon, cfOff, cfDa, cf3hr	time	time	for time-mean fields	time	time	T	days since ?			yes	increasing	
6hrLev, 6hrPlev, 3hr, cf3hr, cfSites	time1	time	synoptic times (for fields that are not time-means)	time	time	T	days since ?			no	increasing	
Oclim, Amon	time2	time	climatological times	time	time	T	days since ?			yes	increasing	

valid_ max	type	positive	value	bounds _values	requested	bounds_ requested	tol_on_requests: variance from requested values that is tolerated
360	double						
180	double						
	double	down			100000. 92500. 85000. 70000. 60000. 50000. 40000. 30000. 25000. 20000. 15000. 10000. 7000. 5000. 3000. 2000. 1000.		0.001
	double	down			100000. 85000. 70000. 50000. 25000. 10000. 5000. 1000.		0.001
	double	down			85000. 50000. 25000.		0.001
	double	down				100000. 80000. 80000. 68000. 68000. 56000. 56000. 44000. 44000. 31000. 31000. 18000. 18000. 0.	0.001
	double	down	50000.				
	double	down	70000.				
	double	down	22000.	0. 44000.			
	double	down	56000.	44000. 68000.			
	double	down	84000.	680. 100000.			
	double	up					
	double						
	double						
	double	up			240. 720. 1200. 1680. 2160. 2640. 3120. 3600. 4080. 4560. 5040. 5520. 6000. 6480. 6960. 7440. 7920. 8400. 8880. 9360. 9840. 10320. 10800. 11280. 11760. 12240. 12720. 13200. 13680. 14160. 14640. 15120. 15600. 16080. 16560. 17040. 17520. 18000. 18480. 18960.	. 0. 480. 480. 960. 960. 1440. 1440. 1920. 1920. 2400. 2400. 2880. 2880. 3360. 3360. 3840. 3840. 4320. 4320. 4800. 4800. 5280. 5280. 5760. 5760. 6240. 6240. 6720. 6720. 7200. 7200. 7680. 7680. 8160. 8160. 8640. 8640. 9120. 9120. 9600. 9600. 10080. 10080. 10560. 10560. 11040. 11040. 11520. 11520. 12000. 12000. 12480. 12480. 12960. 12960. 13440. 13440. 13920. 13920. 14400. 14400. 14880. 14880. 15360. 15360. 15840. 15840. 16320. 16320. 16800. 16800. 17280. 17280. 17760. 17760. 18240. 18240. 18720.	0.001
	double						
	double						
	double						

Amon, da, 3hr, cf3hr, cfSites	height2m	height	~2 m standard surface air temperature and surface humidity height	height	height	Z	m			no	increasing	1
Amon, da, 3hr, cf3hr, cfSites	height10m	height	~10 m standard wind speed height	height	height	Z	m			no	increasing	1
Lmon, LImon	sdepth	depth	coordinate values for soil layers (depth)	depth	depth	Z	m			yes	increasing	0
Lmon	sdepth1	depth	coordinate value for topmost 0.1 meter layer of soil	depth	depth	Z	m			yes	increasing	0
cfMon, cfDa	tau	tau	isccp optical depth categories	atmosphere_optical_thickness_due to cloud	cloud optical thickness		1			yes	increasing	
cfOff, cf3hr	scatratio	scatratio	15 bins of scattering ratio for the CALIPSO simulator CFAD	backscattering_ratio	lidar backscattering ratio		1			yes	increasing	
cfOff, cf3hr	dbze	dbze	15 bins of radar reflectivity for CloudSat simulator CFAD	equivalent_reflectivity_factor	CloudSat simulator equivalent radar reflectivity factor		dBZ			yes	increasing	
cfMon, cfOff, cfDa cf3hr	sza5	sza	5 solar zenith angles for PARASOL reflectances	solar_zenith_angle	solar zenith angle		degree			no	increasing	
cfSites	site	site	an integer assigned to each of 118 stations (standard) and 73 stations (aquaplanet)		site index			ok		no		
Omon	basin	basin		region	ocean basin			ok	region	no		
Omon	rho	rho	density? Potential density++++?		density++++?	Z				yes	decreasing	
fx, Oclim, Oyr, Omon	olevel	lev	generic ocean model vertical coordinate (nondimensional or dimensional)		ocean model level	Z		ok		yes		
Omon	xline	xline	opening, passage, strait, channel, etc.		ocean passage			ok	passage	no		
cf3hr	location	loc	COSP profile in instantaneous curtain mode		location index			ok		no	increasing	
Lmon	vegtype	type	plant functional type		plant functional type			ok	described	no	increasing	
OImon	icetype	type	sea ice category		sea ice thickness category			ok	described	no	increasing	

10	double	up	2.				
30	double	up	10.				
200	double	down					
0.2	double	down	0.05	0.0 0.1			
	double				0.15 0.8 2.45 6.5 16.2 41.5 100.	0.0 0.3 0.3 1.3 1.3 3.6 3.6 9.4 9.4 23.0 23.0 60.0 60.0 100000.	0.001
	double					0.01, 1.2, 3, 5, 7, 10, 15, 20, 25, 30, 40, 50, 60, 80, 999, 1009	0.001
	double				-47.5 -42.5 -37.5 -32.5 -27.5 -22.5 -17.5 -12.5 -7.5 -2.5 2.5 7.5 12.5 17.5 22.5	-50, -45, -40, -35, -30, -25, -20, -15, -10, -5, 0, 5, 10, 15, 20, 25	0.001
	double				0. 20. 40. 60. 80.		0.001
	character				atlantic_arctic_ocean indian_pacific_ocean global_ocean		
	double	down					
	double	down					
	character				barents_opening bering_strait canadian_archipelago denmark_strait drake_passage english_channel pacific_equatorial_undercurrent faroe_scotland_channel florida_bahamas_strait fram_strait iceland_faroe_channel indonesian_thoughflow mozambique_channel taiwan_luzon_straits windward_passage		
	double						
	double						
	double						

CMOR Table fx: Time-Invariant Fields fx fx

on atmospheric grid

Atmospheric and land fields may be submitted on a (single) grid of the modeling group's choosing. We expect most groups will elect to save output on the native grid. If data is "interpolated" to a different grid, it is important to preserve certain global mean properties (e.g., the total surface fluxes of heat, momentum, and water mass).

priority	long name	units	comment	questions	output variable name	standard name
1	Atmosphere Grid-Cell Area	m^2			areacella	cell_area
1	Surface Altitude	m	height above the geoid; as defined here, "the geoid" is a surface of constant geopotential that, if the ocean were at rest, would coincide with mean sea level. Under this definition, the geoid changes as the mean volume of the ocean changes (e.g., due to glacial melt, or global warming of the ocean). Report here the height above the present-day geoid. Over ocean, report as 0.0		orog	surface_altitude
1	Land Area Fraction	%			sftlf	land_area_fraction
1	Fraction of Grid Cell Covered with Glacier	%	fraction of grid cell occupied by "permanent" ice (i.e., glaciers). If time varying, report annual values for each year of simulation		sftgif	land_ice_area_fraction
1	Capacity of Soil to Store Water	kg m^{-2}	"where land": divide the total water holding capacity of all the soil in the grid cell by the land area in the grid cell; report as "missing" where the land fraction is 0.		mrsofc	soil_moisture_content_at_field_capacity
1	Maximum Root Depth	m	report the maximum soil depth reachable by plant roots (if defined in model), i.e., the maximum soil depth from which they can extract moisture; report as "missing" where the land fraction is 0.		rootd	root_depth

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	m2		500	2.50E+05				real	longitude latitude	areacella	atmos land	
	m		-700	1.00E+04				real	longitude latitude	orog	atmos	
	%		0	100				real	longitude latitude	sftlf	atmos	
	%		0	100				real	longitude latitude	sftgif	land	
	kg m-2							real	longitude latitude	mrsofc	land	
	m		0	30				real	longitude latitude	rootd	land	

on ocean grid

The WGOMD has recommended that all ocean fields be saved on the model's native ocean grid. Many groups will also elect to save the sea ice fields on the ocean grid. (The alternative is to save sea ice fields on the atmosphere grid.) If data is "interpolated" from its native grid, it is important to preserve certain global mean properties (e.g., the total surface fluxes of heat, momentum, and water mass into the ocean).

priority	long name	units	comment	questions	output variable name	standard name
1	Sea Floor Depth	m	Ocean bathymetry. Report here the sea floor depth for present day. Report as missing for land grid cells.		deptho	sea_floor_depth_below_geoid
1	Ocean Grid-Cell Volume	m^3	3-D field: grid-cell volume ca. 2000.		volcello	ocean_volume
1	Ocean Grid-Cell Area	m^2			areacello	cell_area
1	Sea Area Fraction	%	Report on the same grid that ocean fields are reported (i.e., the ocean native grid, or the grid that ocean data has been provided to CMIP. For completeness, provide this even if the ocean grid is the same as the atmospheric grid. This is the area fraction at the ocean surface.	Should this be recorded as a function of depth?	sftof	sea_area_fraction
1	Region Selection Index		Report on the same grid as the temperature field. flag_values=0,1,2,3,4,5,6,7,8,9,10 corresponding to flag_meanings=global_land, southern_ocean, atlantic_ocean, pacific_ocean, arctic_ocean, indian_ocean, mediterranean_sea, black_sea, hudson_bay, baltic_sea, red_sea. Report on the grid used for the temperature field.		basin	region
1	Region Selection Index		Report on the same grid as the ocean flag_values=0,1,2,3,4,5,6,7,8,9,10 corresponding to flag_meanings=global_land, southern_ocean, atlantic_ocean, pacific_ocean, arctic_ocean, indian_ocean, mediterranean_sea, black_sea, hudson_bay, baltic_sea, red_sea. Report on the grid used for the meridional overturning stream function.		basinv	region

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	m		0	10000	2000	5000		real	longitude latitude	deptho	ocean	
	m3		1000	1.00E+15	1.00E+10	1.00E+15		real	longitude latitude olevel	volcello	ocean	
	m2		10	2.50E+05				real	longitude latitude	areacello	ocean	
	%		0	100				real	longitude latitude	sftof	ocean	
	0		1	10				integer	longitude latitude	basin	ocean	
	0		1	10				integer	longitude latitude	basinv	ocean	

CMOR Table Oyr: Annual Mean Ocean Fields, Including Biogechemical Fields Oyr yr

(All Saved on the Ocean Grid)

In CMOR Table Oyr: *3-D Marine Biogeochemical Tracer Fields*

priority	long name	units	comment	questions	output variable name	standard name
1	Dissolved Inorganic Carbon Concentration	mol C m^{-3}	Dissolved inorganic carbon (CO3+HCO3+H2CO3) concentration		dissic	
2	Dissolved Organic Carbon Concentration	mol C m^{-3}	Dissolved organic carbon concentration		dissoc	
2	Phytoplankton Carbon Concentration	mol C m^{-3}	sum of phytoplankton carbon component concentrations. In most (all?) cases this is the sum of phycdiat and phycmisc (i.e., "Diatom Carbon Concentration" and "Non-Diatom Phytoplankton Carbon Concentration"		phyc	
2	Zooplankton Carbon Concentration	mol C m^{-3}	sum of zooplankton carbon component concentrations		zooc	
3	Bacterial Carbon Concentration	mol C m^{-3}	sum of bacterial carbon component concentrations		bacc	
2	Detrital Organic Carbon Concentration	mol C m^{-3}	sum of detrital organic carbon component concentrations		detoc	
2	Calcite Concentration	mol C m^{-3}	sum of particulate calcite component concentrations (e.g. Phytoplankton, Detrital, etc.)		calc	
2	Aragonite Concentration	mol C m^{-3}	sum of particulate aragonite components (e.g. Phytoplankton, Detrital, etc.)		arag	
3	Diatom Carbon Concentration	mol C m^{-3}	carbon from the diatom phytoplankton component concentration alone		phycdiat	
3	Non-Diatom Phytoplankton Carbon Concentration	mol C m^{-3}	carbon from additional phytoplankton component concentrations alone (e.g. Calc., diaz., cyano., etc)		phycmisc	
3	Other Zooplankton Carbon Concentration	mol C m^{-3}	carbon from additional zooplankton component concentrations alone (e.g. Micro, meso)	I think this variable should be omitted. It can be gotten by subtracting the already listed individual zooplankton components from the sum (zooc).	zoocmisc	
1	Total Alkalinity	eq m^{-3}	total alkalinity equivalent concentration (including carbonate, nitrogen, silicate, and borate components)	Is "eq" in udunits? Dunne says "equivalents" is preferred to 10**-6 (i.e., ppm) or kmol/m**3?	talk	
1	pH	1	negative log of hydrogen ion concentration with the concentration expressed as mol H kg-1.		ph	
1	Dissolve Oxygen Concentration	mol O_2 m^{-3}	dissolved oxygen gas concentration in sea water		o2	
1	Dissolved Nitrate Concentration	mol N m^{-3}	dissolved nitrate concentration in sea water		no3	
2	Dissolved Ammonium Concentration	mol N m^{-3}	dissolved ammonium concentration in sea water		nh4	
1	Dissolved Phosphate Concentration	mol P m^{-3}	dissolved Phosphate concentration in sea water		po4	
1	Dissolved Iron Concentration	mol Fe m^{-3}	dissolved iron concentration in sea water		dfe	
1	Dissolved Silicate Concentration	mol Si m^{-3}	dissolved silicate concentration in sea water		si	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
dissolved_inorganic_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	dissic	ocnBgchem	
dissolved_organic_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	dissoc	ocnBgchem	
phytoplankton_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	phyc	ocnBgchem	
zooplankton_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	zooc	ocnBgchem	
bacterial_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	bacc	ocnBgchem	
detrital_organic_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	detoc	ocnBgchem	
calcite	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	calc	ocnBgchem	
aragonite	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	arag	ocnBgchem	
diatom_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	phycdiat	ocnBgchem	
other_phytoplankton_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	phycmisc	ocnBgchem	
other_zooplankton_carbon	mol C m-3	time: mean area: mean where sea						real	longitude latitude olevel time	zoocmisc	ocnBgchem	
total_alkalinity	eq m-3	time: mean area: mean where sea						real	longitude latitude olevel time	talk	ocnBgchem	
ph	1	time: mean area: mean where sea						real	longitude latitude olevel time	ph	ocnBgchem	
oxygen	mol O2 m-3	time: mean area: mean where sea						real	longitude latitude olevel time	o2	ocnBgchem	
nitrate	mol N m-3	time: mean area: mean where sea						real	longitude latitude olevel time	no3	ocnBgchem	
ammonium	mol N m-3	time: mean area: mean where sea						real	longitude latitude olevel time	nh4	ocnBgchem	
phosphate	mol P m-3	time: mean area: mean where sea						real	longitude latitude olevel time	po4	ocnBgchem	
iron	mol Fe m-3	time: mean area: mean where sea						real	longitude latitude olevel time	dfe	ocnBgchem	
silicate	mol Si m-3	time: mean area: mean where sea						real	longitude latitude olevel time	si	ocnBgchem	

1	Total Chlorophyll Mass Concentration	mg Chl m^{-3}	sum of chlorophyll from all phytoplankton group concentrations. In most models this is equal to chldiat+chlmisc, that is the sum of "Diatom Chlorophyll Mass Concentration" plus "Other Phytoplankton Chlorophyll Mass Concentration"		chl	
3	Diatom Chlorophyll Mass Concentration	mg Chl m^{-3}	chlorophyll from diatom phytoplankton component concentration alone		chldiat	
3	Other Phytoplankton Chlorophyll Mass Concentration	mg Chl m^{-3}	chlorophyll from additional phytoplankton component concentrations alone		chlmisc	
3	Particulate Organic Nitrogen Concentration	mol N m^{-3}	sum of particulate organic nitrogen component concentrations		pon	
3	Particulate Organic Phosphorus Concentration	mol P m^{-3}	sum of particulate organic phosphorus component concentrations		pop	
3	Particulate Biogenic Iron Concentration	mol Fe m^{-3}	sum of particulate organic iron component concentrations		bfe	
3	Particulate Biogenic Silica Concentration	mol Si m^{-3}	sum of particulate silica component concentrations		bsi	
3	Phytoplankton Nitrogen Concentration	mol N m^{-3}	sum of phytoplankton nitrogen component concentrations		phyn	
3	Phytoplankton Phosphorus Concentration	mol P m^{-3}	sum of phytoplankton phosphorus components		phyp	
3	Phytoplankton Iron Concentration	mol Fe m^{-3}	sum of phytoplankton iron component concentrations		phyfe	
3	Phytoplankton Silica Concentration	mol Si m^{-3}	sum of phytoplankton silica component concentrations		physi	
3	Dimethyl Sulphide Concentration	mol DMS m^{-3}	dimethyl sulphide concentration		dms	

In CMOR Table Oyr: *Marine Biogeochemical 3-D Fields: Rates of Production and Removal*

priority	long name	units	comment	questions	output variable name	standard name
3	Primary Carbon Production by Phytoplankton	mol C m^{-3} s^{-1}	total primary (organic carbon) production by phytoplankton		pp	
3	Primary Carbon Production by Phytoplankton Based on NO3 Alone	mol C m^{-3} s^{-1}	Primary (organic carbon) production by phytoplankton based on NO3 alone		pnew	
3	Biogenic Iron Production	mol Fe m^{-3} s^{-1}	Biogenic iron production		pbfe	
3	Biogenic Silica Production	mol Si m^{-3} s^{-1}	Biogenic silica production		pbsi	
3	Calcite Production	mol C m^{-3} s^{-1}	calcite production		pcalc	
3	Aragonite Production	mol C m^{-3} s^{-1}	aragonite production		parag	
3	Sinking Particulate Organic Carbon Flux	mol C m^{-2} s^{-1}	sinking flux of organic carbon		expc	
3	Sinking Particulate Organic Nitrogen Flux	mol N m^{-2} s^{-1}	sinking flux of organic nitrogen		expn	
3	Sinking Particulate Organic Phosphorus Flux	mol P m^{-2} s^{-1}	sinking flux of organic phosphorus		expp	
3	Sinking Particulate Iron Flux	mol Fe m^{-2} s^{-1}	sinking flux of iron		expcfe	
3	Sinking Particulate Silica Flux	mol Si m^{-2} s^{-1}	sinking flux of silica		expsi	
3	Sinking Calcite Flux	mol C m^{-2} s^{-1}	sinking flux of calcite		expcalc	
3	Sinking Aragonite Flux	mol C m^{-2} s^{-1}	sinking flux of aragonite		exparag	

total_chlorophyll	mg Chl m-3	time: mean area: mean where sea						real	longitude latitude olevel time	chl	ocnBgchem	
diatom_chlorophyll	mg Chl m-3	time: mean area: mean where sea						real	longitude latitude olevel time	chldiat	ocnBgchem	
other_phytoplankton_chlorophyll	mg Chl m-3	time: mean area: mean where sea						real	longitude latitude olevel time	chlmisc	ocnBgchem	
particulate_organic_nitrogen	mol N m-3	time: mean area: mean where sea						real	longitude latitude olevel time	pon	ocnBgchem	
particulate_organic_phosphorus	mol P m-3	time: mean area: mean where sea						real	longitude latitude olevel time	pop	ocnBgchem	
particulate_biogenic_iron	mol Fe m-3	time: mean area: mean where sea						real	longitude latitude olevel time	bfe	ocnBgchem	
particulate_biogenic_silica	mol Si m-3	time: mean area: mean where sea						real	longitude latitude olevel time	bsi	ocnBgchem	
phytoplankton_nitrogen	mol N m-3	time: mean area: mean where sea						real	longitude latitude olevel time	phyn	ocnBgchem	
phytoplankton_phosphorus	mol P m-3	time: mean area: mean where sea						real	longitude latitude olevel time	phyp	ocnBgchem	
phytoplankton_iron	mol Fe m-3	time: mean area: mean where sea						real	longitude latitude olevel time	phyfe	ocnBgchem	
phytoplankton_silica	mol Si m-3	time: mean area: mean where sea						real	longitude latitude olevel time	physi	ocnBgchem	
dimethylsulfide	mol DMS m-3	time: mean area: mean where sea						real	longitude latitude olevel time	dms	ocnBgchem	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
primary_production	mol C m-3 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	pp	ocnBgchem	
new_production	mol C m-3 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	pnew	ocnBgchem	
biogenic_iron_production	mol Fe m-3 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	pbfe	ocnBgchem	
biogenic_silica_production	mol Si m-3 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	pbsi	ocnBgchem	
calcite_production	mol C m-3 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	pcalc	ocnBgchem	
aragonite_production	mol C m-3 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	parag	ocnBgchem	
sinking_particulate_organic_carbon_export	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	expc	ocnBgchem	
sinking_particulate_organic_nitrogen_export	mol N m-2 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	expn	ocnBgchem	
sinking_particulate_organic_phosphorus_export	mol P m-2 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	expp	ocnBgchem	
sinking_particulate_iron_export	mol Fe m-2 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	expcfe	ocnBgchem	
sinking_particulate_silica_export	mol Si m-2 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	expsi	ocnBgchem	
sinking_calcite_export	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	expcalc	ocnBgchem	
sinking_aragonite_export	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	exparag	ocnBgchem	

3	Calcite Dissolution	mol C $m^{-3} s^{-1}$	calcite dissolution		dcalc	
3	Aragonite Dissolution	mol C $m^{-3} s^{-1}$	aragonite dissolution		darag	
3	Diatom Primary Carbon Production	mol C $m^{-3} s^{-1}$	Primary (organic carbon) production by the diatom component alone		pdi	
3	Other Phytoplankton Carbon Production	mol C $m^{-3} s^{-1}$	Primary (organic carbon) production by other phytoplankton components alone	I think this variable is unnecessary since it can be gotten by subtracting diatom primary carbon production from pp.	phypmisc	
3	Rate of Change of Dissolved Inorganic Carbon due to Biological Activity	mol C $m^{-3} s^{-1}$	Net of biological terms in time rate of change of dissolved inorganic carbon		bddtdic	
3	Rate of Change of Nitrogen Nutrient due to Biological Activity	mol N $m^{-3} s^{-1}$	Net of biological terms in time rate of change of nitrogen nutrients (e.g. NO3+NH4)		bddtdin	
3	Rate of Change of Dissolved Phosphate due to Biological Activity	mol P $m^{-3} s^{-1}$	Net of biological terms in time rate of change of dissolved phosphate		bddtdip	
3	Rate of Change of Dissolved Inorganic Iron due to Biological Activity	mol Fe $m^{-3} s^{-1}$	Net of biological terms in time rate of change of dissolved inorganic iron		bddtdife	
3	Rate of Change of Dissolved Inorganic Silicate due to Biological Activity	mol Si $m^{-3} s^{-1}$	Net of biological terms in time rate of change of dissolved inorganic silicate		bddtdisi	
3	Rate of Change of Alkalinity due to Biological Activity	eq $m^{-3} s^{-1}$	Net of biological terms in time rate of change of alkalinity	Is "eq" in udunits? Dunne says "equivalents" is preferred to 10**-6 (i.e., ppm) or kmol/m**3?	bddtalk	
3	Nonbiogenic Iron Scavenging	mol Fe $m^{-3} s^{-1}$	Dissolved Fe removed through nonbiogenic scavenging onto particles		fescav	
3	Particle Source of Dissolved Iron	mol Fe $m^{-3} s^{-1}$	Dissolution, remineralization and desorption of iron back to the dissolved phase		fediss	
3	Total Grazing of Phytoplankton by Zooplankton	mol Fe $m^{-3} s^{-1}$	Total grazing of phytoplankton by zooplankton		graz	

calcite_dissolution	mol C m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	dcalc	ocnBgchem
aragonite_dissolution	mol C m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	darag	ocnBgchem
diatom_production	mol C m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	pdi	ocnBgchem
other_phytoplankton_production	mol C m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	phypmisc	ocnBgchem
net_biological_dic_rate_of_change	mol C m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdic	ocnBgchem
net_biological_din_rate_of_change	mol N m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdin	ocnBgchem
net_biological_dip_rate_of_change	mol P m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdip	ocnBgchem
net_biological_dife_rate_of_change	mol Fe m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdife	ocnBgchem
net_biological_disi_rate_of_change	mol Si m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdisi	ocnBgchem
net_biological_alkalinity_rate_of_change	eq m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtalk	ocnBgchem
nonbiogenic_iron_scavenging	mol Fe m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	fescav	ocnBgchem
dissolved_iron_source_from_particles	mol Fe m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	fediss	ocnBgchem
total_grazing	mol Fe m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	graz	ocnBgchem

CMOR Table Oclim: Monthly Mean Ocean Climatology (Jan. 1986-Dec. 2005 of historical run) Oclim monClim

(All Saved on the Ocean Grid)

Further explanation of the fields in the following tables can be found in Griffies et al., available at http://eprints.soton.ac.uk/65415/01/137_WGOMD_ModelOutput.pdf . Some of the information in that document will be transcribed into the "comment" column of this spreadsheet.

In CMOR Table Oclim: *WGOMD Table 2.9*

priority	long name	units	comment	questions	output variable name	standard name
3	Ocean Vertical Heat Diffusivity	$m^2 s^{-1}$			difvho	ocean_vertical_heat_diffusivity
3	Ocean Vertical Salt Diffusivity	$m^2 s^{-1}$			difvso	
3	Ocean Vertical Tracer Diffusivity due to Background	$m^2 s^{-1}$			difvtrbo	ocean_vertical_tracer_diffusivity_due_to_background
3	Ocean Vertical Tracer Diffusivity due to Tides	$m^2 s^{-1}$			difvtrto	ocean_vertical_tracer_diffusivity_due_to_tides
3	Tendency of Ocean Potential Energy Content	$W m^{-2}$			tnpeo	tendency_of_ocean_potential_energy_content
3	Tendency of Ocean Potential Energy Content due to Tides	$W m^{-2}$			tnpeot	tendency_of_ocean_potential_energy_content_due_to_tides
3	Tendency of Ocean Potential Energy Content due to Background	$W m^{-2}$			tnpeotb	tendency_of_ocean_potential_energy_content_due_to_background
3	Ocean Vertical Momentum Diffusivity	$m^2 s^{-1}$			difvmo	ocean_vertical_momentum_diffusivity
3	Ocean Vertical Momentum Diffusivity due to Background	$m^2 s^{-1}$			difvmbo	ocean_vertical_momentum_diffusivity_due_to_background
3	Ocean Vertical Momentum Diffusivity due to Tides	$m^2 s^{-1}$			difvmto	ocean_vertical_momentum_diffusivity_due_to_tides
3	Ocean Vertical Momentum Diffusivity due to Form Drag	$m^2 s^{-1}$			difvmfdo	ocean_vertical_momentum_diffusivity_due_to_form_drag
3	Ocean Kinetic Energy Dissipation Per Unit Area due to Vertical Friction	$W m^{-2}$			dispkevfo	ocean_kinetic_energy_dissipation_per_unit_area_due_to_vertical_friction

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difvho	ocean	
ocean_vertical_salt_diffusivity_due_to_background	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difvso	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difvtrbo	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difvtrto	ocean	
	W m-2	time: mean within years time: mean over years						real	longitude latitude olevel time2	tnpeo	ocean	
	W m-2	time: mean within years time: mean over years						real	longitude latitude olevel time2	tnpeot	ocean	
	W m-2	time: mean within years time: mean over years						real	longitude latitude olevel time2	tnpeotb	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difvmo	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difvmbo	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difvmto	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difvmfdo	ocean	
	W m-2	time: mean within years time: mean over years						real	longitude latitude olevel time2	dispkevfo	ocean	

In CMOR Table Oclim: *WGOMD Table 2.10*

priority	long name	units	comment	questions	output variable name	standard name
3	Ocean Tracer Bolus Laplacian Diffusivity	$m^2 s^{-1}$			diftrblo	ocean_tracer_bolus_laplacian_diffusivity
3	Ocean Tracer Bolus Biharmonic Diffusivity	$m^4 s^{-1}$			diftrbbo	ocean_tracer_bolus_biharmonic_diffusivity
3	Ocean Tracer Epineutral Laplacian Diffusivity	$m^2 s^{-1}$			diftrelo	ocean_tracer_epineutral_laplacian_diffusivity
3	Ocean Tracer Epineutral Biharmonic Diffusivity	$m^2 s^{-1}$			diftrebo	ocean_tracer_epineutral_biharmonic_diffusivity
3	Ocean Tracer XY Laplacian Diffusivity	$m^2 s^{-1}$			diftrxylo	ocean_tracer_xy_laplacian_diffusivity
3	Ocean Tracer XY Biharmonic Diffusivity	$m^2 s^{-1}$			diftrxybo	ocean_tracer_xy_biharmonic_diffusivity
3	Tendency of Ocean Eddy Kinetic Energy Content due to Bolus Transport	$W m^{-2}$			tnkebto	tendency_of_ocean_eddy_kinetic_energy_content_due_to_bolus_transport
3	Ocean Momentum XY Laplacian Diffusivity	$m^2 s^{-1}$			difmxylo	ocean_momentum_xy_laplacian_diffusivity
3	Ocean Momentum XY Biharmonic Diffusivity	$m^2 s^{-1}$			difmxybo	ocean_momentum_xy_biharmonic_diffusivity
3	Ocean Kinetic Energy Dissipation Per Unit Area due to XY Friction	$W m^{-2}$			dispkexyfo	ocean_kinetic_energy_dissipation_per_unit_area_due_to_xy_friction

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	diftrblo	ocean	
	m4 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	diftrbbo	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	diftrelo	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	diftrebo	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	diftrxylo	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	diftrxybo	ocean	
	W m-2	time: mean within years time: mean over years						real	longitude latitude olevel time2	tnkebto	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difmxylo	ocean	
	m2 s-1	time: mean within years time: mean over years						real	longitude latitude olevel time2	difmxybo	ocean	
	W m-2	time: mean within years time: mean over years						real	longitude latitude olevel time2	dispkexyfo	ocean	

CMOR Table Amon: Monthly Mean Atmospheric Fields and Some Surface Fields Amon mon

(All Saved on the Atmospheric Grid)

In CMOR Table Amon: *2-D fields on atmospheric grid*

priority	long name	units	comment	questions	output variable name	standard name
1	Near-Surface Air Temperature	K	near-surface (usually, 2 meter) air temperature.		tas	air_temperature
1	Surface Temperature	K	"skin" temperature (i.e., SST for open ocean)		ts	surface_temperature
1	Daily Minimum Near-Surface Air Temperature	K	monthly mean of the daily-minimum near-surface (usually, 2 meter) air temperature.		tasmin	air_temperature
1	Daily Maximum Near-Surface Air Temperature	K	monthly mean of the daily-maximum near-surface (usually, 2 meter) air temperature.		tasmax	air_temperature
1	Sea Level Pressure	Pa	not, in general, the same as surface pressure		psl	air_pressure_at_sea_level
1	Surface Air Pressure	Pa	not, in general, the same as mean sea-level pressure		ps	surface_air_pressure
1	Eastward Near-Surface Wind Speed	$m\ s^{-1}$	near-surface (usually, 10 meters) eastward component of wind.		uas	eastward_wind
1	Northward Near-Surface Wind Speed	$m\ s^{-1}$	near-surface (usually, 10 meters) northward component of wind.		vas	northward_wind
1	Near-Surface Wind Speed	$m\ s^{-1}$	near-surface (usually, 10 meters) wind speed. This is the mean of the speed, not the speed computed from the mean u and v components of wind		sfcWind	wind_speed
1	Near-Surface Relative Humidity	%	near-surface (usually, 2meters) relative humidity expressed as a percentage. This is the relative humidity with respect to liquid water for T> 0 C, and with respect to ice for T<0 C.		hurs	relative_humidity
1	Near-Surface Specific Humidity	1	near-surface (usually, 2 meters) specific humidity.		huss	specific_humidity
1	Precipitation	$kg\ m^{-2}\ s^{-1}$	at surface; includes both liquid and solid phases from all types of clouds (both large-scale and convective)		pr	precipitation_flux
1	Snowfall Flux	$kg\ m^{-2}\ s^{-1}$	at surface; includes precipitation of all forms of water in the solid phase		prsn	snowfall_flux
1	Convective Precipitation	$kg\ m^{-2}\ s^{-1}$	at surface; includes both liquid and solid phases.		prc	convective_precipitation_flux
1	Evaporation	$kg\ m^{-2}\ s^{-1}$	at surface; flux of water into the atmosphere due to conversion of both liquid and solid phases to vapor (from underlying surface and vegetation)		evspsbl	water_evaporation_flux
1	Surface Snow and Ice Sublimation Flux	$kg\ m^{-2}\ s^{-1}$	The snow and ice sublimation flux is the loss of snow and ice mass from the surface resulting from their conversion to water vapor that enters the atmosphere.		sbl	water_sublimation_flux
1	Surface Downward Eastward Wind Stress	Pa			tauu	surface_downward_eastward_stress
1	Surface Downward Northward Wind Stress	Pa			tauv	surface_downward_northward_stress
1	Surface Upward Latent Heat Flux	$W\ m^{-2}$	includes both evaporation and sublimation		hfls	surface_upward_latent_heat_flux
1	Surface Upward Sensible Heat Flux	$W\ m^{-2}$			hfss	surface_upward_sensible_heat_flux
1	Surface Downwelling Longwave Radiation	$W\ m^{-2}$			rlds	surface_downwelling_longwave_flux_in_air
1	Surface Upwelling Longwave Radiation	$W\ m^{-2}$			rlus	surface_upwelling_longwave_flux_in_air
1	Surface Downwelling Shortwave Radiation	$W\ m^{-2}$			rsds	surface_downwelling_shortwave_flux_in_air
1	Surface Upwelling Shortwave Radiation	$W\ m^{-2}$			rsus	surface_upwelling_shortwave_flux_in_air
1	Surface Downwelling Clear-Sky Shortwave Radiation	$W\ m^{-2}$			rsdscs	surface_downwelling_shortwave_flux_in_air_assuming_clear_sky
1	Surface Upwelling Clear-Sky Shortwave Radiation	$W\ m^{-2}$			rsuscs	surface_upwelling_shortwave_flux_in_air_assuming_clear_sky

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	K	time: mean						real	longitude latitude time height2m	tas	atmos	
	K	time: mean						real	longitude latitude time	ts	atmos	
	K	time: minimum within days time: mean over time						real	longitude latitude time height2m	tasmin	atmos	
	K	time: maximum within days time: mean over time						real	longitude latitude time height2m	tasmax	atmos	
	Pa	time: mean						real	longitude latitude time	psl	atmos	
	Pa	time: mean						real	longitude latitude time	ps	atmos	
	m s-1	time: mean						real	longitude latitude time height10m	uas	atmos	
	m s-1	time: mean						real	longitude latitude time height10m	vas	atmos	
	m s-1	time: mean						real	longitude latitude time height10m	sfcWind	atmos	
	%	time: mean						real	longitude latitude time height2m	hurs	atmos	
	1	time: mean						real	longitude latitude time height2m	huss	atmos	
											atmos	
	kg m-2 s-1	time: mean						real	longitude latitude time	pr	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude time	prsn	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude time	prc	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude time	evspsbl	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude time	sbl	atmos	
											atmos	
	Pa	time: mean					down	real	longitude latitude time	tauu	atmos	
	Pa	time: mean					down	real	longitude latitude time	tauv	atmos	
											atmos	
	W m-2	time: mean					up	real	longitude latitude time	hfls	atmos	
	W m-2	time: mean					up	real	longitude latitude time	hfss	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rlds	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlus	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rsds	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsus	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rsdscs	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsuscs	atmos	

1	Surface Downwelling Clear-Sky Longwave Radiation	W m^{-2}		rldscs	surface_downwelling_longwave_flux_in_air_assuming_clear_sky
1	TOA Incident Shortwave Radiation	W m^{-2}	incident shortwave at the top of the atmosphere	rsdt	toa_incoming_shortwave_flux
1	TOA Outgoing Shortwave Radiation	W m^{-2}	at the top of the atmosphere	rsut	toa_outgoing_shortwave_flux
1	TOA Outgoing Longwave Radiation	W m^{-2}	at the top of the atmosphere (to be compared with satellite measurements)	rlut	toa_outgoing_longwave_flux
1	TOA Outgoing Clear-Sky Longwave Radiation	W m^{-2}		rlutcs	toa_outgoing_longwave_flux_assuming_clear_sky
1	TOA Outgoing Clear-Sky Shortwave Radiation	W m^{-2}		rsutcs	toa_outgoing_shortwave_flux_assuming_clear_sky
1	Water Vapor Path	kg m^{-2}	vertically integrated through the atmospheric column	prw	atmosphere_water_vapor_content
1	Total Cloud Fraction	%	for the whole atmospheric column, as seen from the surface or the top of the atmosphere. Include both large-scale and convective cloud.	clt	cloud_area_fraction
1	Condensed Water Path	kg m^{-2}	calculate mass of condensed (liquid + ice) water in the column divided by the area of the column (not just the area of the cloudy portion of the column). Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.	clwvi	atmosphere_cloud_condensed_water_content
1	Ice Water Path	kg m^{-2}	calculate mass of ice water in the column divided by the area of the column (not just the area of the cloudy portion of the column). Include precipitating frozen hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.	clivi	atmosphere_cloud_ice_content
1	Net Downward Flux at Top of Model	W m^{-2}	i.e., at the top of that portion of the atmosphere where dynamics are explicitly treated by the model. Report only if this differs from the net downward radiative flux at the top of the atmosphere.	rtmt	net_downward_radiative_flux_at_top_of_atmosphere_model
1	Air Pressure at Convective Cloud Base	Pa		ccb	air_pressure_at_convective_cloud_base
1	Air Pressure at Convective Cloud Top	Pa		cct	air_pressure_at_convective_cloud_top
1	Fraction of Time Convection Occurs	1	Fraction of time that convection occurs in the grid cell .	ci	
1	Fraction of Time Shallow Convection Occurs	1	Fraction of time that shallow convection occurs in the grid cell. (For models with a distinct shallow convection scheme only)	sci	
1	Total Anthropogenic CO2 Flux (All Emissions)	kg C m^{-2} s^{-1}	This is requested only for the emission-driven coupled carbon climate model runs. Do not include natural fire sources, but include all anthropogenic sources, including fossil fuel use, cement production, agricultural burning, and all sources associated with anthropogenic land use change.	fco2antt	
1	Fossil Fuel Anthropogenic CO2 Flux (Fossil Fuel Emissions)	kg C m^{-2} s^{-1}	This is requested only for the emission-driven coupled carbon climate model runs. Report the prescribed anthropogenic CO2 flux from fossil fuel use.	fco2fos	
1	Natural Net Surface Flux of CO2 into The Atmosphere	kg C m^{-2} s^{-1}	Report from all simulations (both emission-driven and concentration-driven) performed by models with fully interactive and responsive carbon cycles. This is what the atmosphere sees (*on its own grid*). This field should be equivalent to the combined natural fluxes of carbon (requested in the L_mon and O_mon tables) that account for natural exchanges between the atmosphere and land or ocean reservoirs (i.e., "net biospheric productivity", for land, and "air to sea CO2 flux", for ocean.)	fco2nat	

W m-2	time: mean		down	real	longitude latitude time	rldscs	atmos
							atmos
W m-2	time: mean		down	real	longitude latitude time	rsdt	atmos
W m-2	time: mean		up	real	longitude latitude time	rsut	atmos
W m-2	time: mean		up	real	longitude latitude time	rlut	atmos
W m-2	time: mean		up	real	longitude latitude time	rlutcs	atmos
W m-2	time: mean		up	real	longitude latitude time	rsutcs	atmos
				real			atmos
kg m-2	time: mean			real	longitude latitude time	prw	atmos
%	time: mean			real	longitude latitude time	clt	atmos
kg m-2	time: mean			real	longitude latitude time	clwvi	atmos
kg m-2	time: mean			real	longitude latitude time	clivi	atmos
							atmos
W m-2	time: mean		down	real	longitude latitude time	rtmt	atmos
Pa	time: mean			real	longitude latitude time	ccb	atmos
Pa	time: mean			real	longitude latitude time	cct	atmos
1	time: mean			real	longitude latitude time	ci	atmos
1	time: mean			real	longitude latitude time	sci	atmos
kg C m-2 s-1	time: mean		up	real	longitude latitude time	fco2antt	atmos
kg C m-2 s-1	time: mean		up	real	longitude latitude time	fco2fos	atmos
kg C m-2 s-1	time: mean		up	real	longitude latitude time	fco2nat	atmos

In CMOR Table Amon: *Atmospheric 3-D fields on standard pressure levels, except 4 cloud fields which are on model levels.*

Include the following mandatory pressure levels (which are available from all available reanalyses and CMIP3): 1000, 925, 850, 700, 600, 500, 400, 300, 250, 200, 150, 100, 70, 50, 30, 20, and 10 hPa; Also include, when appropriate, output on the following additional pressure levels: 7, 5, 3, 2, 1 and 0.4 hPa.

priority	long name	units	comment	questions	output variable name	standard name
1	Cloud Area Fraction	%	Report on model layers (not standard pressures). Include both large-scale and convective cloud.		cl	cloud_area_fraction_in_atmosphere_layer
1	Mass Fraction of Cloud Liquid Water	1	Report on model layers (not standard pressures). Include both large-scale and convective cloud. Calculate as the mass of cloud liquid water in the grid cell divided by the mass of air (including the water in all phases) in the grid cells. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clw	mass_fraction_of_cloud_liquid_water_in_air
1	Mass Fraction of Cloud Ice	1	Report on model layers (not standard pressures). Include both large-scale and convective cloud. Calculate as the mass of cloud ice in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		cli	mass_fraction_of_cloud_ice_in_air
1	Convective Mass Flux	kg m^{-2} s^{-1}	Report on model half-levels (i.e., model layer bounds and not standard pressures). The atmosphere convective mass flux is the vertical transport of mass for a field of cumulus clouds or thermals, given by the product of air density and vertical velocity. The flux is computed as the mass divided by the area of the grid cell.		mc	atmosphere_convective_mass_flux
1	Air Temperature	K			ta	air_temperature
1	Eastward Wind	m s^{-1}			ua	eastward_wind
1	Northward Wind	m s^{-1}			va	northward_wind
1	Specific Humidity	1			hus	specific_humidity
1	Relative Humidity	%	This is the relative humidity with respect to liquid water for T> 0 C, and with respect to ice for T<0 C.		hur	relative_humidity
1	omega (=dp/dt)	Pa s^{-1}	commonly referred to as "omega", this represents the vertical component of velocity in pressure coordinates (positive down)		wap	lagrangian_tendency_of_air_pressure
1	Geopotential Height	m			zg	geopotential_height
1	Mole Fraction of O3	1e-9	If this does not change over time (except possibly to vary identically over each annual cycle), report instead the variable described in the next table entry.	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	tro3	mole_fraction_of_ozone_in_air

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	%	time: mean						real	longitude latitude alevel time	cl	atmos	
	1	time: mean						real	longitude latitude alevel time	clw	atmos	
	1	time: mean						real	longitude latitude alevel time	cli	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude alevbnds time	mc	atmos	
	K	time: mean						real	longitude latitude plev17 time	ta	atmos	
	m s-1	time: mean						real	longitude latitude plev17 time	ua	atmos	
	m s-1	time: mean						real	longitude latitude plev17 time	va	atmos	
	1	time: mean						real	longitude latitude plev17 time	hus	atmos	
	%	time: mean						real	longitude latitude plev17 time	hur	atmos	
	Pa s-1	time: mean						real	longitude latitude plev17 time	wap	atmos	
	m	time: mean						real	longitude latitude plev17 time	zg	atmos	
	1e-9	time: mean						real	longitude latitude plev17 time	tro3	atmos atmosChem	

1	Mole Fraction of O3	1e-9	If O3 does not vary from one year to the next, report 12 months, starting with January. (Note: include all 12 months even if the values don't vary seasonally.) When calling CMOR, identify this variable as tro3Clim, not tro3. If the O3 varies from one year to the next, then report instead the field described in the previous table entry.	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	tro3	mole_fraction_of_ozone_in_air
1	Mole Fraction of CO2	1e-6	For some simulations (e.g., prescribed concentration pi-control run), this will not vary from one year to the next, and so report instead the variable described in the next table entry. If spatially uniform, omit this field, but report Total Atmospheric Mass of CO2 (see the table entry after the next one).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	co2	mole_fraction_of_carbon_dioxide_in_air
1	Mole Fraction of CO2	1e-6	Report only for simulations (e.g., prescribed concentration pi-control run), in which the CO2 does not vary from one year to the next. Report 12 monthly values, starting with January, even if the values don't vary seasonally. When calling CMOR, identify this variable as co2Clim, not co2. If CO2 is spatially uniform, omit this field, but report Total Atmospheric Mass of CO2 (see the table entry after the next).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	co2	mole_fraction_of_carbon_dioxide_in_air
1	Total Atmospheric Mass of CO2	kg	For some simulations (e.g., prescribed concentration pi-control run), this will not vary from one year to the next, and so report instead the variable described in the next table entry. If CO2 is spatially nonuniform, omit this field, but report Mole Fraction of CO2 (see the table entry before the previous one).		co2mass	
1	Total Atmospheric Mass of CO2	kg	Report only for simulations (e.g., prescribed concentration pi-control run), in which the CO2 does not vary from one year to the next. Report 12 monthly values, starting with January, even if the values don't vary seasonally. When calling CMOR, identify this variable as co2massClim, not co2mass. If CO2 is spatially nonuniform, omit this field, but report Mole Fraction of CO2 (see the table entry before the previous one).		co2mass	
1	Mole Fraction of CH4	1e-9	For some simulations (e.g., prescribed concentration pi-control run), this will not vary from one year to the next, and so report instead the variable described in the next table entry. If CH4 is spatially uniform, omit this field, but report Global Mean Mole Fraction of CH4 (see the table entry after the next one).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	ch4	mole_fraction_of_methane_in_air
1	Mole Fraction of CH4	1e-9	Report only for simulations (e.g., prescribed concentration pi-control run), in which the CH4 does not vary from one year to the next. Report 12 monthly values, starting with January, even if the values don't vary seasonally. When calling CMOR, identify this variable as ch4global, not ch4. If CH4 is spatially uniform, omit this field, but report Global Mean Mole Fraction of CH4 (see the table entry after the next).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	ch4	mole_fraction_of_methane_in_air

1e-9	time: mean	real	longitude latitude plev17 time2	tro3Clim	atmos atmosChem	monClim
1e-6	time: mean	real	longitude latitude plev17 time	co2	atmos	
1e-6	time: mean	real	longitude latitude plev17 time2	co2Clim	atmos	monClim
kg	time: mean	real	time	co2mass	atmos	
kg	time: mean	real	time2	co2massClim	atmos	monClim
1e-9	time: mean	real	longitude latitude plev17 time	ch4	atmos atmosChem	
1e-9	time: mean	real	longitude latitude plev17 time2	ch4	atmos atmosChem	monClim

1	Global Mean Mole Fraction of CH4	1e-9	For some simulations (e.g., prescribed concentration pi-control run), this will not vary from one year to the next, and so report instead the variable described in the next table entry. If CH4 is spatially nonuniform, omit this field, but report Mole Fraction of CH4 (see the table entry before the previous one).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	ch4global	mole_fraction_of_methane_in_air
1	Global Mean Mole Fraction of CH4	1e-9	Report only for simulations (e.g., prescribed concentration pi-control run), in which the CH4 does not vary from one year to the next. Report 12 monthly values, starting with January, even if the values don't vary seasonally. When calling CMOR, identify this variable as ch4globalClim, not ch4global. If CH4 is spatially nonuniform, omit this field, but report Global Mean Mole Fraction of CH4 (see the table entry before the previous one).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	ch4global	mole_fraction_of_methane_in_air
1	Mole Fraction of N2O	1e-9	For some simulations (e.g., prescribed concentration pi-control run), this will not vary from one year to the next, and so report instead the variable described in the next table entry. If N2O is spatially uniform, omit this field, but report Global Mean Mole Fraction of N2O (see the table entry after the next one).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	n2o	mole_fraction_of_nitrous_oxide_in_air
1	Mole Fraction of N2O	1e-9	Report only for simulations (e.g., prescribed concentration pi-control run), in which the N2O does not vary from one year to the next. Report 12 monthly values, starting with January, even if the values don't vary seasonally. When calling CMOR, identify this variable as n2oglobal, not n2o. If N2O is spatially uniform, omit this field, but report Global Mean Mole Fraction of N2O (see the table entry after the next).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	n2o	mole_fraction_of_nitrous_oxide_in_air
1	Global Mean Mole Fraction of N2O	1e-9	For some simulations (e.g., prescribed concentration pi-control run), this will not vary from one year to the next, and so report instead the variable described in the next table entry. If N2O is spatially nonuniform, omit this field, but report Mole Fraction of N2O (see the table entry before the previous one).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	n2oglobal	mole_fraction_of_nitrous_oxide_in_air
1	Global Mean Mole Fraction of N2O	1e-9	Report only for simulations (e.g., prescribed concentration pi-control run), in which the N2O does not vary from one year to the next. Report 12 monthly values, starting with January, even if the values don't vary seasonally. When calling CMOR, identify this variable as ch4globalClim, not ch4global. If N2O is spatially nonuniform, omit this field, but report Global Mean Mole Fraction of N2O (see the table entry before the previous one).	Are these the preferred units or should it be a unitless fraction? Should this field be reported instead on model levels? Or should we also require either the vertically integrated mole fraction (or mass?) of this species or the vertically integrated globally averaged mole fraction (or mass?)?	n2oglobal	mole_fraction_of_nitrous_oxide_in_air

1e-9	time: mean	real	time	ch4global	atmos atmosChem	
1e-9	time: mean	real	time2	ch4globalClim	atmos atmosChem	monClim
1e-9	time: mean	real	longitude latitude plev17 time	n2o	atmos atmosChem	
1e-9	time: mean	real	longitude latitude plev17 time2	n2oClim	atmos atmosChem	monClim
1e-9	time: mean	real	time	n2oglobal	atmos atmosChem	
1e-9	time: mean	real	time2	n2oglobalClim	atmos atmosChem	monClim

1	Mole Fraction of Other Radiatively Important Trace Gases (That Are Evolving in Time).		If assumed spatially uniform, report only time-series of the single value. For some simulations (e.g., prescribed concentration pi-control run), this will not vary from one year to the next, and so report values for only 12 months (starting with January. (Note: include all 12 months even if the values don't vary seasonally.)	Please let me know what (if any) other trace gas concentrations should be included.		

In CMOR Table Amon: *Climatological atmospheric 3-D pressure fields*

These field are requested *only for models in which the pressure can't be calculated from the vertical coordinate information stored already for each variable.* Thus, the pressures on each model level are needed for height or theta-coordinate models, for example, but not sigma- or eta-coordinate models. The annual cycle climatology (computed from an appropriate segment of the pre-industrial control run) should be reported on model levels and half levels. DO ***NOT*** REPORT ALL MONTHS FOR ALL EXPERIMENTS: Report only 12 months of data representing the climatology of the pre-industrial control run.

priority	long name	units	comment	questions	output variable name	standard name
1	Pressure on Model Levels	Pa			pfull	air_pressure
1	Pressure on Model Half-Levels	Pa			phalf	air_pressure

	0							real	longitude latitude plev17 time	0	atmos atmosChem	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	Pa	time: mean within years time: mean over years						real	longitude latitude alevel time2	pfull	atmos	monClim
	Pa	time: mean within years time: mean over years						real	longitude latitude alevbnds time2	phalf	atmos	monClim

CMOR Table Omon: Monthly Mean Ocean Fields, Including Biogechemical Fields   Omon   mon

(All Saved on the Ocean Grid)

In CMOR Table Omon: *Marine Biogeochemical 2-D Fields*

priority	long name	units	comment	questions	output variable name	standard name
2	Surface Concentration of (+name of tracer)	mol XXX m^{-3}	surface concentrations of all 3D tracers. See first table in Oyr for a complete list of these tracers. "Tracer" concentations should be reported even if they are diagnosed rather than prognostically calculated		include Oyr 3D tracers	
1	Primary Organic Carbon Production by All Types of Phytoplankton	mol C m^{-2} s^{-1}	Vertically integrated total primary (organic carbon) production by phytoplankton. This should equal the sum of intpdiat+intpphymisc, but those individual components may be unavailable in some models		intpp	
2	Primary Organic Carbon Production by Phytoplankton Based on NO3 Alone	mol C m^{-2} s^{-1}	Vertically integrated primary (organic carbon) production by phytoplankton based on NO3 alone		intpnew	
2	Primary Organic Carbon Production by Diatom Phytoplankton	mol C m^{-2} s^{-1}	Vertically integrated primary (organic carbon) production by the diatom phytoplankton component alone		intpdiat	
3	Primary Organic Carbon Production by Other Phytoplankton	mol C m^{-2} s^{-1}	Vertically integrated total primary (organic carbon) production by other phytoplankton components alone		intpphymisc	
3	Iron Production	mol Fe m^{-2} s^{-1}	Vertically integrated biogenic iron production		intpbfe	
3	Silica Production	mol Si m^{-2} s^{-1}	Vertically integrated biogenic silica production		intpbsi	
3	Calcite Production	mol C m^{-2} s^{-1}	Vertically integrated calcite production		intpcalc	
3	Aragonite Production	mol C m^{-2} s^{-1}	Vertically integrated aragonite production		intparag	
1	Downward Flux of Particle Organic Carbon at 100M	mol C m^{-2} s^{-1}	sinking flux of organic carbon at 100m		epc100	
3	Downward Flux of Particulate Iron at 100M	mol Fe m^{-2} s^{-1}	sinking flux of biogenic and scavenged iron at 100m		epfe100	
3	Downward Flux of Particulate Silica at 100M	mol Si m^{-2} s^{-1}	sinking flux of biogenic silica at 100m		epsi100	
1	Downward Flux of Calcite at 100M	mol C m^{-2} s^{-1}	sinking flux of calcite at 100m		epcalc100	
1	Downward Flux of Aragonite at 100M	mol C m^{-2} s^{-1}	sinking flux of aragonite at 100m		eparag100	
2	Dissolved Inorganic Carbon Content	kg C m^{-2}	Vertically integrated DIC	For consistency with other fluxes, shouldn't this have units of mol C m^{-2} s^{-1}	intdic	
1	Surface Aqueous Partial Pressure of CO2	uatm	Surface aqueous partial pressure of CO2		spco2	
3	Delta PCO2	uatm	Difference between atmospheric and oceanic partial pressure of CO2 (positive meaning ocean > atmosphere)		dpco2	
3	Delta PO2	uatm	Difference between atmospheric and oceanic partial pressure of O2 (positive meaning ocean > atmosphere)	Are these correct and preferred units? Why not some variant on Pa?	dpo2	
1	Surface Downward CO2 Flux	kg C m^{-2} s^{-1}	Gas exchange flux of CO2 (positive into ocean)	For consistency with other fluxes, shouldn't this have units of mol C m^{-2} s^{-1}	fgco2	
1	Surface Downward O2 Flux	mol O_2 m^{-2} s^{-1}	Gas exchange flux of O2 (positive into ocean)		fgo2	
3	Surface Upward DMS Flux	mol DMS m^{-2} s^{-1}	Gas exchange flux of DMS (positive into atmosphere)		fgdms	
3	Flux of Carbon Into Ocean Surface by Runoff and Sediment Dissolution	mol C m^{-2} s^{-1}	Carbon supply to ocean through runoff and sediment dissolution (neglects gas exchange)		fsc	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	mol XXX m-3	time: mean area: mean where sea						real	longitude latitude time		ocnBgchem	
integrated_primary_production	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	intpp	ocnBgchem	
integrated_new_production	mol C m-2 s-1	time: mean arera: where sea						real	longitude latitude time	intpnew	ocnBgchem	
integrated_diatom_phytoplankton_production	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	intpdiat	ocnBgchem	
integrated_other_phytoplankton_production	mol C m-2 s-1	time: mean arera: where sea						real	longitude latitude time	intpphymisc	ocnBgchem	
integrated_iron_production	mol Fe m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	intpbfe	ocnBgchem	
integrated_silica_production	mol Si m-2 s-1	time: mean arera: where sea						real	longitude latitude time	intpbsi	ocnBgchem	
integrated_calcite_production	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	intpcalc	ocnBgchem	
integrated_aragonite_production	mol C m-2 s-1	time: mean arera: where sea						real	longitude latitude time	intparag	ocnBgchem	
sinking_particle_organic_carbon_export	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	epc100	ocnBgchem	
sinking_particulate_iron_export	mol Fe m-2 s-1	time: mean arera: where sea						real	longitude latitude time	epfe100	ocnBgchem	
sinking_particulate_silica_export	mol Si m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	epsi100	ocnBgchem	
sinking_calcite	mol C m-2 s-1	time: mean arera: where sea						real	longitude latitude time	epcalc100	ocnBgchem	
sinking_aragonite	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	eparag100	ocnBgchem	
dic_inventory	kg C m-2	time: mean arera: where sea						real	longitude latitude time	intdic	ocnBgchem	
surface_pco2	uatm	time: mean area: mean where sea						real	longitude latitude time	spco2	ocnBgchem	
delta_pco2	uatm	time: mean arera: where sea						real	longitude latitude time	dpco2	ocnBgchem	
delta_po2	uatm	time: mean area: mean where sea						real	longitude latitude time	dpo2	ocnBgchem	
air_to_sea_co2_flux	kg C m-2 s-1	time: mean arera: where sea						real	longitude latitude time	fgco2	ocnBgchem	
air_to_sea_o2_flux	mol O2 m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	fgo2	ocnBgchem	
sea_to_air_dms_flux	mol DMS m-2 s-1	time: mean arera: where sea						real	longitude latitude time	fgdms	ocnBgchem	
carbon_source_flux	mol C m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	fsc	ocnBgchem	

3	Downward Carbon Flux at Ocean Bottom	mol C m^{-2} s^{-1}	Carbon loss to sediments		frc	
3	Nitrogen Fixation Rate in Ocean	mol N m^{-2} s^{-1}	Vertically integrated nitrogen fixation		intpn2	
3	Surface Downward Net Flux of Nitrogen	mol N m^{-2} s^{-1}	N supply through deposition flux onto sea surface, nitrogen fixation, and runoff		fsn	
3	Nitrogen Loss to Sediments and through Denitrification	mol N m^{-2} s^{-1}	N loss to sediment and water column denitrification		frn	
3	Surface Downward Net Flux of Iron	mol Fe m^{-2} s^{-1}	Iron supply through deposition flux onto sea surface, runoff, coasts, sediments, etc		fsfe	
3	Iron Loss to Sediments	mol Fe m^{-2} s^{-1}	Iron loss to sediments		frfe	
3	Oxygen Minimum Concentration	mol O_2 m^{-3}	Vertical minimum concentration of dissolved oxygen gas		o2min	
3	Depth of Oxygen Minimum Concectration	mol O_2 m^{-3}	Depth of vertical minimum concentration of dissolved oxygen gas (if two, then the shallower)		zo2min	
3	Calcite Saturation Depth	m	Depth of calcite saturation horizon (0 if < surface, "missing" if > bottom, if two, then the shallower)		zsatcalc	
3	Aragonite Saturation Depth	m	Depth of aragonite saturation horizon (0 if < surface, "missing" if > bottom, if two, then the shallower)		zsatarag	
3	Rate of Change of Net Dissolved Inorganic Carbon	mol C m^{-2} s^{-1}	Net time rate of change of dissolved inorganic carbon	Is this the rate of change integrated through the entire water column or uppermost 100 m?	fddtdic	
3	Rate of Change in Upper 100 m of Net Dissolved Inorganic Nitrogen	mol N m^{-2} s^{-1}	Net time rate of change of nitrogen nutrients (e.g. NO3+NH4) in upper 100m		fddtdin	
3	Rate of Change in Upper 100 m of Net Dissolved Inorganic Phosphate	mol P m^{-2} s^{-1}	vertical integral of net time rate of change of phosphate in upper 100m		fddtdip	
3	Rate of Change in Upper 100 m of Net Dissolved Inorganic Iron	mol Fe m^{-2} s^{-1}	vertical integral of net time rate of change of dissolved inorganic iron in upper 100m		fddtdife	
3	Rate of Change in Upper 100 m of Net Dissolved Inorganic Silicate	mol Si m^{-2} s^{-1}	vertical integral of net time rate of change of dissolved inorganic silicate in upper 100m		fddtdisi	
3	Rate of Change in Upper 100 m of Alkalinity	eq m^{-2} s^{-1}	vertical integral of net time rate of change of alkalinity in upper 100m	Is "equivalents" preferred to, say, 10**-6 (i.e., ppm) or kmol/m**3?	fddtalk	
3	Rate of Change in Upper 100 m of Dissolved Inorganic Carbon due to Biological Activity	mol C m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of dissolved inorganic carbon in upper 100m		fbddtdic	
3	Rate of Change in Upper 100 m of Dissolved Inorganic Nitrogen due to Biological Activity	mol N m^{-3} s^{-1}	vertical integral of net biological terms in time rate of change of nitrogen nutrients (e.g. NO3+NH4) in upper 100m		fbddtdin	
3	Rate of Change in Upper 100 m of Dissolved Inorganic Phosphate due to Biological Activity	mol P m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of phosphate in upper 100m		fbddtdip	
3	Rate of Change in Upper 100 m of Dissolved Inorganic Iron due to Biological Activity	mol Fe m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of dissolved inorganic iron in upper 100m		fbddtdife	
3	Rate of Change in Upper 100 m of Dissolved Inorganic Silicate due to Biological Activity	mol Si m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of dissolved inorganic silicate in upper 100m		fbddtdisi	
3	Rate of Change in Upper 100 m of Biological Alkalinity due to Biological Activity	eq m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of alkalinity in upper 100m	Is "equivalents" preferred to, say, 10**-6 (i.e., ppm) or kmol/m**3?	fbddtalk	

carbon_removal_flux	mol C m-2 s-1	time: mean arera: where sea	real	longitude latitude time	frc	ocnBgchem
integrated_nitrogen_fixation	mol N m-2 s-1	time: mean area: mean where sea	real	longitude latitude time	intpn2	ocnBgchem
nitrogen_source_flux	mol N m-2 s-1	time: mean arera: where sea	real	longitude latitude time	fsn	ocnBgchem
nitrogen_removal_flux	mol N m-2 s-1	time: mean area: mean where sea	real	longitude latitude time	frn	ocnBgchem
iron_source_flux	mol Fe m-2 s-1	time: mean arera: where sea	real	longitude latitude time	fsfe	ocnBgchem
iron_removal_flux	mol Fe m-2 s-1	time: mean area: mean where sea	real	longitude latitude time	frfe	ocnBgchem
oxygen_minimum	mol O2 m-3	time: mean arera: where sea	real	longitude latitude time	o2min	ocnBgchem
oxygen_minimum_depth	mol O2 m-3	time: mean area: mean where sea	real	longitude latitude time	zo2min	ocnBgchem
calcite_saturation_depth	m	time: mean arera: where sea	real	longitude latitude time	zsatcalc	ocnBgchem
aragonite_saturation_depth	m	time: mean area: mean where sea	real	longitude latitude time	zsatarag	ocnBgchem
net_dic_rate_of_change	mol C m-2 s-1	time: mean arera: where sea	real	longitude latitude time	fddtdic	ocnBgchem
net_din_rate_of_change	mol N m-2 s-1	time: mean area: mean where sea	real	longitude latitude time	fddtdin	ocnBgchem
net_dip_rate_of_change	mol P m-2 s-1	time: mean arera: where sea	real	longitude latitude time	fddtdip	ocnBgchem
net_dife_rate_of_change	mol Fe m-2 s-1	time: mean area: mean where sea	real	longitude latitude time	fddtdife	ocnBgchem
net_disi_rate_of_change	mol Si m-2 s-1	time: mean arera: where sea	real	longitude latitude time	fddtdisi	ocnBgchem
net_alkalinity_rate_of_change	eq m-2 s-1	time: mean area: mean where sea	real	longitude latitude time	fddtalk	ocnBgchem
net_biological_dic_rate_of_change	mol C m-2 s-1	time: mean arera: where sea	real	longitude latitude time	fbddtdic	ocnBgchem
net_biological_din_rate_of_change	mol N m-3 s-1	time: mean area: mean where sea	real	longitude latitude time	fbddtdin	ocnBgchem
net_biological_dip_rate_of_change	mol P m-2 s-1	time: mean arera: where sea	real	longitude latitude time	fbddtdip	ocnBgchem
net_biological_dife_rate_of_change	mol Fe m-2 s-1	time: mean area: mean where sea	real	longitude latitude time	fbddtdife	ocnBgchem
net_biological_disi_rate_of_change	mol Si m-2 s-1	time: mean arera: where sea	real	longitude latitude time	fbddtdisi	ocnBgchem
net_biological_alkalinity_rate_of_cha nge	eq m-2 s-1	time: mean area: mean where sea	real	longitude latitude time	fbddtalk	ocnBgchem

Further explanation of the fields in the following tables can be found in Griffies et al., available at http://eprints.soton.ac.uk/65415/01/137_WGOMD_ModelOutput.pdf .

In CMOR Table Omon: *WGOMD Table 2.2*

priority	long name	units	comment	questions	output variable name	standard name
1	Sea Water Mass	kg			masso	sea_water_mass
1	Sea Water Pressure at Sea floor	dbar			pbo	sea_water_pressure_at_sea_floor
2	Sea Water Pressure at Sea Water Surface	dbar			pso	sea_water_pressure_at_sea_water_surface
1	Sea Water Volume	m^3			volo	sea_water_volume
1	Sea Surface Height Above Geoid	m			zos	sea_surface_height_above_geoid
3	Square of Sea Surface Height Above Geoid	m^2			zossq	square_of_sea_surface_height_above_geoid
1	Global Average Sea Level Change	m			zosga	global_average_sea_level_change
1	Global Average Steric Sea Level Change	m			zossga	global_average_steric_sea_level_change
1	Global Average Thermosteric Sea Level Change	m			zostoga	global_average_thermosteric_sea_level_change
1	Sea Water Mass Per Unit Area	kg m^{-2}			masscello	sea_water_mass_per_unit_area
1	Ocean Model Cell Thickness	m			thkcello	cell_thickness
1	Sea Water Potential Temperature	K			thetao	sea_water_potential_temperature
1	Global Average Sea Water Potential Temperature	K			thetaoga	sea_water_potential_temperature
2	Sea Surface Temperature	K	this may differ from "surface temperature" in regions of sea ice.		tos	sea_surface_temperature
3	Square of Sea Surface Temperature	K^2			tossq	square_of_sea_surface_temperature
1	Sea Water Salinity	psu			so	sea_water_salinity
1	Global Mean Sea Water Salinity	psu			soga	sea_water_salinity
2	Sea Surface Salinity	psu			sos	sea_surface_salinity
3	Sea Water Potential Density	kg m^{-3}			rhopoto	sea_water_potential_density
3	Sea Water Age Since Surface Contact	yr			agessc	sea_water_age_since_surface_contact
3	Moles Per Unit Mass of CFC-11 in Sea Water	mol kg^{-1}			cfc11	moles_per_unit_mass_of_cfc11_in_sea_water
3	Ocean Barotropic Mass Streamfunction	kg s^{-1}	differs from CMIP3 because it includes mass.		msftbarot	ocean_barotropic_mass_streamfunction
3	Ocean Mixed Layer Thickness Defined by Sigma T	m			mlotst	ocean_mixed_layer_thickness_defined_by_sigma_t
3	Square of Ocean Mixed Layer Thickness Defined by Sigma T	m^2			mlotstsq	square_of_ocean_mixed_layer_thickness_defined_by_sigma_t
3	Mean Daily Maximum Ocean Mixed Layer Thickness Defined by Mixing Scheme	m			omldamax	ocean_mixed_layer_thickness_defined_by_mixing_scheme
3	Monthly Maximum Ocean Mixed Layer Thickness Defined by Mixing Scheme	m			omlmax	ocean_mixed_layer_thickness_defined_by_mixing_scheme

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	kg	time: mean area: sum where sea						real	time	masso	ocean	
	dbar	time: mean						real	longitude latitude time	pbo	ocean	
	dbar	time: mean						real	longitude latitude time	pso	ocean	
	m3	time: mean area: sum where sea						real	time	volo	ocean	
	m	time: mean						real	longitude latitude time	zos	ocean	
	m2	time: mean						real	longitude latitude time	zossq	ocean	
	m	time: mean area: mean where sea						real	time	zosga	ocean	
	m	time: mean area: mean where sea						real	time	zossga	ocean	
	m	time: mean area: mean where sea						real	time	zostoga	ocean	
	kg m-2	time: mean						real	longitude latitude olevel time	masscello	ocean	
	m	time: mean						real	longitude latitude olevel time	thkcello	ocean	
	K	time: mean						real	longitude latitude olevel time	thetao	ocean	
	K	time: mean area: mean where sea						real	time	thetaoga	ocean	
	K	time: mean						real	longitude latitude time	tos	ocean	
	K2	time: mean						real	longitude latitude time	tossq	ocean	
	psu	time: mean						real	longitude latitude olevel time	so	ocean	
	psu	time: mean area: mean where sea						real	time	soga	ocean	
	psu	time: mean						real	longitude latitude time	sos	ocean	
	kg m-3	time: mean						real	longitude latitude olevel time	rhopoto	ocean	
	yr	time: mean						real	longitude latitude olevel time	agessc	ocean	
	mol kg-1	time: mean						real	longitude latitude olevel time	cfc11	ocean	
	kg s-1	time: mean						real	longitude latitude time	msftbarot	ocean	
	m	time: mean						real	longitude latitude time	mlotst	ocean	
	m2	time: mean						real	longitude latitude time	mlotstsq	ocean	
	m	time: maximum within days time: mean over days						real	longitude latitude time	omldamax	ocean	
	m	time: maximum						real	longitude latitude time	omlmax	ocean	

In CMOR Table Omon: *WGOMD Table 2.3*

priority	long name	units	comment	questions	output variable name	standard name
1	Sea Water X Velocity	$m\ s^{-1}$			uo	sea_water_x_velocity
1	Sea Water Y Velocity	$m\ s^{-1}$			vo	sea_water_y_velocity
1	Upward Ocean Mass Transport	$kg\ s^{-1}$	differs from CMIP3, which only had upward velocity.		wmo	upward_ocean_mass_transport
1	Square of Upward Ocean Mass Transport	$kg^2\ s^{-2}$			wmosq	square_of_upward_ocean_mass_transport
2	Ocean Mass X Transport	$kg\ s^{-1}$			umo	ocean_mass_x_transport
2	Ocean Mass Y Transport	$kg\ s^{-1}$			vmo	ocean_mass_y_transport
2	Ocean Meridional Overturning Mass Streamfunction	$kg\ s^{-1}$	function of Y, Z, basin. differs from CMIP3 because it includes mass.		msftmyz	ocean_meridional_overturning_mass_streamfunction
2	Ocean Meridional Overturning Mass Streamfunction	$kg\ s^{-1}$	function of of Y-rho-basin.		msftmrhoz	ocean_meridional_overturning_mass_streamfunction
2	Ocean Y Overturning Mass Streamfunction	$kg\ s^{-1}$	function of Y, Z, basin.		msftyyz	ocean_y_overturning_mass_streamfunction
2	Ocean Y Overturning Mass Streamfunction	$kg\ s^{-1}$	function of Y, rho, basin.		msftyrhoz	ocean_y_overturning_mass_streamfunction
3	Ocean Meridional Overturning Mass Streamfunction due to Bolus Advection	$kg\ s^{-1}$	function of Y, Z, basin.		msftmyzba	ocean_meridional_overturning_mass_streamfunction due_to_bolus_advection
3	Ocean Meridional Overturning Mass Streamfunction due to Bolus Advection	$kg\ s^{-1}$	function of Y, rho, basin.		msftmrhozba	ocean_meridional_overturning_mass_streamfunction due_to_bolus_advection
3	Ocean Y Overturning Mass Streamfunction due to Bolus Advection	$kg\ s^{-1}$	function of Y, Z, basin.		msftyyzba	ocean_y_overturning_mass_streamfunction_due_to_bolus_advection
3	Ocean Y Overturning Mass Streamfunction due to Bolus Advection	$kg\ s^{-1}$	function of Y, rho, basin.		msftyrhozba	ocean_y_overturning_mass_streamfunction_due_to_bolus_advection
2	Northward Ocean Heat Transport	W	For a model with a cartesian latxlon grid, this is the same as the "Ocean Heat Y Transport" in line 108.		hfnorth	northward_ocean_heat_transport
3	Northward Ocean Heat Transport due to Bolus Advection	W			hfyba	northward_ocean_heat_transport_due_to_bolus_adv ection
3	Northward Ocean Heat Transport due to Diffusion	W			hfydiff	northward_ocean_heat_transport_due_to_diffusion
2	Ocean Heat X Transport	W				ocean_heat_x_transport
2	Ocean Heat Y Transport	W	For a model with a cartesian latxlon grid, this is the same as the "Northward Ocean Heat Transport" in line 104.		hfy	ocean_heat_y_transport
3	Ocean Heat X Transport due to Bolus Advection	W			hfxba	ocean_heat_x_transport_due_to_bolus_advection
3	Ocean Heat X Transport due to Diffusion	W			hfxdiff	ocean_heat_x_transport_due_to_diffusion
3	Ocean Heat Y Transport due to Bolus Advection	W			hfyba	ocean_heat_y_transport_due_to_bolus_advection
3	Ocean Heat Y Transport due to Diffussion	W			hfydiff	ocean_heat_y_transport_due_to_diffusion
2	Northward Ocean Heat Transport due to Gyre	W			htovgyre	northward_ocean_heat_transport_due_to_gyre
2	Northward Ocean Heat Transport due to Overturning	W			htovovrt	northward_ocean_heat_transport_due_to_overturnin g
2	Northward Ocean Salt Transport due to Gyre	$kg\ s^{-1}$			sltovgyre	northward_ocean_salt_transport_due_to_gyre
2	Northward Ocean Salt Transport due to Overturning	$kg\ s^{-1}$			sltovovrt	northward_ocean_salt_transport_due_to_overturning

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	m s-1	time: mean						real	longitude latitude olevel time	uo	ocean	
	m s-1	time: mean						real	longitude latitude olevel time	vo	ocean	
	kg s-1	time: mean						real	longitude latitude olevel time	wmo	ocean	
	kg2 s-2	time: mean						real	longitude latitude olevel time	wmosq	ocean	
	kg s-1	time: mean						real	longitude latitude olevel time	umo	ocean	
	kg s-1	time: mean						real	longitude latitude olevel time	vmo	ocean	
	kg s-1	time: mean longitude: mean						real	latitude olevel basin time	msftmyz	ocean	
	kg s-1	time: mean longitude: mean						real	latitude rho basin time	msftmrhoz	ocean	
	kg s-1	time: mean longitude: mean						real	latitude olevel basin time	msftyyz	ocean	
	kg s-1	time: mean longitude: mean						real	latitude rho basin time	msftyrhoz	ocean	
	kg s-1	time: mean longitude: mean						real	latitude olevel basin time	msftmyzba	ocean	
	kg s-1	time: mean longitude: mean						real	latitude rho basin time	msftmrhozba	ocean	
	kg s-1	time: mean longitude: mean						real	latitude olevel basin time	msftyyzba	ocean	
	kg s-1	time: mean longitude: mean						real	latitude rho basin time	msftyrhozba	ocean	
	W	time: mean						real	longitude latitude time	hfnorth	ocean	
	W	time: mean						real	longitude latitude time	hfyba	ocean	
	W	time: mean						real	longitude latitude time	hfydiff	ocean	
	W	time: mean						real	longitude latitude time	0	ocean	
	W	time: mean						real	longitude latitude time	hfy	ocean	
	W	time: mean						real	longitude latitude time	hfxba	ocean	
	W	time: mean						real	longitude latitude time	hfxdiff	ocean	
	W	time: mean						real	longitude latitude time	hfyba	ocean	
	W	time: mean						real	longitude latitude time	hfydiff	ocean	
	W	time: mean longitude: mean						real	latitude basin time	htovgyre	ocean	
	W	time: mean longitude: mean						real	latitude basin time	htovovrt	ocean	
	kg s-1	time: mean longitude: mean						real	latitude basin time	sltovgyre	ocean	
	kg s-1	time: mean longitude: mean						real	latitude basin time	sltovovrt	ocean	

In CMOR Table Omon: *WGOMD Table 2.4*

sea water transport through (or associated with) the following straits, openings, channels, passages, etc.: barents_opening, bering_strait, canadian_archipelago, denmark_strait, drake_passage, english_channel, pacific_equatorial_undercurrent, faroe_scotland_channel, florida_bahamas_strait, fram_strait, iceland_faroe_channel, indonesian_thoughflow, mozambique_channel, taiwan_luzon_straits, and windward_passage. For definitions see WGOMD document referenced above. All transports will be stored in a single variable with a dimension that covers the set of regions listed here.

priority	long name	units	comment	questions	output variable name	standard name
2	Sea Water Transport	kg s^{-1}			mfo	

In CMOR Table Omon: *WGOMD Table 2.5*

priority	long name	units	comment	questions	output variable name	standard name
2	Rainfall Flux where Ice Free Ocean over Sea	kg m^{-2} s^{-1}	compute as the total mass of liquid water falling as liquid rain into the ice-free portion of the ocean divided by the area of the ocean portion of the grid cell.		pr	rainfall_flux
2	Snowfall Flux where Ice Free Ocean over Sea	kg m^{-2} s^{-1}	compute as the total mass of ice directly falling as snow into the ice-free portion of the ocean divided by the area of the ocean portion of the grid cell.		prsn	snowfall_flux
2	Water Evaporation Flux Where Ice Free Ocean over Sea	kg m^{-2} s^{-1}	compute as the total mass of water vapor evaporating from the ice-free portion of the ocean divided by the area of the ocean portion of the grid cell.		evs	water_evaporation_flux
2	Water Flux into Sea Water From Rivers	kg m^{-2} s^{-1}	compute as the river flux of water into the ocean divided by the area of the ocean portion of the grid cell.		friver	water_flux_into_sea_water_from_rivers
2	Water Flux into Sea Water From Icebergs	kg m^{-2} s^{-1}	compute as the iceberg melt water flux into the ocean divided by the area of the ocean portion of the grid cell.		ficeberg	water_flux_into_sea_water_from_icebergs
1	Water Flux into Sea Water due to Sea Ice Thermodynamics	kg m^{-2} s^{-1}	compute as the sea ice thermodynamic water flux into the ocean divided by the area of the ocean portion of the grid cell.	The priority set by the WGOMD was 2 for this field. The sea-ice folks requested that the priority be raised to 1.	fsitherm	water_flux_into_sea_water_due_to_sea_ice_thermo dynamics
2	Water Flux into Sea Water	kg m^{-2} s^{-1}	compute as the water flux into the ocean divided by the area of the ocean portion of the grid cell. This is the sum of the next two variables in this table.		wfo	water_flux_into_sea_water
2	Water Flux into Sea Water Without Flux Correction	kg m^{-2} s^{-1}	compute as the water flux (without flux correction) into the ocean divided by the area of the ocean portion of the grid cell. This is the sum of the first 6 variables in this table?		wfonocorr	water_flux_into_sea_water_without_flux_correction
2	Water Flux Correction	kg m^{-2} s^{-1}	If this does not vary from one year to the next, report only a single year. Positive flux implies correction adds water to ocean.		wfcorr	water_flux_correction

In CMOR Table Omon: *WGOMD Table 2.6*

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
sea_water_transport_across_line	kg s-1	time: mean						real	xline time	mfo	ocean	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm
	kg m-2 s-1	time: mean area: mean where ice_free_sea over sea						real	longitude latitude time	pr	ocean
	kg m-2 s-1	time: mean area: mean where ice_free_sea over sea						real	longitude latitude time	prsn	ocean
	kg m-2 s-1	time: mean area: mean where ice_free_sea over sea						real	longitude latitude time	evs	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	friver	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude olevel time	ficeberg	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	fsitherm	ocean seaIce
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	wfo	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	wfonocorr	ocean
	kg m-2 s-1	time: mean area: mean where sea					down	real	longitude latitude time	wfcorr	ocean

priority	long name	units	comment	questions	output variable name	standard name
2	Virtual Salt Flux into Sea Water due to Rainfall	kg m^{-2} s^{-1}			vsfpr	virtual_salt_flux_into_sea_water_due_to_rainfall
2	Virtual Salt Flux into Sea Water due to Evaporation	kg m^{-2} s^{-1}			vsfevap	virtual_salt_flux_into_sea_water_due_to_evaporation
2	Virtual Salt Flux into Sea Water From Rivers	kg m^{-2} s^{-1}			vsfriver	virtual_salt_flux_into_sea_water_from_rivers
1	Virtual Salt Flux into Sea Water due to Sea Ice Thermodynamics	kg m^{-2} s^{-1}	This variable measures the virtual salt flux into sea water due to the melting of sea ice. It is set to zero in models which receive a real water flux.	The priority set by the WGOMD was 2 for this field. The sea-ice folks requested that the priority be raised to 1.	vsfsit	virtual_salt_flux_into_sea_water_due_to_sea_ice_thermodynamics
2	Virtual Salt Flux into Sea Water	kg m^{-2} s^{-1}	If this does not vary from one year to the next, report only a single year. Positive flux implies correction increases salinity of water. This includes all virtual salt flux, including that due to a salt flux correction.		vsf	virtual_salt_flux_into_sea_water
2	Virtual Salt Flux Correction	kg m^{-2} s^{-1}			wfcorr	virtual_salt_flux_correction
1	Downward Sea Ice Basal Salt Flux	kg m^{-2} s^{-1}	This field is physical, and it arises since sea ice has a nonzero salt content, so it exchanges salt with the liquid ocean upon melting and freezing.	The priority set by the WGOMD was 2 for this field. The sea-ice folks requested that the priority be raised to 1.	sfdsi	downward_sea_ice_basal_salt_flux
2	Salt Flux into Sea Water from Rivers	kg m^{-2} s^{-1}			sfriver	salt_flux_into_sea_water_from_rivers

In CMOR Table Omon: *WGOMD Table 2.7*

priority	long name	units	comment	questions	output variable name	standard name
2	Upward Geothermal Heat Flux at Sea Floor	W m^{-2}			hfgeou	upward_geothermal_heat_flux_at_sea_floor
2	Temperature Flux due to Rainfall Expressed as Heat Flux into Sea Water	W m^{-2}	This is defined as "where ice_free_sea over sea"; i.e., compute the total flux (considered here) entering the ice-free portion of the grid cell divided by the area of the ocean portion of the grid cell.		hfrainds	temperature_flux_due_to_rainfall_expressed_as_heat_flux_into_sea_water
2	Temperature Flux due to Evaporation Expressed as Heat Flux Out of Sea Water	W m^{-2}	This is defined as "where ice_free_sea over sea"		hfevapds	temperature_flux_due_to_evaporation_expressed_as_heat_flux_out_of_sea_water
2	Temperature Flux due to Runoff Expressed as Heat Flux into Sea Water	W m^{-2}	In general this should be reported as a function of depth, (i.e., it will be a function of the generic "XYZ" dimensions). Include enough depth levels to represent the non-zero values of this field everywhere on the globe.		hfrunoffds	temperature_flux_due_to_runoff_expressed_as_heat_flux_into_sea_water
2	Heat Flux into Sea Water due to Snow Thermodynamics	W m^{-2}	In general this should be reported as a function of depth, (i.e., it will be a function of the generic "XYZ" dimensions). Include enough depth levels to represent the non-zero values of this field everywhere on the globe.		hfsnthermds	heat_flux_into_sea_water_due_to_snow_thermodynamics
1	Heat Flux into Sea Water due to Sea Ice Thermodynamics	W m^{-2}	In general this should be reported as a function of depth, (i.e., it will be a function of the generic "XYZ" dimensions). Include enough depth levels to represent the non-zero values of this field everywhere on the globe.	The priority set by the WGOMD was 2 for this field. The sea-ice folks requested that the priority be raised to 1.	hfsithermds	heat_flux_into_sea_water_due_to_sea_ice_thermodynamics

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	vsfpr	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	vsfevap	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	vsfriver	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	vsfsit	ocean seaIce
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	vsf	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	wfcorr	ocean
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	sfdsi	ocean seaIce
	kg m-2 s-1	time: mean area: mean where sea						real	longitude latitude time	sfriver	ocean

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	W m-2	time: mean area: whre sea					up	real	longitude latitude time	hfgeou	ocean	
	W m-2	time: mean area: mean where ice_free_sea over sea					down	real	longitude latitude time	hfrainds	ocean	
	W m-2	time: mean area: mean where ice_free_sea over sea					up	real	longitude latitude time	hfevapds	ocean	
	W m-2	time: mean area: mean where sea						real	longitude latitude olevel time	hfrunoffds	ocean	
	W m-2	time: mean area: mean where sea						real	longitude latitude olevel time	hfsnthermds	ocean	
	W m-2	time: mean area: mean where sea						real	longitude latitude olevel time	hfsithermds	ocean seaIce	

2	Heat Flux into Sea Water due to Iceberg Thermodynamics	W m^{-2}	In general this should be reported as a function of depth, (i.e., it will be a function of the generic "XYZ" dimensions). Include enough depth levels to represent the non-zero values of this field everywhere on the globe.		hfibthermds	heat_flux_into_sea_water_due_to_iceberg_thermodynamics
2	Surface Net Downward Longwave Radiation	W m^{-2}	This is defined as "where ice_free_sea over sea"		rlds	surface_net_downward_longwave_flux
2	Surface Downward Latent Heat Flux	W m^{-2}	This is defined as "where ice_free_sea over sea"		hfls	surface_downward_latent_heat_flux
2	Surface Downward Sensible Heat Flux	W m^{-2}	This is defined as "where ice_free_sea over sea"		hfss	surface_downward_sensible_heat_flux
2	Net Downward Shortwave Radiation at Sea Water Surface	W m^{-2}	This is the flux into the surface of liquid sea water only. This excludes shortwave flux absorbed by sea ice, but includes any light that passes through the ice and is absorbed by the ocean.		rsntds	
2	Downwelling Shortwave Radiation in Sea Water	W m^{-2}	In general the shortwave flux should be reported as a function of ocean depth, (i.e., it will be a function of the generic "XYZ" dimensions). Include enough depth levels to represent the non-zero values of this field everywhere on the globe.		rsds	downwelling_shortwave_flux_in_sea_water
2	Heat Flux Correction	W m^{-2}	If this does not vary from one year to the next, report only a single year. Positive indicates correction adds heat to ocean.		hfcorr	heat_flux_correction
1	Downward Heat Flux at Sea Water Surface	W m^{-2}	This is the net flux of heat entering the liquid water column through its upper surface (excluding any "flux adjustment") .		hfds	

In CMOR Table Omon: *WGOMD Table 2.8*

priority	long name	units	comment	questions	output variable name	standard name
2	Surface Downward X Stress	N m^{-2}	This is the stress on the liquid ocean from overlying atmosphere, sea ice, ice shelf, etc.		tauuo	surface_downward_x_stress
2	Surface Downward Y Stress	N m^{-2}	This is the stress on the liquid ocean from overlying atmosphere, sea ice, ice shelf, etc.		tauvo	surface_downward_y_stress
2	Surface Downward X Stress Correction	N m^{-2}	This is the stress on the liquid ocean from overlying atmosphere, sea ice, ice shelf, etc. If this does not vary from one year to the next, report only a single year.		tauucorr	surface_downward_x_stress_correction
2	Surface Downward Y Stress Correction	N m^{-2}	This is the stress on the liquid ocean from overlying atmosphere, sea ice, ice shelf, etc. If this does not vary from one year to the next, report only a single year.		tauvcorr	surface_downward_y_stress_correction

	W m-2	time: mean area: mean where sea						real	longitude latitude olevel time	hfibthermds	ocean	
	W m-2	time: mean area: mean where ice_free_sea over sea					down	real	longitude latitude time	rlds	ocean	
	W m-2	time: mean area: mean where ice_free_sea over sea					down	real	longitude latitude time	hfls	ocean	
	W m-2	time: mean area: mean where ice_free_sea over sea					down	real	longitude latitude time	hfss	ocean	
net_downward_shortwave_flux_at_sea_water_surface	W m-2	time: mean area: mean where sea					down	real	longitude latitude time	rsntds	ocean	
	W m-2	time: mean area: mean where sea					down	real	longitude latitude olevel time	rsds	ocean	
	W m-2	time: mean area: mean where sea					down	real	longitude latitude time	hfcorr	ocean	
downward_heat_flux_at_sea_water_surface	W m-2	time: mean area: mean where sea					down	real	longitude latitude time	hfds	ocean	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	N m-2	time: mean area: mean where sea					down	real	longitude latitude time	tauuo	ocean	
	N m-2	time: mean area: mean where sea					down	real	longitude latitude time	tauvo	ocean	
	N m-2	time: mean area: mean where sea					down	real	longitude latitude time	tauucorr	ocean	
	N m-2	time: mean area: mean where sea					down	real	longitude latitude time	tauvcorr	ocean	

CMOR Table Lmon: Monthly Mean Land Fields, Including Lmon mon

Physical, Vegetation, Soil, and Biogeochemical Variables

(All fields should be saved on the atmospheric grid; unless otherwise indicated, values are averaged over only the land portion of each grid cell and report 0.0 where land fraction is 0.)

priority	long name	units	comment	questions	output variable name	standard name
1	Moisture in Upper 0.1 m of Soil Column	kg m^{-2}	Compute the mass of water in all phases in the upper 0.1 meters of soil.		mrsos	moisture_content_of_soil_layer
1	Total Soil Moisture Content	kg m^{-2}	Compute the mass per unit area (summed over all soil layers) of water in all phases.		mrso	soil_moisture_content
1	Soil Frozen Water Content	kg m^{-2}	Compute the mass (summed over all all layers) of frozen water.		mrlso	soil_frozen_water_content
1	Surface Runoff	kg m^{-2} s^{-1}	Compute the total surface runoff leaving the land portion of the grid cell.		mrros	surface_runoff_flux
1	Total Runoff	kg m^{-2} s^{-1}	compute the total runoff (including "drainage" through the base of the soil model) leaving the land portion of the grid cell.		mrro	runoff_flux
2	Precipitation onto Canopy	kg m^{-2} s^{-1}	Report the precipitation flux that is intercepted by the vegetation canopy (if present in model) before reaching the ground.		prveg	precipitation_flux_onto_canopy
1	Evaporation from Canopy	kg m^{-2} s^{-1}	Report the canopy evaporation+sublimation (if present in model).		evspsblveg	water_evaporation_flux_from_canopy
1	Water Evaporation from Soil	kg m^{-2} s^{-1}	includes sublimation.		evspsblsoi	water_evaporation_flux_from_soil
1	Transpiration	kg m^{-2} s^{-1}			tran	transpiration_flux
1	Water Content of Soil Layer	kg m^{-2}	in each soil layer, the mass of water in all phases, including ice.		mrlsl	moisture_content_of_soil_layer
2	Temperature of Soil	K	Temperature of each soil layer. Report as "missing" for grid cells occupied entirely by "sea".		tsl	
1	Tree Cover Fraction	%	fraction of entire grid cell that is covered by trees.		treeFrac	
1	Natural Grass Fraction	%	fraction of entire grid cell that is covered by natural grass.		grassFrac	
1	Shrub Fraction	%	fraction of entire grid cell that is covered by shrub.		shrubFrac	
1	Crop Fraction	%	fraction of entire grid cell that is covered by crop.		cropFrac	
1	Anthropogenic Pasture Fraction	%	fraction of entire grid cell that is covered by anthropogenic pasture.		pastureFrac	
1	Bare Soil Fraction	%	fraction of entire grid cell that is covered by bare soil.		baresoilFrac	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	kg m-2	time: mean area: mean where land						real	longitude latitude time sdepth1	mrsos	land	
	kg m-2	time: mean area: mean where land						real	longitude latitude time	mrso	land	
	kg m-2	time: mean area: mean where land						real	longitude latitude time	mrlso	land	
	kg m-2 s-1	time: mean area: mean where land						real	longitude latitude time	mrros	land	
	kg m-2 s-1	time: mean area: mean where land						real	longitude latitude time	mrro	land	
	kg m-2 s-1	time: mean area: mean where land						real	longitude latitude time	prveg	land	
	kg m-2 s-1	time: mean area: mean where land					up	real	longitude latitude time	evspsblveg	land	
	kg m-2 s-1	time: mean area: mean where land					up	real	longitude latitude time	evspsblsoi	land	
	kg m-2 s-1	time: mean area: mean where land					up	real	longitude latitude time	tran	land	
water_content_of_soil_layer	kg m-2	time: mean area: mean where land						real	longitude latitude sdepth time	mrlsl	land	
temperature_of_soil_layer NOT PROPOSED	K	time: mean						real	longitude latitude sdepth time	tsl	land	
tree_cover_fraction Two options for all these names: 1) Use existing standard name area_fraction + a scalar coordinate variable with existing standard name area_type. The area type names (with definitions) would then need to be proposed for inclusion in the new area_type table. 2) Propose the individual X_fraction names (by analogy with cloud_area_fraction, etc.) N.B. Neither option has been proposed so far. I recommend the first option because the area_types would then also be available for use in cell_methods.	%	time: mean						real	longitude latitude time	treeFrac	land	
natural_grass_fraction	%	time: mean						real	longitude latitude time	grassFrac	land	
shrub_fraction	%	time: mean						real	longitude latitude time	shrubFrac	land	
crop_fraction	%	time: mean						real	longitude latitude time	cropFrac	land	
anthropogenic_pasture_fraction	%	time: mean						real	longitude latitude time	pastureFrac	land	
bare_soil_fraction	%	time: mean						real	longitude latitude time	baresoilFrac	land	

1	Fraction of Grid Cell that is Land but Neither Vegetation-Covered nor Bare Soil	%	fraction of entire grid cell that is land and is covered by "non-vegetation" and "non-bare-soil" (e.g., urban, ice, lakes, etc.)	residualFrac	
1	Burnt Area Fraction	%	fraction of entire grid cell that is covered by burnt vegetation.	burntArea	
	Land Carbon & Biogeochemistry				
1	Carbon in Vegetation	kg C m^{-2}		cVeg	vegetation_carbon_content
1	Carbon in Litter Pool	kg C m^{-2}		cLitter	litter_carbon_content
1	Carbon in Soil Pool	kg C m^{-2}		cSoil	soil_carbon_content
1	Carbon in Products of Land Use Change	kg C m^{-2}		cProduct	
1	Leaf Area Index	1	projected leaf area per unit of ground area (i.e., only the land portion of the grid cell), expressed as a proper fraction (not a percentage)	lai	leaf_area_index
1	Gross Primary Production	kg C m^{-2} s^{-1}		gpp	
1	Autotrophic (Plant) Respiration	kg C m^{-2} s^{-1}		ra	
1	Net Primary Production	kg C m^{-2} s^{-1}	needed for models that do not compute GPP (if any)	npp	
1	Heterotrophic Respiration	kg C m^{-2} s^{-1}		rh	
1	CO2 Emission from Fire	kg C m^{-2} s^{-1}	CO2 emissions from natural fires + human ignition fires as calculated by the fire module of the DGVM, but excluding any CO2 flux from fire included in fLuc, defined below (CO2 Flux to Atmosphere from Land Use Change).	fFire	
1	CO2 Flux to Atmosphere from Grazing	kg C m^{-2} s^{-1}		fGrazing	
1	CO2 Flux to Atmosphere from Crop Harvesting	kg C m^{-2} s^{-1}		fHarvest	
1	CO2 Flux to Atmosphere from Land Use Change	kg C m^{-2} s^{-1}	human changes to land accounting possibly for different time-scales related to fate of the wood, for example.	fLuc	
1	Net Biospheric Production	kg C m^{-2} s^{-1}	This is the net flux between land and atmosphere defined as photosynthesis MINUS the sum of plant and soil respiration, carbonfluxes from fire, harvest, grazing and land use change. Positive flux is into the land.	nbp	
1	Total Carbon Flux from Vegetation to Litter	kg C m^{-2} s^{-1}		fVegLitter	

fraction_of_grid_cell_which_is_non_vegetation_and_non_bare_soil	%	time: mean		real	longitude latitude time	residualFrac	land
burnt_area_fraction	%	time: mean		real	longitude latitude time	burntArea	land
							land
	kg C m-2	time: mean area: mean where land		real	longitude latitude time	cVeg	land
	kg C m-2	time: mean area: mean where land		real	longitude latitude time	cLitter	land
	kg C m-2	time: mean area: mean where land		real	longitude latitude time	cSoil	land
PF: carbon_in_products_of_luc NOT PROPOSED	kg C m-2	time: mean area: mean where land		real	longitude latitude time	cProduct	land
	1	time: mean area: mean where land		real	longitude latitude time	lai	land
gross_primary_productivity_of_carbon ? gross_primary_production	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	gpp	land
plant_respiration_carbon_flux? autotrophic_plant_respiration	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	ra	land
net_primary_productivity_of_carbon? net_primary_production	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	npp	land
heterotrophic_respiration_carbon_flux? heterotrophic_respiration	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	rh	land
PF: co2_emission_from_fire NOT PROPOSED – recommend tendency_of_atmosphere_mass_content_of_carbon_dioxide_due_to_biomass_burning for consistency with chemistry names	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	fFire	land
PF: co2_flux_to_atmosphere_from_grazing NOT PROPOSED – recommend tendency_of_atmosphere_mass_content_of_carbon_dioxide_due_to_grazing for consistency with chemistry names	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	fGrazing	land
PF: co2_flux_to_atmosphere_from_crop_harvesting NOT PROPOSED – recommend tendency_of_atmosphere_mass_content_of_carbon_dioxide_due_to_crop_harvesting for consistency with chemistry names	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	fHarvest	land
PF: co2_flux_to_atmosphere_from_land_use_change NOT PROPOSED – recommend tendency_of_atmosphere_mass_content_of_carbon_dioxide_due_to_land_use_change for consistency with chemistry names	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	fLuc	land
PF: net_biospheric_productivity Is this the same as net_primary_productivity_of_carbon (also in cell G53)?	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	nbp	land
PF: carbon_flux_from_vegetation_into_litter total_carbon_flux_from_vegetation_to_litter	kg C m-2 s-1	time: mean area: mean where land		real	longitude latitude time	fVegLitter	land

1	Total Carbon Flux from Litter to Soil	kg C m^{-2} s^{-1}			fLitterSoil	
1	Total Carbon Flux from Vegetation Directly to Soil	kg C m^{-2} s^{-1}	In some models part of carbon (e.g., root exudate) can go directly into the soil pool without entering litter.		fVegSoil	
2	Carbon in Leaves	kg C m^{-2}		This field and some of the following may sum to yield some of the more generic carbon pool totals given above.	cLeaf	
2	Carbon in Wood	kg C m^{-2}	including sapwood and hardwood.		cWood	
2	Carbon in Roots	kg C m^{-2}	including fine and coarse roots.		cRoot	
2	Carbon in Other Living Compartments	kg C m^{-2}	e.g., labile, fruits, reserves, ….		cMisc	
2	Carbon in Coarse Woody Debris	kg C m^{-2}			cCwd	
2	Carbon in Above-Ground Litter	kg C m^{-2}			cLitterAbove	
2	Carbon in Below-Ground Litter	kg C m^{-2}			cLitterBelow	

PF: carbon_flux_from_litter_into_soil total_carbon_flux_from_litter_to_soil NOT PROPOSED – recommend carbon_flux_from_litter_into_soil for consistency with water and salt flux names	kg C m-2 s-1	time: mean area: mean where land	real	longitude latitude time	fLitterSoil	land
PF: carbon_flux_into_soil_from_plants_excluding_litter total_carbon_flux_from_vegetation_directly_to_soil NOT PROPOSED – recommend carbon_flux_into_soil_from_plants_excluding_litter for consistency with water and salt flux names and runoff names	kg C m-2 s-1	time: mean area: mean where land	real	longitude latitude time	fVegSoil	land
carbon_in_leaves NOT PROPOSED – recommend leaf_carbon_content for consistency with soil_carbon_content, etc. PF agrees.	kg C m-2	time: mean area: mean where land	real	longitude latitude time	cLeaf	land
carbon_in_wood NOT PROPOSED – recommend wood_carbon_content for consistency with soil_carbon_content, etc. PF agrees	kg C m-2	time: mean area: mean where land	real	longitude latitude time	cWood	land
carbon_in_roots NOT PROPOSED – recommend root_carbon_content for consistency with soil_carbon_content, etc. PF agrees.	kg C m-2	time: mean area: mean where land	real	longitude latitude time	cRoot	land
carbon_in_other_living_compartments NOT PROPOSED – this should also be a carbon_content name, and we probably need something more specific than 'other_living_compartments' but I'm stuck for a suggestion here. PF agrees.	kg C m-2	time: mean area: mean where land	real	longitude latitude time	cMisc	land
carbon_in_coarse_woody_debris – NOT PROPOSED – recommend coarse_wood_debris_carbon_content or just wood_debris_carbon_content for consistency with soil_carbon_content, etc. PF agrees.	kg C m-2	time: mean area: mean where land	real	longitude latitude time	cCwd	land
PF: aboveground_litter_carbon_content carbon_in_aboveground_litter NOT PROPOSED – recommend surface_litter_carbon_content for consistency with soil_carbon_content, etc. and runoff names	kg C m-2	time: mean area: mean where land	real	longitude latitude time	cLitterAbove	land
PF: belowground_litter_carbon_content carbon_in_aboveground_litter N.B. Should this be belowground litter? NOT PROPOSED – recommend subsurface_litter_carbon_content for consistency with soil_carbon_content, etc. and runoff names	kg C m-2	time: mean area: mean where land	real	longitude latitude time	cLitterBelow	land

2	Carbon in Fast Soil Pool	kg C m^{-2}	fast is meant as lifetime of less than 10 years for reference climate conditions (20°C, no water limitations).	cSoilFast	
2	Carbon in Medium Soil Pool	kg C m^{-2}	medium is meant as lifetime of more than than 10 years and less than 100 years for reference climate conditions (20°C, no water limitations)	cSoilMedium	
2	Carbon in Slow Soil Pool	kg C m^{-2}	fast is meant as lifetime of more than 100 years for reference climate conditions (20°C, no water limitations)	cSoilSlow	
2	Fractional Land Cover of PFT	%	using each individual ESM PFT definition. This includes natural PFTs, anthropogenic PFTs, bare soil, lakes, urban areas, etc. Sum of all should equal the fraction of the grid-cell that is land. Note that the "types" will be model dependent and for each type there should be a full description of the PFT (plant functional type). To facilitate model comparison, it is also requested that the aggregated land cover types called for in lines 25 to 32 be archived	landCoverFrac	
2	Total Primary Deciduous Tree Cover Fraction	%	Agregation of model PFTs as defined in 1st priority to aid model intercomparison. This is the fraction of the entire grid cell that is covered by "total primary deciduous trees."	treeFracPrimDec	
2	Total Primary Evergreen Tree Cover Fraction	%	fraction of entire grid cell that is covered by primary evergreen trees.	treeFracPrimEver	
2	Total Secondary Deciduous Tree Cover Fraction	%	fraction of entire grid cell that is covered by secondary deciduous trees.	treeFracSecDec	
2	Total Secondary Evergreen Tree Cover Fraction	%	fraction of entire grid cell that is covered by secondary evergreen trees.	treeFracSecEver	
2	Total C3 PFT Cover Fraction	%	fraction of entire grid cell that is covered by C3 PFTs (including grass, crops, and trees).	c3PftFrac	
2	Total C4 PFT Cover Fraction	%	fraction of entire grid cell that is covered by C4 PFTs (including grass and crops).	c4PftFrac	
2	Growth Autotrophic Respiration	kg C m^{-2} s^{-1}	This flux and the one in the following row provide a breakdown of the higher priority "Autotrophic (Plant) Respiration" in an earlier row of this table; thus the sum should be identical to that.	rGrowth	
2	Maintenance Autotrophic Respiration	kg C m^{-2} s^{-1}	This flux and the one in the previous row provide a breakdown of the higher priority "Autotrophic (Plant) Respiration" in an earlier row of this table; thus the sum should be identical to that.	rMaint	

carbon_in_fast_soil_pool NOT PROPOSED – recommend fast_soil_pool_carbon_content for consistency with soil_carbon_content, etc. PF agrees.	kg C m-2	time: mean area: mean where land		real	longitude latitude time	cSoilFast	land
medium_soil_pool NOT PROPOSED – recommend medium_soil_pool_carbon_content for consistency with soil_carbon_content, etc. PF agrees.	kg C m-2	time: mean area: mean where land		real	longitude latitude time	cSoilMedium	land
carbon_in_slow_soil_pool NOT PROPOSED – recommend slow_soil_pool_carbon_content for consistency with soil_carbon_content, etc. PF agrees.	kg C m-2	time: mean area: mean where land		real	longitude latitude time	cSoilSlow	land
fractional_land_cover_types NOT PROPOSED – is this actually a separate standard name or just a list of types as in the new area type table?	%	time: mean		real	longitude latitude vegtype time	landCoverFrac	land
total_primary_deciduous_tree_cover_fraction Two options for all these names: 1) Use existing standard name area_fraction + a scalar coordinate variable with existing standard name area_type. The area type names (with definitions) would then need to be proposed for inclusion in the new area_type table. 2) Propose the individual X_fraction names (by analogy with cloud_area_fraction, etc.) N.B. Neither option has been proposed so far. I recommend the first option because the area_types would then also be available for use in cell_methods.	%	time: mean		real	longitude latitude time	treeFracPrimDec	land
total_primary_evergreen_tree_cover_fraction	%	time: mean		real	longitude latitude time	reeFracPrimEve	land
total_secondary_deciduous_tree_cover_fraction	%	time: mean		real	longitude latitude time	treeFracSecDec	land
total_secondary_evergreen_tree_cover_fraction	%	time: mean		real	longitude latitude time	treeFracSecEver	land
total_c3_pft_cover_fraction	%	time: mean		real	longitude latitude time	c3PftFrac	land
total_c4_pft_cover_fraction	%	time: mean		real	longitude latitude time	c4PftFrac	land
PF: for consistency with row 40: growth_autothrophic_respiration NOT PROPOSED – recommend plant_respiration_carbon_flux_due_to_growth for consistency with row 52	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	rGrowth	land
PF: for consistency with row 40: maintenance_autothrophic_respiration NOT PROPOSED – recommend plant_respiration_carbon_flux_due_to_maintenance for consistency with row 52 (what is 'maintenance'?)	kg C m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	rMaint	land

2	CO2 Flux from Atmosphere due to NPP Allocation to Leaf	kg C m^{-2} s^{-1}	This is the rate of carbon uptake by leaves due to NPP	nppLeaf	
2	CO2 Flux from Atmosphere due to NPP Allocation to Wood	kg C m^{-2} s^{-1}	This is the rate of carbon uptake by wood due to NPP	nppWood	
2	CO2 Flux from Atmosphere due to NPP Allocation to Root	kg C m^{-2} s^{-1}	This is the rate of carbon uptake by roots due to NPP	nppRoot	

PF: net_primary_production_allocated_into_leaves npp_allocation_to_leaf NOT PROPOSED – what is npp? Don't understand this quantity.	kg C m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	nppLeaf	land
PF: net_primary_production_allocated_into_wood npp_allocation_to_wood NOT PROPOSED – what is npp? Don't understand this quantity.	kg C m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	nppWood	land
PF: net_primary_production_allocated_into_roots npp_allocation_to_root NOT PROPOSED – what is npp? Don't understand this quantity.	kg C m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	nppRoot	land

CMOR Table LImon: Monthly Mean Land Cryosphere Fields LImon mon

(All fields should be saved on the atmospheric grid; unless otherwise indicated, values are averaged over only the land portion of each grid cell and report 0.0 where land fraction is 0.)

priority	long name	units	comment	questions	output variable name	standard name
1	Snow Area Fraction	%	Fraction of each grid cell that is occupied by snow that rests on land portion of cell.		snc	surface_snow_area_fraction
1	Surface Snow Amount	kg m^{-2}	Compute as the mass of surface snow on the land portion of the grid cell divided by the land area in the grid cell; report as 0.0 where the land fraction is 0; exclude snow on vegetation canopy or on sea ice.		snw	surface_snow_amount
1	Snow Depth	m	where land over land. Compute the mean thickness of snow in the land portion of the grid cell (averaging over the entire land portion, including the snow-free fraction. Report as 0.0 where the land fraction is 0.		snd	surface_snow_thickness
2	Liquid Water Content of Snow Layer	kg m^{-2}	where land over land: compute the total mass of liquid water contained interstitially within the snow layer of the land portion of a grid cell divided by the area of the land portion of the cell.		lwsnl	liquid_water_content_of_snow_layer
1	Soil Frozen Water Content	kg m^{-2}	summed over all soil layers, where land over land: compute by dividing the total mass of frozen water contained in the soil layer of the grid cell by the land area in the grid cell; report as 0.0 where the land fraction is 0.		mrfso	soil_frozen_water_content
2	Soil Moisture Content	kg m^{-2}	summed over all soil layers, where land over land: compute by dividing the total mass of water (both liquid and ice) contained in the soil layer of the grid cell by the land area in the grid cell; report as 0.0 where the land fraction is 0.		mfrso	soil_moisture_content
2	Snow Soot Content	kg m^{-2}	Consider the entire land portion of the grid cell, with snow soot content set to 0.0 in regions free of snow.		sootsn	
1	Snow Age	day	When computing the time-mean here, the time samples, weighted by the mass of snow on the land portion of the grid cell, are accumulated and then divided by the sum of the weights. Report as "missing in regions free of snow on land.		agesno	
1	Snow Internal Temperature	K	This temperature is averaged over all the snow in the grid cell that rests on land or land ice. When computing the time-mean here, the time samples, the weighted by the mass of snow on the land portion of the grid cell, are accumulated and then divided by the sum of the weights. Report as "missing in regions free of snow on land.		tsn	
1	Surface Snow Melt	kg m^{-2} s^{-1}	Compute as the total surface melt water on the land portion of the grid cell divided by the land area in the grid cell; report as 0.0 for snow-free land regions; report as 0.0 where the land fraction is 0.		snm	surface_snow_melt_flux
1	Surface Snow and Ice Sublimation Flux	kg m^{-2} s^{-1}	The snow and ice sublimation flux is the loss of snow and ice mass resulting from their conversion to water vapor. Compute as the total sublimation on the land portion of the grid cell divided by the land area in the grid cell; report as 0.0 for snow-free land regions; report as 0.0 where the land fraction is 0.		sbl	
1	Downward Heat Flux into Snow Where Land over Land	W m^{-2}	Compute the net downward heat flux from the atmosphere into the snow that lies on land divided by the land area in the grid cell; report as 0.0 for snow-free land regions or where the land fraction is 0.		hfdsn	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	%	time: mean						real	longitude latitude time	snc	landIce land	
	kg m-2	time: mean area: mean where land						real	longitude latitude time	snw	landIce land	
	m	time: mean area: mean where land						real	longitude latitude time	snd	landIce land	
	kg m-2	time: mean area: mean where land						real	longitude latitude time	lwsnl	landIce land	
	kg m-2	time: mean						real	longitude latitude time	mrfso	landIce land	
	kg m-2	time: mean						real	longitude latitude time	mfrso	landIce land	
snow_soot_content	kg m-2	time: mean area: mean where land						real	longitude latitude time	sootsn	landIce land	
snow_age	day	time: mean area: mean where land						real	longitude latitude time	agesno	landIce land	
snow_temperature	K	time: mean area: mean where land						real	longitude latitude time	tsn	landIce land	
	kg m-2 s-1	time: mean area: mean where land						real	longitude latitude time	snm	landIce land	
	kg m-2 s-1	time: mean area: mean where land						real	longitude latitude time	sbl	landIce land	
net_downward_heat_flux	W m-2	time: mean area: mean where land					down	real	longitude latitude time	hfdsn	landIce land	

3	Permafrost Layer Thickness	m	where land over land. Compute the mean thickness of the permafrost layer in the land portion of the grid cell. Report as 0.0 in permafrost-free regions.	tpf	
3	Liquid Water Content of Permafrost Layer	kg m^{-2}	"where land over land", i.e., this is the total mass of liquid water contained within the permafrost layer within the land portion of a grid cell divided by the area of the land portion of the cell.	pflw	

permafrost_layer_thickness	m	time: mean area: mean where land	real	longitude latitude time	tpf	landIce land
liquid_water_content_of_permafrost_layer	kg m-2	time: mean area: mean where land	real	longitude latitude time	pflw	landIce land

CMOR Table OImon: Monthly Mean Ocean Cryosphere Fields OImon mon

(All saved on the ocean grid; unless otherwise indicated, values are averaged over only the ocean portion of each grid cell and report 0.0 where ocean fraction is 0.)

priority	long name	units	comment	questions	output variable name	standard name
1	Sea Ice Area Fraction	%	fraction of grid cell covered by sea ice.		sic	sea_ice_area_fraction
1	Sea Ice Thickness	m	Compute the mean thickness of sea ice in the ocean portion of the grid cell (averaging over the entire ocean portion, including the ice-free fraction). Report as 0.0 in regions free of sea ice.		sit	sea_ice_thickness
1	Water Evaporation Flux from Sea Ice	kg m^{-2} s^{-1}	Compute the average rate that water mass evaporates (or sublimates) from the sea ice surface (i.e., kg/s) divided by the area of the ocean (i.e., open ocean + sea ice) portion of the grid cell. This quantity multiplied both by the oean area of the grid cell and by the length of the month should yield the total mass of water evaporated (or sublimated) from the sea ice. Report as 0.0 in regions free of sea ice. [This was computed differently in CMIP3		evap	water_evaporation_flux
1	Snow Depth	m	Compute the mean thickness of snow in the ocean portion of the grid cell (averaging over the entire ocean portion, including the snow-free ocean fraction). Report as 0.0 in regions free of snow-covered sea ice.		snd	surface_snow_thickness
2	Surface Snow Area Fraction	%	Fraction of entire grid cell covered by snow that lies on sea ice; exclude snow that lies on land or land ice.		snc	surface_snow_area_fraction
1	Bare Sea Ice Albedo	1	Report as "missing" if there is no sunlight or if a region is free of sea ice.	This variable may be omitted unless the answers to the following questions are obvious: Will this vary from year to year or is it a property of "bare sea ice" and sun angle? How is the time-mean calculated?	ialb	
3	Sea Ice Salinity	psu	When computing the time-mean here, the time-samples, weighted by the mass of sea ice in the grid cell, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		ssi	
1	Surface Temperature of Sea Ice	K	When computing the time-mean here, the time-samples, weighted by the area of sea ice in the grid cell, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice. Note this will be the surface snow temperature in regions where snow covers the sea ice.		tsice	
1	Temperature at Interface Between Sea Ice and Snow	K	When computing the time-mean here, the time-samples, weighted by the area of snow-covered sea ice in the grid cell, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of snow-covered sea ice.		tsnint	
1	Surface Rainfall Rate into the Sea Ice Portion of the Grid Cell	kg m^{-2} s^{-1}	where sea ice over sea: compute the the water mass per unit time falling as rain onto the sea ice portion of a grid cell divided by the area of the ocean portion of the grid cell (including both ice-free and sea-ice covered fractions). Report as 0. in regions free of sea ice.		pr	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	%	time: mean						real	longitude latitude time	sic	seaIce ocean	
	m	time: mean area: mean where sea						real	longitude latitude time	sit	seaIce ocean	
	kg m-2 s-1	time: mean area: mean where sea_ice over sea					up	real	longitude latitude time	evap	seaIce	
	m	time: mean area: mean where sea						real	longitude latitude time	snd	seaIce	
	%	time: mean						real	longitude latitude time	snc	seaIce	
bare_sea_ice_albedo	1	time: mean area: mean where sea_ice						real	longitude latitude time	ialb	seaIce	
sea_ice_salinity	psu	time: mean (weighted by mass of sea ice)						real	longitude latitude time	ssi	seaIce	
surface_temperature_of_sea_ice	K	time: mean (weighted by area of sea ice)						real	longitude latitude time	tsice	seaIce	
temperature_at_interface_between_sea_ice_and_snow	K	time: mean (weighted by area of snow-covered sea ice)						real	longitude latitude time	tsnint	seaIce	
surface_rainfall_rate_into_the_sea_ice_portion_of_the_grid_cell	kg m-2 s-1	time: mean area: mean where sea_ice over sea						real	longitude latitude time	pr	seaIce	

1	Surface Snowfall Rate into the Sea Ice Portion of the Grid Cell	kg m^{-2} s^{-1}	where sea ice over sea: compute the the water mass per unit time falling as snow onto the sea ice portion of a grid cell divided by the area of the ocean portion of the grid cell (including both ice-free and sea-ice covered fractions). Report as 0. in regions free of sea ice.		prsn	
3	Age of Sea Ice	years	When computing the time-mean here, the time samples, weighted by the mass of sea ice in the grid cell, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		ageice	
1	Frazil Sea Ice Growth (Leads) Rate	kg m^{-2} s^{-1}	Compute the rate of change of sea ice mass due to frazil sea ice formation divided by the area of the ocean portion of the grid cell. Report as 0.0 in regions free of sea ice.		grFrazil	
1	Congelation Sea Ice Growth Rate	kg m^{-2} s^{-1}	Compute the rate of change of sea ice mass due to congelation sea ice divided by the area of the ocean portion of the grid cell. Report as 0.0 in regions free of sea ice.		grCongel	
1	Lateral Sea Ice Growth Rate	kg m^{-2} s^{-1}	Compute the rate of change of sea ice mass due to lateral growth alone of the sea ice divided by the area of the ocean portion of the grid cell. Report as 0.0 in regions free of sea ice.		grLateral	
1	Snow-Ice Formation Rate	kg m^{-2} s^{-1}	Compute the rate of change of sea ice mass due to transformation of snow to sea ice, divided by the area of the ocean portion of the grid cell. Report as 0.0 in regions free of snow-covered sea ice.		snoToIce	
1	Snow Melt Rate	kg m^{-2} s^{-1}	Compute the rate of change of snow mass due to melting, divided by the area of the ocean portion of the grid cell. Report as 0.0 in regions free of sea ice. Include falling snow that melts on impact with the surface.		snomelt	
1	Rate of Melt at Upper Surface of Sea Ice	kg m^{-2} s^{-1}	Compute the rate of change of sea ice mass due to melting at its upper surface, divided by the area of the ocean portion of the grid cell. Report as 0.0 in regions free of sea ice.	Should this also include melting of snow that covers sea ice?	tmelt	
1	Rate of Melt at Sea Ice Base	kg m^{-2} s^{-1}	Compute the rate of change of sea ice mass due to melting at its lower surface, divided by the area of the ocean portion of the grid cell. Report as 0.0 in regions free of sea ice.		bmelt	
2	Sea Ice Total Heat Content	J	Ice at 0 Celsius is assumed taken to have a heat content of 0 J. When averaging over time, this quantity is weighted by the mass of sea ice. Report as "missing in regions free of snow on land.	should this include heat content of snow on sea ice?	hcice	
1	Downward Shortwave over Sea Ice	W m^{-2}	Compute the downward shortwave flux in regions of sea ice divided by the area of the ocean portion of the grid cell.	priority was raised from 2 to 1 because snow albedo was deleted.	rsdssi	surface_downwelling_shortwave_flux_in_air
1	Upward Shortwave over Sea Ice	W m^{-2}	Compute the upward shortwave flux in regions of sea ice divided by the area of the ocean portion of the grid cell.	priority was raised from 2 to 1 because snow albedo was deleted.	rsussi	surface_upwelling_shortwave_flux_in_air
2	Downward Long Wave over Sea Ice	W m^{-2}	Compute the downward longwave flux in regions of sea ice divided by the area of the ocean portion of the grid cell.		rldssi	surface_downwelling_longwave_flux_in_air
2	Upward Long Wave over Sea Ice	W m^{-2}	Compute the upward longwave flux in regions of sea ice divided by the area of the ocean portion of the grid cell.		rlussi	surface_upwelling_longwave_flux_in_air
2	Surface Upward Sensible Heat Flux over Sea Ice	W m^{-2}	Compute the upward sensible heat flux in regions of sea ice divided by the area of the ocean portion of the grid cell.		hfssi	surface_upward_sensible_heat_flux
2	Surface Upward Latent Heat Flux over Sea Ice	W m^{-2}	Compute the upward latent heat flux in regions of sea ice divided by the area of the ocean portion of the grid cell.		hflssi	surface_upward_latent_heat_flux
2	Sublimation over Sea Ice	kg m^{-2}	Compute the upward flux of water vapor to the atmosphere due to sublimation of snow and sea ice in regions of sea ice divided by the area of the ocean portion of the grid cell.		sblsi	surface_snow_and_ice_sublimation_flux
1	Eastward Sea Ice Transport	kg s^{-1}	The sea ice transport is 0.0 in ice-free regions of the ocean.		transix	
1	Northward Sea Ice Transport	kg s^{-1}	The sea ice transport is 0.0 in ice-free regions of the ocean.		transiy	
2	Sea Ice Mass Transport Through Fram Strait	kg s^{-1}			transifs	

surface_snowfall_rate_into_the_sea_ice_portion_of_the_grid_cell	kg m-2 s-1	time: mean area: mean where sea_ice over sea		real	longitude latitude time	prsn	seaIce
age_of_sea_ice	years	time: mean (weighted b mass of sea ice)		real	longitude latitude time	ageice	seaIce
frazil_sea_ice_growth_(leads)_rate	kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	grFrazil	seaIce
congelation_sea_ice_growth_rate	kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	grCongel	seaIce
lateral_sea_ice_growth_rate	kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	grLateral	seaIce
snow-ice_formation_rate	kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	snoToIce	seaIce
snow_melt_rate	kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	snomelt	seaIce
rate_of_melt_at_upper_surface_of_sea_ice	kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	tmelt	seaIce
rate_of_melt_at_sea_ice_base	kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	bmelt	seaIce
sea_ice_total_heat_content	J	time: mean (weighted by mass of sea ice)		real	longitude latitude time	hcice	seaIce
	W m-2	time: mean area: mean where sea_ice over sea	down	real	longitude latitude time	rsdssi	seaIce
	W m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	rsussi	seaIce
	W m-2	time: mean area: mean where sea_ice over sea	down	real	longitude latitude time	rldssi	seaIce
	W m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	rlussi	seaIce
	W m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	hfssi	seaIce
	W m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	hflssi	seaIce
	kg m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	sblsi	seaIce
	kg s-1	time: mean		real	longitude latitude time	transix	seaIce
	kg s-1	time: mean		real	longitude latitude time	transiy	seaIce
	kg s-1	time: mean		real	longitude latitude time	transifs	seaIce

2	Eastward Atmospheric Stress On Sea Ice	N m^{-2}	When computing the time-mean here, the time samples, weighted by the area of sea ice, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		strairx	
2	Northward Atmospheric Stress On Sea Ice	N m^{-2}	When computing the time-mean here, the time samples, weighted by the area of sea ice, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		strairy	
2	Eastward Ocean Stress On Sea Ice	N m^{-2}	When computing the time-mean here, the time samples, weighted by the area of sea ice, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		strocnx	
2	Northward Ocean Stress On Sea Ice	N m^{-2}	When computing the time-mean here, the time samples, weighted by the area of sea ice, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		strocny	
2	Compressive Sea Ice Strength	N m^{-2}	When computing the time-mean here, the time samples, weighted by the area of sea ice, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		streng	
2	Strain Rate Divergence of Sea Ice	s^{-1}	When computing the time-mean here, the time samples, weighted by the area of sea ice, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		divice	
2	Strain Rate Shear of Sea Ice	s^{-1}	When computing the time-mean here, the time samples, weighted by the area of sea ice, are accumulated and then divided by the sum of the weights. Report as "missing" in regions free of sea ice.		shrice	
2	Sea Ice Ridging Rate	s^{-1}		This field may be omitted unless the answers to the following questions are obvious: How exactly is this defined? Are time-means weighted by sea ice area?	ridgice	

	N m-2	time: mean (weighted by area of sea ice)		down	real	longitude latitude time	strairx	seaIce
	N m-2	time: mean (weighted by area of sea ice)		down	real	longitude latitude time	strairy	seaIce
	N m-2	time: mean (weighted by area of sea ice)			real	longitude latitude time	strocnx	seaIce ocean
	N m-2	time: mean (weighted by area of sea ice)			real	longitude latitude time	strocny	seaIce ocean
	N m-2	time: mean (weighted by area of sea ice)			real	longitude latitude time	streng	seaIce
	s-1	time: mean (weighted by area of sea ice)			real	longitude latitude time	divice	seaIce
	s-1	time: mean (weighted by area of sea ice)			real	longitude latitude time	shrice	seaIce
	s-1	time: mean			real	longitude latitude time	ridgice	seaIce

CMOR Table aero: Monthly Mean Aerosol-Related Fields (All Saved on the Atmospheric Grid)

aero mon

In CMOR Table aero: *2-D fields on atmospheric grid*

priority	long name	units	comment	questions	output variable name	standard name
	Aerosol Optics					
1	Ambient Aerosol Opitical Thickness at 550 nm	1	atmosphere_optical_thickness_due_to_ambient_aerosol: AOD from the ambient aerosls (i.e., includes aerosol water). Does not include AOD from stratospheric aerosols if these are prescribed but includes other possible background aerosol types.		od550aer	atmosphere_optical_thickness_due_to_ambient_aerosol
1	Ambient Fine Aerosol Opitical Thickness at 550 nm	1	atmosphere_optical_thickness_due_to_pm1_ambient_aerosol: od550 due to particles with wet diameter less than 1 um ("ambient" means "wetted"). When models do not include explicit size information, it can be assumed that all anthropogenic aerosols and natural secondary aerosols have diameter less than 1 um		od550lt1aer	atmosphere_optical_thickness_due_to_pm1_ambient_aerosol
1	Ambient Aerosol Absorption Optical Thickness at 550 nm	1	atmosphere_absorption_optical_thickness_due_to_aerosol		abs550aer	atmosphere_absorption_optical_thickness_due_to_ambient_aerosol
2	Ambient Aerosol Opitical Thickness at 870 nm	1	atmosphere_optical_thickness_due_to_ambient_aerosol: AOD from the ambient aerosls (i.e., includes aerosol water). Does not include AOD from stratospheric aerosols if these are prescribed but includes other possible background aerosol types.		od870aer	atmosphere_optical_thickness_due_to_ambient_aerosol
	Aerosol Budgets					
1	Rate of Emission and Production of Dry Aerosol Total Organic Matter	kg m^{-2} s^{-1}	tendency of atmosphere mass content of organic matter dry aerosol due to net production and emission. This is the sum of total emission of POA and total production of SOA (see next two entries), and it should only be reported if POA and SOA cannot be separately reported. "Mass" refers to the mass of organic matter, not mass of organic carbon alone.		emioa	tendency_of_atmosphere_mass_content_of_particulate_organic_matter_dry_aerosol_due_to_net_chemical_production_and_emission
1	Emission Rate of Dry Aerosol Primary Organic Matter	kg m^{-2} s^{-1}	tendency of atmosphere mass content of primary organic aerosol due to emission: "mass" refers to the mass of primary organic matter, not mass of organic carbon alone.	In a previous message you said production referred to SOA, not POA, so I've removed "production" here and only use "emission". Is this o.k.?	emipoa	tendency_of_atmosphere_mass_content_of_primary_particulate_organic_matter_dry_aerosol_due_to_net_chemical_production
1	Production Rate of Dry Aerosol Secondary Organic Matter	kg m^{-2} s^{-1}	tendency of atmosphere mass content of secondary organic matter_dry aerosol due to net production: If model lumps SOA emissions with POA, then report the sum of POA and SOA emissions as POA emissions. "mass" refers to the mass of primary organic matter, not mass of organic carbon alone.		chepsoa	tendency_of_atmosphere_mass_content_of_secondary_particulate_organic_matter_dry_aerosol_due_to_net_chemical_production
1	Emission Rate of Black Carbon Aerosol Mass	kg m^{-2} s^{-1}	tendency_of_atmosphere_mass_content_of_black_carbon_dry_aerosol_due_to_emission		emibc	tendency_of_atmosphere_mass_content_of_black_carbon_dry_aerosol_due_to_emission
3	Dry Deposition Rate of Dry Aerosol Organic Matter	kg m^{-2} s^{-1}	tendency_of_atmosphere_mass_content_of_organic_dry_aerosol_due_to_dry_deposition: This is the sum of dry deposition of POA and dry deposition of SOA (see next two entries), and it should only be reported if POA and SOA cannot be separately reported. "Mass" refers to the mass of organic matter, not mass of organic carbon alone.		emioa	tendency_of_atmosphere_mass_content_of_particulate_organic_matter_dry_aerosol_due_to_dry_deposition
3	Dry Deposition Rate of Dry Aerosol Primary Organic Matter	kg m^{-2} s^{-1}	tendency_of_atmosphere_mass_content_of_primary_organic_matter_dry_aerosol_due_to_dry_deposition		dryoa	tendency_of_atmosphere_mass_content_of_primary_particulate_organic_matter_dry_aerosol_due_to_dry_deposition
3	Dry Deposition Rate of Dry Aerosol Secondary Organic Matter	kg m^{-2} s^{-1}	tendency_of_atmosphere_mass_content_of_secondary_organic_dry_aerosol_due_to_dry_deposition		drysoa	tendency_of_atmosphere_mass_content_of_secondary_particulate_organic_matter_dry_aerosol_due_to_dry_deposition
3	Dry Deposition Rate of Black Carbon Aerosol Mass	kg m^{-2} s^{-1}	tendency_of_atmosphere_mass_content_of_black_carbon_dry_aerosol_due_to_dry_deposition		drybc	tendency_of_atmosphere_mass_content_of_black_carbon_dry_aerosol_due_to_dry_deposition

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	1	time: mean						real	longitude latitude time	od550aer	aerosol	
	1	time: mean						real	longitude latitude time	od550lt1aer	aerosol	
	1	time: mean						real	longitude latitude time	abs550aer	aerosol	
	1	time: mean						real	longitude latitude time	od870aer	aerosol	
											aerosol	
	kg m-2 s-1	time: mean						real	longitude latitude time	emioa	aerosol	
	kg m-2 s-1	time: mean						real	longitude latitude time	emipoa	aerosol	
	kg m-2 s-1	time: mean						real	longitude latitude time	chepsoa	aerosol	
	kg m-2 s-1	time: mean						real	longitude latitude time	emibc	aerosol	
	kg m-2 s-1	time: mean						real	longitude latitude time	emioa	aerosol	
	kg m-2 s-1	time: mean						real	longitude latitude time	dryoa	aerosol	
	kg m-2 s-1	time: mean						real	longitude latitude time	drysoa	aerosol	
	kg m-2 s-1	time: mean						real	longitude latitude time	drybc	aerosol	

3	Wet Deposition Rate of Dry Aerosol Organic Matter	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_organic_matter_dry_aerosols_due_to_wet_deposition: This is the sum of wet deposition of POA and wet deposition of SOA (see next two entries), and it should only be reported if POA and SOA cannot be separately reported. "Mass" refers to the mass of organic matter, not mass of organic carbon alone	wetoa	tendency_of_atmosphere_mass_content_of_particulate_organic_matter_dry_aerosol_due_to_wet_deposition
3	Wet Deposition Rate of Dry Aerosol Primary Organic Matter	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_primary_organic_matter_dry_aerosols_due_to_wet_deposition	wetpoa	tendency_of_atmosphere_mass_content_of_primary_particulate_organic_matter_dry_aerosol_due_to_wet_deposition
3	Wet Deposition Rate of Dry Aerosol Secondary Organic Matter	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_secondary_organic_dry_aerosol_due_to_wet_deposition	wetsoa	tendency_of_atmosphere_mass_content_of_secondary_particulate_organic_matter_dry_aerosol_due_to_wet_deposition
3	Wet Deposition Rate of Black Carbon Aerosol Mass	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_black_carbon_dry_aerosol_due_to_wet_deposition	wetbc	tendency_of_atmosphere_mass_content_of_black_carbon_dry_aerosol_due_to_wet_deposition
1	Total Emission of Primary Aerosol from Biomass Burning	$kg\ m^{-2}\ s^{-1}$	tendency of atmosphere mass content of primary organic matter dry aerosol due to emission: This does not include sources of secondary aerosols from biomass burning aerosols, such as SO2 or SOA.	emibb	tendency_of_atmosphere_mass_content_of_primary_particulate_organic_matter_dry_aerosol_due_to_emission
1	Total Emission Rate of SO2	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_emission: mass refers to SO2, not S.	emiso2	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_emission
1	Total Direct Emission Rate of SO4	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_sulfate_dry_aerosol_due_to_net_production_and_emission: mass refers to SO4, not S	emiso4	
1	Total Emission Rate of DMS	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_dimethyl_sulfide_due_to_emission: mass refers to DMS, not S	emidms	tendency_of_atmosphere_mass_content_of_dimethyl_sulfide_due_to_emission
3	Dry Deposition Rate of SO2	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_dry_deposition	dryso2	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_dry_deposition
1	Dry Deposition Rate of SO4	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_sulfate_due_to_dry_deposition	dryso4	tendency_of_atmosphere_mass_content_of_sulfate_dry_aerosol_due_to_dry_deposition
3	Dry Deposition Rate of DMS	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_dimethyl_sulfide_due_to_dry_deposition: omit if DMS is not dry deposited in the model.	drydms	tendency_of_atmosphere_mass_content_of_dimethyl_sulfide_due_to_dry_deposition
1	Wet Deposition Rate of SO4	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_sulfate_dry_aerosol_due_to_wet_deposition	wetso4	tendency_of_atmosphere_mass_content_of_sulfate_dry_aerosol_due_to_wet_deposition
3	Wet Deposition Rate of SO2	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_wet_deposition	wetso2	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_wet_deposition
3	Wet Deposition Rate of DMS	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_dimethyl_sulfide_due_to_wet_deposition: omit if DMS is not wet deposited in the model.	wetdms	tendency_of_atmosphere_mass_content_of_dimethyl_sulfide_due_to_wet_deposition
1	Total Emission Rate of NH3	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_ammonia_due_to_emission	eminh3	tendency_of_atmosphere_mass_content_of_ammonia_due_to_emission
3	Dry Deposition Rate of NH3	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_ammonia_due_to_dry_deposition	drynh3	tendency_of_atmosphere_mass_content_of_ammonia_due_to_dry_deposition
1	Dry Deposition Rate of NH4	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_ammonium_due_to_dry_deposition	drynh4	tendency_of_atmosphere_mass_content_of_ammonium_dry_aerosol_due_to_dry_deposition
1	Wet Deposition Rate of NH4+NH3	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_ammonium_due_to_wet_deposition	wetnh4	tendency_of_atmosphere_mass_content_of_ammonium_dry_aerosol_due_to_wet_deposition
1	Total Emission Rate of Seasalt	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_seasalt_dry_aerosol_due_to_emission	emiss	tendency_of_atmosphere_mass_content_of_seasalt_dry_aerosol_due_to_emission
3	Dry Deposition Rate of Seasalt	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_seasalt_dry_aerosol_due_to_dry_deposition	dryss	tendency_of_atmosphere_mass_content_of_seasalt_dry_aerosol_due_to_dry_deposition
3	Wet Deposition Rate of Seasalt	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_seasalt_dry_aerosol_due_to_wet_deposition	wetss	tendency_of_atmosphere_mass_content_of_seasalt_dry_aerosol_due_to_wet_deposition
1	Total Emission Rate of Dust	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_dust_dry_aerosol_due_to_emission	emidust	tendency_of_atmosphere_mass_content_of_dust_dry_aerosol_due_to_emission
1	Dry Deposition Rate of Dust	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_dust_dry_aerosol_due_to_dry_deposition	drydust	tendency_of_atmosphere_mass_content_of_dust_dry_aerosol_due_to_dry_deposition
1	Wet Deposition Rate of Dust	$kg\ m^{-2}\ s^{-1}$	tendency_of_atmosphere_mass_content_of_dust_dry_aerosol_due_to_wet_deposition	wetdust	tendency_of_atmosphere_mass_content_of_dust_dry_aerosol_due_to_wet_deposition
	Aerosol Loads				

	kg m-2 s-1	time: mean		real	longitude latitude time	wetoa	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetpoa	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetsoa	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetbc	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	emibb	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	emiso2	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	emiso4	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	emidms	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	dryso2	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	dryso4	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	drydms	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetso4	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetso2	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetdms	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	eminh3	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	drynh3	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	drynh4	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetnh4	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	emiss	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	dryss	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetss	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	emidust	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	drydust	aerosol
	kg m-2 s-1	time: mean		real	longitude latitude time	wetdust	aerosol

1	Load of Dry Aerosol Organic Matter	kg m^{-2}	atmosphere dry organic content: This is the vertically integrated sum of atmosphere_primary_organic_content and atmosphere_secondary_organic_content (see next two table entries), and therefore should only be reported if those two components cannot be separately reported.		loadoa	atmosphere_mass_content_of_particulate_organic_matter_dry_aerosol
1	Load of Dry Aerosol Primary Organic Matter	kg m^{-2}	atmosphere_primary_organic_content		loadpoa	atmosphere_mass_content_of_primary_particulate_organic_matter_dry_aerosol
1	Load of Dry Aerosol Secondary Organic Matter	kg m^{-2}	atmosphere_secondary_organic_content		loadsoa	atmosphere_mass_content_of_secondary_particulate_organic_matter_dry_aerosol
1	Load of Black Carbon Aerosol	kg m^{-2}	atmosphere_black_carbon_content		loadbc	atmosphere_mass_content_of_black_carbon_dry_aerosol
1	Load of SO4	kg m^{-2}	atmosphere_sulfate_content	Is this "dry" or "ambient"?	loadso4	atmosphere_mass_content_of_sulfate_dry_aerosol
1	Load of Dust	kg m^{-2}	atmosphere_dust_content		loaddust	atmosphere_mass_content_of_dust_dry_aerosol
1	Load of Seasalt	kg m^{-2}	atmosphere_seasalt_content		loadss	atmosphere_mass_content_of_seasalt_dry_aerosol
1	Load of NO3	kg m^{-2}	atmosphere_nitrate_content		loadno3	atmosphere_mass_content_of_nitrate_dry_aerosol
3	Load of NH4	kg m^{-2}	atmosphere_ammonium_content		loadnh4	atmosphere_mass_content_of_ammonium_dry_aerosol
	Surface Concentrations					
3	Surface Concentration of Dry Aerosol Organic Matter	kg m^{-3}	mass_concentration_of_organic_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file). This is the sum of concentrations of primary and secondary organic aerosol (see next two table entries), and therefore should only be reported if those two components cannot be separately reported.		sconcoa	mass_concentration_of_particulate_organic_matter_dry_aerosol_in_air
3	Surface Concentration of Dry Aerosol Primary Organic Matter	kg m^{-3}	mass_concentration_of_primary_organic_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file).		sconcpoa	mass_concentration_of_primary_particulate_organic_matter_dry_aerosol_in_air
3	Surface Concentration of Dry Aerosol Secondary Organic Matter	kg m^{-3}	mass_concentration_of_secondary_organic_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file). If the model lumps SOA with POA, then report their sum as POA.		sconcsoa	mass_concentration_of_secondary_particulate_organic_matter_dry_aerosol_in_air
3	Surface Concentration of Black Carbon Aerosol	kg m^{-3}	mass_concentration_of_black_carbon_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file).		sconcbc	mass_concentration_of_black_carbon_dry_aerosol_in_air
3	Surface Concentration of SO4	kg m^{-3}	mass_concentration_of_sulfate_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file).		sconcso4	mass_concentration_of_sulfate_dry_aerosol_in_air
3	Surface Concentration of Dust	kg m^{-3}	mass_concentration_of_dust_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file).		sconcdust	mass_concentration_of_dust_dry_aerosol_in_air
3	Surface Concentration of Seasalt	kg m^{-3}	mass_concentration_of_seasalt_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file).		sconcss	mass_concentration_of_seasalt_dry_aerosol_in_air
3	Surface Concentration of NO3	kg m^{-3}	mass_concentration_of_nitrate_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file).		sconcno3	mass_concentration_of_nitrate_dry_aerosol_in_air
3	Surface Concentration of NH4	kg m^{-3}	mass_concentration_of_ammonium_aerosol_in_air: In model lowest layer (The location of the model's lowest layer should be recorded in the netCDF output file).		sconcnh4	mass_concentration_of_ammonium_dry_aerosol_in_air
	Clouds and Radiation					
2	Surface Diffuse Downward Shortwave Radiation	W m^{-2}	downwelling_diffuse_shortwave_flux_in_air		rsdsdiff	
2	Surface Diffuse Downward Clear Sky Shortwave Radiation	W m^{-2}	downwelling_diffuse_shortwave_flux_in_air_assuming_clear_sky		rsdscsdiff	

	kg m-2	time: mean	real	longitude latitude time	loadoa	aerosol
	kg m-2	time: mean	real	longitude latitude time	loadpoa	aerosol
	kg m-2	time: mean	real	longitude latitude time	loadsoa	aerosol
	kg m-2	time: mean	real	longitude latitude time	loadbc	aerosol
	kg m-2	time: mean	real	longitude latitude time	loadso4	aerosol
	kg m-2	time: mean	real	longitude latitude time	loaddust	aerosol
	kg m-2	time: mean	real	longitude latitude time	loadss	aerosol
	kg m-2	time: mean	real	longitude latitude time	loadno3	aerosol
	kg m-2	time: mean	real	longitude latitude time	loadnh4	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcoa	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcpoa	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcsoa	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcbc	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcso4	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcdust	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcss	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcno3	aerosol
	kg m-3	time: mean	real	longitude latitude alev1, time	sconcnh4	aerosol
downwelling_diffuse_shortwave_flux_in_air	W m-2	time: mean	real	longitude latitude time	rsdsdiff	aerosol land
downwelling_diffuse_shortwave_flux_in_air_assuming_clear_sky	W m-2	time: mean	real	longitude latitude time	rsdscsdiff	aerosol land

1	Cloud-Top Effective Droplet Radius	m	Droplets are liquid only. Report effective radiaus "as seen from space" over liquid cloudy portion of grid cell. This is the value from uppermost model layer with liquid cloud or, if available, it is better to sum over all liquid cloud tops, no matter where they occur, as long as they are seen from the top of the atmosphere. Weight by total liquid cloud top fraction of (as seen from TOA) each time sample when computing monthly mean.	reffclwtop	
1	Cloud Droplet Number Concentration of Cloud Tops	m^{-3}	Droplets are liquid only. Report concentration "as seen from space" over liquid cloudy portion of grid cell. This is the value from uppermost model layer with liquid cloud or, if available, it is better to sum over all liquid cloud tops, no matter where they occur, as long as they are seen from the top of the atmosphere. Weight by total liquid cloud top fraction of (as seen from TOA) each time sample when computing monthly mean.	cldncl	
1	Ice Crystal Number Concentration of Cloud Tops	m^{-3}	Report concentration "as seen from space" over liquid cloudy portion of grid cell. This is the value from uppermost model layer with ice cloud or, if available, it is better to sum over all ice cloud tops, no matter where they occur, as long as they are seen from the top of the atmosphere. Weight by total ice cloud top fraction (as seen from TOA) of each time sample when computing monthly mean	cldnci	
1	Column Integrated Cloud Droplet Number	m^{-2}	Droplets are liquid only. Weight by liquid cloud fraction in each layer when vertically integrating. Weight by total liquid cloud fraction (as seen from TOA) when reporting monthly mean	cldnvi	atmosphere_number_content_of_cloud_droplets

cloud_droplet_effective_radius_at_liquid_water_cloud_top	m	time: mean	real	longitude latitude time	reffclwtop	aerosol
cloud_droplet_number_concentration_in_liquid_water_clouds	m-3	time: mean	real	longitude latitude time	cldncl	aerosol
ice_crystal_number_concentration_in_ice_water_clouds	m-3	time: mean	real	longitude latitude time	cldnci	aerosol
	m-2	time: mean	real	longitude latitude time	cldnvi	aerosol

In CMOR Table aero: *3-D aerosol-related mixing ratios and extinction on model levels*

1-year samples: 1850 to 1950 every 20 years, 1960 to 2020 every 10 years, 2040 to 2100 every 20 years

priority	long name	units	comment	questions	output variable name	standard name
1	Ambient Aerosol Extinction Optical Thickness at 550 nm	m^{-1}	atmosphere_extinction_due_to_ambient_aerosol: "ambient" means "wetted". This and other fields in this table are 3-D.		ec550aer	
1	Concentration of Dry Aerosol Organic Matter	kg m^{-3}	mass_concentration_of_organic_matter_dry_aerosol_in_air mass concentration of organic matter dry aerosol in air: This is the sum of concentrations of primary and secondary organic aerosols (see next two table entries), and therefore should only be reported if those two components cannot be separately reported.		concoa	mass_concentration_of_particulate_organic_matter_dry_aerosol_in_air
1	Concentration of Dry Aerosol Primary Organic Matter	kg m^{-3}	mass_concentration_of_primary_organic_matter_dry_aerosol_in_air		concpoa	mass_concentration_of_primary_particulate_organic_matter_dry_aerosol_in_air
1	Concentration of Dry Aerosol Secondary Organic Matter	kg m^{-3}	mass_concentration_of_secondary_organic_matter_dry_aerosol_in_air: If the model lumps SOA with POA, then report their sum as POA.		concsoa	mass_concentration_of_secondary_particulate_organic_matter_dry_aerosol_in_air
1	Concentration of Biomass Burning Aerosol	kg m^{-3}	mass_concentration_of_biomass_burning_dry_aerosol_in_air		concbb	
1	Concentration of Black Carbon Aerosol	kg m^{-3}	mass_concentration_ of_black_carbon_dry_aerosol_in_air		concbc	mass_concentration_of_black_carbon_dry_aerosol_in air
1	Concentration of Aerosol Water	kg m^{-3}	mass_concentration_of_water_in_ambient_aerosol_in_air: "ambient" means "wetted"		concaerh2o	mass_concentration_of_water_in_ambient_aerosol_in air
1	Concentration of SO4	kg m^{-3}	mass_concentration_of_sulfate_dry_aerosol_in_air		concso4	mass_concentration_of_sulfate_dry_aerosol_in_air
1	Concentration of SO2	kg m^{-3}	mole_concentration_of_sulfur_dioxide_in_air		concso2	mole_concentration_of_sulfur_dioxide_in_air
1	Concentration of DMS	kg m^{-3}	mole_concentration_of_dimethyl_sulfide_in_air		concdms	mole_concentration_of_dimethyl_sulfide_in_air
1	Concentration of NO3 Aerosol	kg m^{-3}	mass_concentration_ of_nitrate_dry_aerosol_in_air		concno3	mass_concentration_of_nitrate_dry_aerosol_in_air
1	Concentration of NH4	kg m^{-3}	mass_concentration_of_ammonium_dry_aerosol_in_air		concnh4	mass_concentration_of_ammonium_dry_aerosol_in_air
1	Concentration of Seasalt	kg m^{-3}	mass_concentration_ of_seasalt_dry_aerosol_in_air		concss	mass_concentration_of_seasalt_dry_aerosol_in_air
1	Concentration of Dust	kg m^{-3}	mass_concentration_ of_dust_dry_aerosol_in_air		concdust	mass_concentration_of_dust_dry_aerosol_in_air
2	Aerosol Number Concentration	m^{-3}	number_concentration_of_ambient_aerosol_in_air		conccn	
3	Number Concentration of Nucleation Mode Aerosol	m^{-3}	number_concentration_of_ambient_aerosol_in_nucleation_mode_in_air: include all particles with diameter smaller than 3 nm		concnmcn	
2	Number Concentration Coarse Mode Aerosol	m^{-3}	number_concentration_of_ambient_aerosol_in_coarse_mode_in_air: include all particles with diameter larger than 1 micron		conccmcn	
1	Stratiform Cloud Droplet Effective Radius	m	Droplets are liquid. The effective radius is defined as the ratio of the third moment over the second moment of the particle size distribution and the time-mean should be calculated, weighting the individual samples by the cloudy fraction of the grid cell.		reffclws	effective_radius_of_stratiform_cloud_liquid_water_particle
1	Convective Cloud Droplet Effective Radius	m	Droplets are liquid. The effective radius is defined as the ratio of the third moment over the second moment of the particle size distribution and the time-mean should be calculated, weighting the individual samples by the cloudy fraction of the grid cell.		reffclwc	effective_radius_of_convective_cloud_liquid_water_particle
1	Cloud Droplet Number Concentration	m^{-3}	Cloud droplet number concentration in liquid clouds	Weighted by the cloud liquid fraction.	cdnc	
1	Ice Crystal Number Concentration	m^{-3}	Ice Crystal number concentration in ice clouds	Weighted by the ice liquid fraction.	inc	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
atmosphere_extinction_due_to_ambient_aerosol	m-1	time: mean							longitude latitude alevel time	ec550aer	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concoa	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concpoa	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concsoa	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concbb	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concbc	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concaerh2o	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concso4	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concso2	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concdms	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concno3	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concnh4	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concss	aerosol	
	kg m-3	time: mean							longitude latitude alevel time	concdust	aerosol	
number_concentration_of_ambient_aerosol_in_air	m-3	time: mean							longitude latitude alevel time	conccn	aerosol	
number_concentration_of_ambient_aerosol_in_nucleation_mode_in_air	m-3	time: mean							longitude latitude alevel time	concnmcn	aerosol	
number_concentration_of_ambient_aerosol_in_coarse_mode_in_air	m-3	time: mean							longitude latitude alevel time	conccmcn	aerosol	
	m	time: mean							longitude latitude alevel time	reffclws	aerosol	
	m	time: mean							longitude latitude alevel time	reffclwc	aerosol	
	m-3	time: mean							longitude latitude alevel time	cdnc	aerosol	
	m-3	time: mean							longitude latitude alevel time	inc	aerosol	

CMOR Table da: Daily Mean Atmosphere, Ocean and Surface Fields da da

(saved on the model's atmospheric or ocean grid, as appropriate)

In CMOR Table da: *2-D daily mean atmospheric and surface fields*

The following daily mean variables should be collected for all simulations (for each ensemble member and the full duration of each experiment).

priority	long name	units	comment	questions	output variable name	standard name
1	Near-Surface Specific Humidity	1	near-surface (usually, 2 meter) specific humidity.		huss	specific_humidity
1	Daily Minimum Near-Surface Air Temperature	K	daily-minimum near-surface (usually, 2 meter) air temperature.		tasmin	air_temperature
1	Daily Maximum Near-Surface Air Temperature	K	daily-maximum near-surface (usually, 2 meter) air temperature.		tasmax	air_temperature
1	Near-Surface Air Temperature	K	daily-mean near-surface (usually, 2 meter) air temperature.		tas	air_temperature
1	Precipitation	kg m^{-2} s^{-1}	at surface; includes both liquid and solid phases from all types of clouds (both large-scale and convective)		pr	precipitation_flux
1	Sea Level Pressure	Pa			psl	air_pressure_at_sea_level
1	Daily-Mean Wind Speed	m s^{-1}	near-surface (usually, 10 meters) wind speed.		sfcWind	wind_speed
1	Square of Sea Surface Temperature	K^2	square of temperature of liquid ocean, averaged over the day. Report on the ocean grid. This variable appears in WGOMD Table 2.2		tossq	square_of_sea_surface_temperature
1	Sea Surface Temperature	K	temperature of liquid ocean. Report on the ocean grid. This variable appears in WGOMD Table 2.2		tos	surface_temperature
1	Daily Maximum Ocean Mixed Layer Thickness Defined by Mixing Scheme	m	This variable appears in WGOMD Table 2.2		omldamax	ocean_mixed_layer_thickness_defined_by_mixing_scheme

The rest of the daily mean fields on this spreadsheet should be collected only for a single ensemble member of the following experiments.

experiment	*time-period requested*
pre-industrial controls	20 years, preferably corresponding to years 1986-2005 of the historical run
historical	Jan 1950 -- Dec 2005
future simulations driven by RCP concentrations or emissions	only years 2006-2100, 2181-2200, and 2281-2300
AMIP	all years

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	1	time: mean						real	longitude latitude time height2m	huss	atmos	
	K	time: minimum						real	longitude latitude time height2m	tasmin	atmos	
	K	time: maximum						real	longitude latitude time height2m	tasmax	atmos	
	K	time: mean						real	longitude latitude time height2m	tas	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude time	pr	atmos	
	Pa	time: mean						real	longitude latitude time	psl	atmos	
	m s-1	time: mean						real	longitude latitude time height10m	sfcWind	atmos	
	K2	time:mean						real	longitude latitude time	tossq	atmos	
	K	time: mean						real	longitude latitude time	tos	atmos	
	m	time: maximum						real	longitude latitude time	omldamax	ocean	

CMOR Table da: *2-D daily-mean atmospheric and surface fields*

priority	long name	units	comment	questions	output variable name	standard name
1	Moisture in Upper 0.1 m of Soil Column	kg m^{-2}	Compute the mass of water in all phases in the upper 0.1 meters of soil.		mrsos	moisture_content_of_soil_layer
1	Near-Surface Relative Humidity	%	near-surface (usually, 2 meter) relative humidity. This is the relative humidity with respect to liquid water for T> 0 C, and with respect to ice for T<0 C.		rhs	relative_humidity
1	Surface Daily Minimum Relative Humidity	%	near-surface (usually, 2 meter) minimum relative humidity. This is the relative humidity with respect to liquid water for T> 0 C, and with respect to ice for T<0 C.		rhsmin	relative_humidity
1	Surface Daily Maximum Relative Humidity	%	near-surface (usually, 2 meter) maximum relative humidity. This is the relative humidity with respect to liquid water for T> 0 C, and with respect to ice for T<0 C.		rhsmax	relative_humidity
1	Snow Area Fraction	%			snc	surface_snow_area_fraction
1	Total Cloud Fraction	%	for the whole atmospheric column, as seen from the surface or the top of the atmosphere. Include both large-scale and convective cloud.		clt	cloud_area_fraction
1	Surface Temperature Where Land or Sea Ice	K	"skin" temperature of all surfaces except open ocean.		tsl	surface_temperature
1	Surface Snow Amount	kg m^{-2}	Compute as the mass of surface snow on the land portion of the grid cell divided by the land area in the grid cell; report 0.0 where the land fraction is 0; exclude snow on vegetation canopy or on sea ice.		snw	surface_snow_amount
1	Convective Precipitation	kg m^{-2} s^{-1}	at surface; includes both liquid and solid phases.		prc	convective_precipitation_flux
1	Solid Precipitation	kg m^{-2} s^{-1}	at surface; includes precipitation of all forms of water in the solid phase		prsn	snowfall_flux
1	Total Runoff	kg m^{-2} s^{-1}	compute as the total runoff (including "drainage" through the base of the soil model) leaving the land portion of the grid cell divided by the land area in the grid cell.		mrro	runoff_flux
1	Eastward Wind	m s^{-1}	near-surface (usually, 10 meters) eastward component of wind.		uas	eastward_wind
1	Northward Wind	m s^{-1}	near-surface (usually, 10 meters) northward component of wind.		vas	northward_wind
1	Daily Maximum Wind Speed	m s^{-1}	near-surface (usually, 10 meters) wind speed.		sfcWindmax	wind_speed
1	Surface Upward Latent Heat Flux	W m^{-2}			hfls	surface_upward_latent_heat_flux
1	Surface Upward Sensible Heat Flux	W m^{-2}			hfss	surface_upward_sensible_heat_flux
1	Surface Downwelling Longwave Radiation	W m^{-2}			rlds	surface_downwelling_longwave_flux_in_air
1	Surface Upwelling Longwave Radiation	W m^{-2}			rlus	surface_upwelling_longwave_flux_in_air
1	Surface Downwelling Shortwave Radiation	W m^{-2}			rsds	surface_downwelling_shortwave_flux_in_air
1	Surface Upwelling Shortwave Radiation	W m^{-2}			rsus	surface_upwelling_shortwave_flux_in_air
1	TOA Outgoing Longwave Radiation	W m^{-2}	at the top of the atmosphere.		rlut	toa_outgoing_longwave_flux
1	Mean Square of Sea Surface Temperature	K^2	Report on ocean's grid. This variable appears in WGOMD Table 2.2		tsosq	
1	Eastward Sea Ice Velocity	m s^{-1}	Report on ocean's grid. Report as "missing" in regions free of sea ice.		usi	eastward_sea_ice_velocity
1	Northward Sea Ice Velocity	m s^{-1}	Report on ocean's grid. Report as "missing" in regions free of sea ice.		vsi	northward_sea_ice_velocity
1	Sea Ice Area Fraction	%	fraction of grid cell covered by sea ice. Report on ocean's grid.		sic	sea_ice_area_fraction
1	Sea Ice Thickness	m	Report on ocean's grid. Compute the mean thickness of sea ice in the ocean portion of the grid cell (averaging over the entire ocean portion, including the ice-free fraction). Report as 0.0 in regions free of sea ice.		sit	sea_ice_thickness

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	kg m-2	time: mean						real	longitude latitude time	mrsos	atmos	
	%	time: mean						real	longitude latitude time height2m	rhs	atmos	
	%	time: minimum						real	longitude latitude time height2m	rhsmin	atmos	
	%	time: maximum						real	longitude latitude time height2m	rhsmax	atmos	
	%	time: mean						real	longitude latitude time	snc	atmos	
	%	time: mean						real	longitude latitude time	clt	atmos	
	K	time: mean						real	longitude latitude time	tsl	land	
	kg m-2	time: mean area: mean where land						real	longitude latitude time	snw	land	
	kg m-2 s-1	time: mean						real	longitude latitude time	prc	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude time	prsn	atmos	
	kg m-2 s-1	time: mean area: mean where land						real	longitude latitude time	mrro	land	
	m s-1	time: mean						real	longitude latitude time height10m	uas	atmos	
	m s-1	time: mean						real	longitude latitude time height10m	vas	atmos	
	m s-1	time: maximum						real	longitude latitude time height10m	sfcWindmax	atmos	
	W m-2	time: mean					up	real	longitude latitude time	hfls	atmos	
	W m-2	time: mean					up	real	longitude latitude time	hfss	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rlds	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlus	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rsds	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsus	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlut	atmos	
mean_square_of_sea_surface_temperature	K2	time: mean						real	longitude latitude time	tsosq	ocean	
	m s-1	time: mean						real	longitude latitude time	usi	seaIce ocean	
	m s-1	time: mean						real	longitude latitude time	vsi	seaIce ocean	
	%	time: mean						real	longitude latitude time	sic	seaIce ocean	
	m	time: mean area: mean where sea						real	longitude latitude time	sit	seaIce ocean	

In CMOR Table da: daily mean 3-D atmospheric fields on the following pressure surfaces: 1000, 850, 700, 500, 250, 100, 50, and 10 hPa

priority	long name	units	comment	questions	output variable name	standard name
1	Air Temperature	K			ta	air_temperature
1	Relative Humidity	%	This is the relative humidity with respect to liquid water for T> 0 C, and with respect to ice for T<0 C.		hur	relative_humidity
1	Specific Humidity	1			hus	specific_humidity
1	omega (=dp/dt)	Pa s^{-1}	commonly referred to as "omega", this represents the vertical component of velocity in pressure coordinates (positive down)		wap	lagrangian_tendency_of_air_pressure
1	Northward Wind	m s^{-1}			va	northward_wind
1	Eastward Wind	m s^{-1}			ua	eastward_wind
2	Geopotential Height	m			zg	geopotential_height

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm
	K	time: mean						real	longitude latitude plev8 time	ta	atmos
	%	time: mean						real	longitude latitude plev8 time	hur	atmos
	1	time: mean						real	longitude latitude plev8 time	hus	atmos
	Pa s-1	time: mean						real	longitude latitude plev8 time	wap	atmos
	m s-1	time: mean						real	longitude latitude plev8 time	va	atmos
	m s-1	time: mean						real	longitude latitude plev8 time	ua	atmos
	m	time: mean						real	longitude latitude plev8 time	zg	atmos

CMOR Table 6hrLev: Fields (Sampled Every 6 Hours) for Driving Regional Models 6hrLev 6hr

The 6-hourly data on model levels should be sampled as *"snapshots"* (*not* as 6-hour means) at 0Z, 6Z, 12Z, and 18Z and should be collected only for the following experiments and years:

experiment	*reporting time-period*	*ensemble size*	*priority*
historical	Jan 1950 - Dec 2005	1	highest
AMIP	all years	1	highest
RCP4.5 and RCP8.5	Jan 2006 - Dec 2100	1 for each expt.	highest
decadal hindcasts/forecasts runs inititalized in late 2005 and late 1980	late 2005 - Dec 2035 and late 1980 - Dec 2010	3 for each period	lower
decadal hindcasts/forecasts runs inititalized in late 1990	late 1990 - Dec 2000	3	lower

priority	long name	units	comment	questions	output variable name	standard name
1	Air Temperature	K	on all model levels		ta	air_temperature
1	Eastward Wind	$m\ s^{-1}$	on all model levels		ua	eastward_wind
1	Northward Wind	$m\ s^{-1}$	on all model levels		va	northward_wind
1	Specific Humidity	1	on all model levels		hus	specific_humidity
1	Surface Air Pressure	Pa	surface pressure, not mean sea level pressure		ps	surface_air_pressure

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	K							real	longitude latitude alevel time1	ta	atmos	
	m s-1							real	longitude latitude alevel time1	ua	atmos	
	m s-1							real	longitude latitude alevel time1	va	atmos	
	1							real	longitude latitude alevel time1	hus	atmos	
	Pa							real	longitude latitude time1	ps	atmos	

CMOR Table 6hrPlev: Fields (Sampled Every 6 Hours) for Storm-Track Analysis and other Advanced Diagnostic Applications

6hrPlev **6hr**

The 6-hourly data on pressure levels should be sampled as *"snapshots"* (*not* as 6-hour means) at 0Z, 6Z, 12Z, and 18Z and should be collected only for the following experiments and years.

experiment	***time-period requested***
decadal hindcasts/forecasts	all years
historical	Jan 1950 - Dec 2005
AMIP	all years
RCP4.5 and RCP8.5	Jan 2006 - Dec 2100
preindustrial control	30 years -- preferably corresponding to years 1979-2008 of the historical run
Last glacial maximum paleo-run	last 30 years
mid-Holocene paleo- run	last 30 years

priority	**long name**	**units**	**comment**	**questions**	**output variable name**	**standard name**
1	Eastward Wind	$m\ s^{-1}$	on the following pressure levels: 850, 500, 250 hPa		ua	eastward_wind
1	Northward Wind	$m\ s^{-1}$	on the following pressure levels: 850, 500, 250 hPa		va	northward_wind
1	Air Temperature	K	on the following pressure levels: 850, 500, 250 hPa		ta	air_temperature
1	Sea Level Pressure	Pa			psl	air_pressure_at_sea_level

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	m s-1							real	longitude latitude plev3 time1	ua	atmos	
	m s-1							real	longitude latitude plev3 time1	va	atmos	
	K							real	longitude latitude plev3 time1	ta	atmos	
	Pa							real	longitude latitude time1	psl	atmos	

CMOR Table 3hr: 2-D Atmospheric and Surface Fields Sampled Every 3 Hours

3hr 3hr

All fields are saved on the atmospheric grid. Precipitation, clouds, and all flux variables are averaged over 3-hour intervals (0-3Z, 3-6Z, 6-9Z, 9-12Z, 12-15Z, 15-18Z, 18-21Z, 21-24Z). All other fields are sampled synoptically at 0Z, 3Z, 6Z, 9Z, 12Z, 15Z, 18Z, and 21Z.

The 3-hourly data should be collected only for the following experiments and years:

experiment	*time-period requested*
decadal hindcasts/forecasts	all years
historical	Jan 1960 - Dec 2005
AMIP	all years
future simulations driven by RCP concentrations or emissions	Jan 2026 - Dec 2045, Jan 2081-Dec 2100, 2181-2200, and 2281-2300

priority	long name	units	comment	questions	output variable name	standard name
1	Precipitation	kg m-2 s-1	at surface; includes both liquid and solid phases. This is the 3-hour mean precipitation flux.		pr	precipitation_flux
1	Air Temperature	K	near-surface (usually, 2 meter) air temperature, sampled synoptically.		tas	air_temperature
1	Surface Upward Latent Heat Flux	W m-2	This is the 3-hour mean flux.		hfls	surface_upward_latent_heat_flux
1	Surface Upward Sensible Heat Flux	W m-2	This is the 3-hour mean flux.		hfss	surface_upward_sensible_heat_flux
1	Surface Downwelling Longwave Radiation	W m-2	This is the 3-hour mean flux.		rlds	surface_downwelling_longwave_flux_in_air
1	Surface Upwelling Longwave Radiation	W m-2	This is the 3-hour mean flux.		rlus	surface_upwelling_longwave_flux_in_air
1	Surface Downwelling Shortwave Radiation	W m-2	This is the 3-hour mean flux.		rsds	surface_downwelling_shortwave_flux_in_air
1	Surface Upwelling Shortwave Radiation	W m-2	This is the 3-hour mean flux.		rsus	surface_upwelling_shortwave_flux_in_air
1	Eastward Near-Surface Wind Speed	m s-1	sampled synoptically.		uas	eastward_wind
1	Northward Near-Surface Wind Speed	m s-1	sampled synoptically.		vas	northward_wind
1	Near-Surface Specific Humidity	1	near-surface (usually 2 m) specific humidity, sampled synoptically.		huss	specific_humidity
1	Moisture in Upper 0.1 m of Soil Column	kg m-2	Compute the mass of water in all phases in the upper 0.1 meters of soil.		mrsos	moisture_content_of_soil_layer
1	Surface Temperature Where Land or Sea Ice	K	"skin" temperature of all surfaces except open ocean, sampled synoptically.		tsl	surface_temperature
1	Sea Surface Temperature	K	temperature of surface of open ocean, sampled synoptically.		tso	sea_surface_temperature
1	Convective Precipitation	kg m-2 s-1	at surface. This is a 3-hour mean convective precipitation flux.		prc	convective_precipitation_flux
1	Snowfall Flux	kg m-2 s-1	at surface. Includes all forms of precipitating solid phase of water. This is the 3-hour mean snowfall flux.		prsn	snowfall_flux
1	Total Runoff	kg m-2 s-1	compute the total runoff (including "drainage" through the base of the soil model) leaving the land portion of the grid cell divided by the land area in the grid cell, averaged over the 3-hour interval.		mrro	runoff_flux
1	Surface Downwelling Clear-Sky Longwave Radiation	W m-2	This is a 3-hour mean flux.		rldscs	downwelling_longwave_flux_in_air_assuming_clear_sky
1	Surface Downwelling Clear-Sky Shortwave Radiation	W m-2	This is a 3-hour mean flux.		rsdscs	surface_downwelling_shortwave_flux_in_air_assuming_clear_sky
1	Surface Upwelling Clear-Sky Shortwave Radiation	W m-2	This is a 3-hour mean flux.		rluscs	surface_upwelling_shortwave_flux_in_air_assuming_clear_sky

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	kg m-2 s-1	time:mean						real	longitude latitude time	pr	atmos	
	K	time: point						real	longitude latitude time1 height2m	tas	atmos	
	W m-2	time: mean					up	real	longitude latitude time	hfls	atmos	
	W m-2	time: mean					up	real	longitude latitude time	hfss	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rlds	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlus	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rsds	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsus	atmos	
											atmos	
	m s-1	time: point						real	longitude latitude time1 height2m	uas	atmos	
	m s-1	time: point						real	longitude latitude time1 height2m	vas	atmos	
	1	time: point						real	longitude latitude time1 height2m	huss	atmos	
	kg m-2	time: point						real	longitude latitude time1	mrsos	land	
	K	time: point						real	longitude latitude time1	tsl	land	
	K	time: point area: mean where sea						real	longitude latitude time1	tso	ocean	
	kg m-2 s-1	time:mean						real	longitude latitude time	prc	atmos	
	kg m-2 s-1	time:mean						real	longitude latitude time	prsn	atmos	
	kg m-2 s-1	time: mean area: mean where land						real	longitude latitude time	mrro	land	
	W m-2	time: mean					down	real	longitude latitude time	rldscs	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rsdscs	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rluscs	atmos	

1	Surface Pressure	Pa	sampled synoptically to diagnose atmospheric tides, this is better than mean sea level pressure.	ps	surface_air_pressure
1	Total Cloud Fraction	%	for the whole atmospheric column, as seen from the surface or the top of the atmosphere. Include both large-scale and convective cloud. This is a 3-hour mean.	clt	cloud_area_fraction
1	Surface Downward Diffuse Shortwave Radiation	W m^{-2}	This is a 3-hour mean flux.	rsdsdiff	

	Pa	time: point		real	longitude latitude time1	ps	atmos	
	%	time: mean		real	longitude latitude time	clt	atmos	
surface_diffusive_downwelling_shortwave_radiative_flux_in_air	W m-2	time: mean		real	longitude latitude time	rsdsdiff	atmos	

CMOR Table cfMon: CFMIP Monthly-Mean Cloud Diagnostic Fields cfMon mon

(All Saved on the Atmospheric Grid)

For further guidance, please see http://www.cfmip.net

The spread sheet "CFMIP output" specifies the simulations and time-periods for which the cloud diagnostic fields listed on this spread sheet should be saved.

In CMOR Table cfMon: *"CFMIP monthly 3D"-- mon thly mean 3-D fields on model levels (or half levels in the case of fluxes)*

priority	long name	units	comment	questions	output variable name	standard name
1	Upwelling Longwave Radiation	W m^-2	Include also the fluxes at the surface and TOA.		rlu	upwelling_longwave_flux_in_air
1	Upwelling Shortwave Radiation	W m^-2	Include also the fluxes at the surface and TOA.		rsu	upwelling_shortwave_flux_in_air
1	Downwelling Longwave Radiation	W m^-2	Include also the fluxes at the surface and TOA.		rld	downwelling_longwave_flux_in_air
1	Downwelling Shortwave Radiation	W m^-2	Include also the fluxes at the surface and TOA.		rsd	downwelling_shortwave_flux_in_air
1	Upwelling Clear-Sky Longwave Radiation	W m^-2	Include also the fluxes at the surface and TOA.		rlucs	upwelling_longwave_flux_in_air_assuming_clear_sky
1	Upwelling Clear-Sky Shortwave Radiation	W m^-2	Include also the fluxes at the surface and TOA.		rsucs	upwelling_shortwave_flux_in_air_assuming_clear_sky
1	Downwelling Clear-Sky Longwave Radiation	W m^-2	Include also the fluxes at the surface and TOA.		rldcs	downwelling_longwave_flux_in_air_assuming_clear_sky
1	Downwelling Clear-Sky Shortwave Radiation	W m^-2	Include also the fluxes at the surface and TOA.		rsdcs	downwelling_shortwave_flux_in_air_assuming_clear_sky
1	Air Temperature	K			ta	air_temperature
1	Tendency of Air Temperature	K s^-1			tnt	tendency_of_air_temperature
1	Tendency of Air Temperature due to Advection	K s^-1			tnta	tendency_of_air_temperature_due_to_advection
1	Tendency of Air Temperature due to Diabatic Processes	K s^-1			tntmp	tendency_of_air_temperature_due_to_model_physics
1	Tendency of Air Temperature Due to Stratiform Cloud and Precipitation and Boundary Layer Mixing	K s^-1			tntscpbl	tendency_of_air_temperature_due_to_stratiform_cloud_and_precipitation_and_boundary_layer_mixing
1	Tendency of Air Temperature due to Radiative Heating	K s^-1			tntr	tendency_of_air_temperature_due_to_radiative_heating
1	Tendency of Air Temperature due to Moist Convection	K s^-1			tntc	tendency_of_air_temperature_due_to_convection
1	Specific Humidity	1			hus	specific_humidity
1	Tendency of Specific Humidity	s^-1			tnhus	tendency_of_specific_humidity
1	Tendency of Specific Humidity due to Advection	s^-1			tnhusa	tendency_of_specific_humidity_due_to_advection
1	Tendency of Specific Humidity due to Convection	s^-1			tnhusc	tendency_of_specific_humidity_due_to_convection

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	W m-2	time: mean					up	real	longitude latitude alevbnds time	rlu	atmos	
	W m-2	time: mean					up	real	longitude latitude alevbnds time	rsu	atmos	
	W m-2	time: mean					down	real	longitude latitude alevbnds time	rld	atmos	
	W m-2	time: mean					down	real	longitude latitude alevbnds time	rsd	atmos	
	W m-2	time: mean					up	real	longitude latitude alevbnds time	rlucs	atmos	
	W m-2	time: mean					up	real	longitude latitude alevbnds time	rsucs	atmos	
	W m-2	time: mean					down	real	longitude latitude alevbnds time	rldcs	atmos	
	W m-2	time: mean					down	real	longitude latitude alevbnds time	rsdcs	atmos	
	K	time: mean						real	longitude latitude alevel time	ta	atmos	
	K s-1	time: mean						real	longitude latitude alevel time	tnt	atmos	
	K s-1	time: mean						real	longitude latitude alevel time	tnta	atmos	
	K s-1	time: mean						real	longitude latitude alevel time	tntmp	atmos	
	K s-1	time: mean						real	longitude latitude alevel time	tntscpbl	atmos	
	K s-1	time: mean						real	longitude latitude alevel time	tntr	atmos	
	K s-1	time: mean						real	longitude latitude alevel time	tntc	atmos	
											atmos	
	1	time: mean						real	longitude latitude alevel time	hus	atmos	
	s-1	time: mean						real	longitude latitude alevel time	tnhus	atmos	
	s-1	time: mean						real	longitude latitude alevel time	tnhusa	atmos	
	s-1	time: mean						real	longitude latitude alevel time	tnhusc	atmos	

1	Tendency of Specific Humidity due to Diffusion	s^{-1}		tnhusd	tendency_of_specific_humidity_due_to_diffusion
1	Tendency of Specific Humidity due to Stratiform Cloud Condensation and Evaporation	s^{-1}		tnhusscpbl	tendency_of_specific_humidity_due_to_stratiform_cloud_and_precipitation_and_boundary_layer_mixing
1	Tendency of Specific Humidity due to Model Physics	s^{-1}	This should include sources and sinks from parametrized physics (e.g. convection, stratiform condensation/evaporation, etc.) and should exclude sources and sinks from resolved dynamics and diffusion.	tnhusmp	tendency_of_specific_humidity_due_to_model_physics
1	Eddy Viscosity Coefficients for Momentum	$m^2 s^{-1}$		eviscu	atmosphere_momentum_diffusivity
1	Eddy Diffusivity Coefficients for Temperature	$m^2 s^{-1}$		evisct	atmosphere_heat_diffusivity
2	Convective Cloud Area Fraction	%		clc	convective_cloud_area_fraction_in_atmosphere_layer
2	Mass Fraction of Convective Cloud Liquid Water	1	Calculate as the mass of convective cloud liquid water in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.	clwc	mass_fraction_of_convective_cloud_liquid_water_in_air
2	Mass Fraction of Convective Cloud Ice	1	Calculate as the mass of convective cloud ice in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.	clic	mass_fraction_of_convective_cloud_ice_in_air
2	Stratiform Cloud Area Fraction	%		cls	stratiform_cloud_area_fraction_in_atmosphere_layer
2	Mass Fraction of Stratiform Cloud Liquid Water	1	Calculate as the mass of stratiform cloud liquid water in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.	clws	mass_fraction_of_stratiform_cloud_liquid_water_in_air
2	Mass Fraction of Stratiform Cloud Ice	1	Calculate as the mass of stratiform cloud ice in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.	clis	mass_fraction_of_stratiform_cloud_ice_in_air
2	Updraught Convective Mass Flux	kg $m^{-2} s^{-1}$	Report on model half-levels (i.e., model layer bounds and not standard pressures). Calculate as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	mcu	atmosphere_updraft_convective_mass_flux
2	Downdraught Convective Mass Flux	kg $m^{-2} s^{-1}$	Report on model half-levels (i.e., model layer bounds and not standard pressures). Calculate as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	mcd	atmosphere_downdraft_convective_mass_flux
2	Shallow Convective Mass Flux	kg $m^{-2} s^{-1}$	Report on model half-levels (i.e., model layer bounds and not standard pressures). For models with a distinct shallow convection scheme, calculate as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	smc	atmosphere_shallow_convective_mass_flux
2	Deep Convective Mass Flux	kg $m^{-2} s^{-1}$	Report on model half-levels (i.e., model layer bounds and not standard pressures). Calculate as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	dmc	atmosphere_deep_convective_mass_flux
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Condensation and Evaporation	s^{-1}		tnsclwce	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_condensation_and_evaporation

s-1	time: mean	real	longitude latitude alevel time	tnhusd	atmos
s-1	time: mean	real	longitude latitude alevel time	tnhusscpbl	atmos
s-1	time: mean	real	longitude latitude alevel time	tnhusmp	atmos
	time: mean				atmos
m2 s-1	time: mean	real	longitude latitude alevel time	eviscu	atmos
m2 s-1	time: mean	real	longitude latitude alevel time	evisct	atmos
%	time: mean	real	longitude latitude alevel time	clc	atmos
1	time: mean	real	longitude latitude alevel time	clwc	atmos
1	time: mean	real	longitude latitude alevel time	clic	atmos
%	time: mean	real	longitude latitude alevel time	cls	atmos
1	time: mean	real	longitude latitude alevel time	clws	atmos
1	time: mean	real	longitude latitude alevel time	clis	atmos
kg m-2 s-1	time: mean	real	longitude latitude alevbnds time	mcu	atmos
kg m-2 s-1	time: mean	real	longitude latitude alevbnds time	mcd	atmos
kg m-2 s-1	time: mean	real	longitude latitude alevbnds time	smc	atmos
kg m-2 s-1	time: mean	real	longitude latitude alevbnds time	dmc	atmos
					atmos
s-1	time: mean	real	longitude latitude alevel time	tnsclwce	atmos

2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water Due to Convective Detrainment	s^{-1}		tnsclwcd	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_convective_detrainment
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Homogeneous Nucleation	s^{-1}		tnsclwhon	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_homogeneous_nucleation
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Heterogeneous Nucleation	s^{-1}		tnsclwhen	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_heterogeneous_nucleation
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Riming	s^{-1}		tnsclwri	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_riming
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Accretion to Rain	s^{-1}		tnsclwar	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_accretion_to_rain
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Accretion to Snow	s^{-1}		tnsclwas	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_accretion_to_snow
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Melting From Cloud Ice	s^{-1}		tnsclwmi	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_melting_from_cloud_ice
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Autoconversion	s^{-1}		tnsclwac	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_autoconversion
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water due to Advection	s^{-1}		tnsclwa	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_advection
2	Tendency of Mass Fraction of Stratiform Cloud Ice Due Convective Detrainment	s^{-1}	Tendency of Mass Fraction of Stratiform Cloud Ice Due to Convective Detrainment	tnsclicd	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_convective_detrainment
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Homogeneous Nucleation	s^{-1}		tnsclihon	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_homogeneous_nucleation
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Heterogeneous Nucleation From Cloud Liquid	s^{-1}		tnsclihencl	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_heterogeneous_nucleation_from_cloud_liquid
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Heterogeneous Nucleation From Water Vapor	s^{-1}		tnsclihenv	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_heterogeneous_nucleation_from_water_vapor
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Riming From Cloud Liquid	s^{-1}		tnsclircl	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_riming_from_cloud_liquid
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Riming From Rain	s^{-1}		tnsclirir	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_riming_from_rain
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Deposition and Sublimation	s^{-1}		tnsclids	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_deposition_and_sublimation
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Aggregation	s^{-1}		tnscliag	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_aggregation
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Accretion to Snow	s^{-1}		tnsclias	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_accretion_to_snow
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Evaporation of Melting Ice	s^{-1}		tnscliemi	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_evaporation_of_melting_ice
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Melting to Rain	s^{-1}		tnsclimr	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_melting_to_rain
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Melting to Cloud Liquid	s^{-1}		tnsclimcl	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_melting_to_cloud_liquid
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Icefall	s^{-1}		tnscliif	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_icefall
2	Tendency of Mass Fraction of Stratiform Cloud Ice due to Advection	s^{-1}		tnsclia	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_advection
2	Tendency of Mass Fraction of Stratiform Cloud Condensed Water due to Condensation and Evaporation	s^{-1}	condensed water includes both liquid and ice.	tnsccwce	tendency_of_mass_fraction_of_stratiform_cloud_condensed_water_in_air_due_to_condensation_and_evaporation

	s-1	time: mean	real	longitude latitude alevel time	tnsclwcd	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclwhon	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclwhen	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclwri	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclwar	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclwas	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclwmi	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclwac	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclwa	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclicd	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclihon	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclihencl	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclihenv	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnscliricl	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclirir	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclids	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnscliag	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclias	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnscliemi	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclimr	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclimcl	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnscliif	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsclia	atmos
	s-1	time: mean	real	longitude latitude alevel time	tnsccwce	atmos

2	Tendency of Mass Fraction of Stratiform Cloud Condensed Water due to Autoconversion to Rain	s^{-1}	condensed water includes both liquid and ice.		tnsccwacr	tendency_of_mass_fraction_of_stratiform_cloud_condensed_water_in_air_due_to_autoconversion_to_rain
2	Tendency of Mass Fraction of Stratiform Cloud Condensed Water due to Autoconversion to Snow	s^{-1}	condensed water includes both liquid and ice.		tnsccwacs	tendency_of_mass_fraction_of_stratiform_cloud_condensed_water_in_air_due_to_autoconversion_to_snow
2	Tendency of Mass Fraction of Stratiform Cloud Condensed Water due to Icefall	s^{-1}	condensed water includes both liquid and ice.		tnsccwif	tendency_of_mass_fraction_of_stratiform_cloud_condensed_water_in_air_due_to_icefall
2	Tendency of Mass Fraction of Stratiform Cloud Condensed Water due to Advection	s^{-1}	condensed water includes both liquid and ice.		tnsccwa	tendency_of_mass_fraction_of_stratiform_cloud_condensed_water_in_air_due_to_advection

In CMOR Table cfMon: *"CFMIP monthly 4xCO2 2D" -- mon thly mean 2D TOA radiative fluxes calculated by instantaneously quadrupling CO2.*

priority	long name	units	comment	questions	output variable name	standard name
1	TOA Outgoing Shortwave Radiation in 4XCO2 Atmosphere	W m^{-2}			rsut4co2	toa_outgoing_shortwave_flux
1	TOA Outgoing Longwave Radiation 4XCO2 Atmosphere	W m^{-2}			rlut4co2	toa_outgoing_longwave_flux
1	TOA Outgoing Clear-Sky Shortwave Radiation 4XCO2 Atmosphere	W m^{-2}			rsutcs4co2	toa_outgoing_shortwave_flux_assuming_clear_sky
1	TOA Outgoing Clear-Sky Longwave Radiation 4XCO2 Atmosphere	W m^{-2}			rlutcs4co2	toa_outgoing_longwave_flux_assuming_clear_sky

In CMOR Table cfMon: *"CFMIP monthly 4xCO2 3D" -- mon thly mean 3-D radiative fluxes calculated by instantaneously quadrupling CO2. On model half levels, including the surface and the Top of the Atmosphere.*

priority	long name	units	comment	questions	output variable name	standard name
1	Upwelling Longwave Radiation 4XCO2 Atmosphere	W m^{-2}			rlu4co2	upwelling_longwave_flux_in_air
1	Upwelling Shortwave Radiation 4XCO2 Atmosphere	W m^{-2}			rsu4co2	upwelling_shortwave_flux_in_air
1	Downwelling Longwave Radiation 4XCO2 Atmosphere	W m^{-2}			rld4co2	downwelling_longwave_flux_in_air
1	Downwelling Shortwave Radiation 4XCO2 Atmosphere	W m^{-2}			rsd4co2	downwelling_shortwave_flux_in_air
1	Upwelling Clear-Sky Longwave Radiation 4XCO2 Atmosphere	W m^{-2}			rlucs4co2	upwelling_longwave_flux_in_air_assuming_clear_sky
1	Upwelling Clear-Sky Shortwave Radiation 4XCO2 Atmosphere	W m^{-2}			rsucs4co2	upwelling_shortwave_flux_in_air_assuming_clear_sky
1	Downwelling Clear-Sky Longwave Radiation 4XCO2 Atmosphere	W m^{-2}			rldcs4co2	downwelling_longwave_flux_in_air_assuming_clear_sky
1	Downwelling Clear-Sky Shortwave Radiation 4XCO2 Atmosphere	W m^{-2}			rsdcs4co2	downwelling_shortwave_flux_in_air_assuming_clear_sky

	s-1	time: mean						real	longitude latitude alevel time	tnsccwacr	atmos	
	s-1	time: mean						real	longitude latitude alevel time	tnsccwacs	atmos	
	s-1	time: mean						real	longitude latitude alevel time	tnsccwif	atmos	
	s-1	time: mean						real	longitude latitude alevel time	tnsccwa	atmos	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	W m-2	time: mean					up	real	longitude latitude time	rsut4co2	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlut4co2	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsutcs4co2	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlutcs4co2	atmos	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm
	W m-2	time: mean					up	real	longitude latitude alevbnds time	rlu4co2	atmos
	W m-2	time: mean					up	real	longitude latitude alevbnds time	rsu4co2	atmos
	W m-2	time: mean					down	real	longitude latitude alevbnds time	rld4co2	atmos
	W m-2	time: mean					down	real	longitude latitude alevbnds time	rsd4co2	atmos
	W m-2	time: mean					up	real	longitude latitude alevbnds time	rlucs4co2	atmos
	W m-2	time: mean					up	real	longitude latitude alevbnds time	rsucs4co2	atmos
	W m-2	time: mean					down	real	longitude latitude alevbnds time	rldcs4co2	atmos
	W m-2	time: mean					down	real	longitude latitude alevbnds time	rsdcs4co2	atmos

In CMOR Table cfMon: *"CFMIP monthly inline" -- monthly mean in line ISCCP and CALIPSO/PARASOL simulator output*

priority	long name	units	comment	questions	output variable name	standard name
1	ISCCP Total Cloud Fraction	%			cltisccp	cloud_area_fraction
1	ISCCP Mean Cloud Albedo	1	When computing time-means, weight by the ISCCP Total Cloud Fraction - see http://www.cfmip.net/README		albisccp	cloud_albedo
1	ISCCP Mean Cloud Top Pressure	Pa	When computing time-means, weight by the ISCCP Total Cloud Fraction - see http://www.cfmip.net/README		ctpisccp	air_pressure_at_cloud_top
1	ISCCP Cloud Area Fraction	%	7 levels x 7 tau		clisccp	isccp_cloud_area_fraction
1	CALIPSO Total Cloud Fraction	%			cltcalipso	cloud_area_fraction
1	CALIPSO Low Level Cloud Fraction	%			cllcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO Mid Level Cloud Fraction	%			clmcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO High Level Cloud Fraction	%			clhcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO Cloud Fraction	%	40 height levels		clcalipso	cloud_area_fraction_in_atmosphere_layer
1	PARASOL Reflectance	1	5 bins of solar zenith angle. This is reflectance as seen at the top of the atmosphere.		parasolRefl	toa_bidirectional_reflectance

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	%	time: mean						real	longitude latitude time	cltisccp	atmos	
	1	time: mean						real	longitude latitude time	albisccp	atmos	
	Pa	time: mean						real	longitude latitude time	ctpisccp	atmos	
	%	time: mean						real	longitude latitude plev7, tau, time	clisccp	atmos	
	%	time: mean						real	longitude latitude time	cltcalipso	atmos	
	%	time: mean						real	longitude latitude time p840	cllcalipso	atmos	
	%	time: mean						real	longitude latitude time p560	clmcalipso	atmos	
	%	time: mean						real	longitude latitude time p220	clhcalipso	atmos	
	%	time: mean						real	longitude latitude alt40 time	clcalipso	atmos	
	1	time: mean						real	longitude latitude sza5 time	parasolRefl	atmos	

CMOR Table cfOff: "CFMIP monthly offline" Cloud Diagnostic Fields cfOff mon

(All Saved on the Atmospheric Grid)

For further guidance, please see http://www.cfmip.net

The spread sheet "CFMIP output" specifies the simulations and time-periods for which the cloud diagnostic fields listed on this spread sheet should be saved.

CMOR Table cfOff: *"CFMIP monthly offline" -- monthly mean CloudSat/CALIPSO/PARASOL simulator output*

(Calculate monthly means by averaging the orbital curtain output from CFMIP_orbital_offline. The difference between similar variables appearing in this and the previous table is in the spatial sampling and time period requested. The previous table builds monthly means from global fields, whereas this table below uses only data along the satellite track for a short period of time (one year). This will enable studies of the impact of the satellite sampling in the comparisons.)

priority	long name	units	comment	questions	output variable name	standard name
1	CALIPSO Cloud Fraction	%	(40 height levels)		clcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO Cloud Fraction Undetected by CloudSat	%	(40 height levels) Clouds detected by CALIPSO but below the detectability threshold of CloudSat		clcalipso2	cloud_area_fraction_in_atmosphere_layer
1	CloudSat Radar Reflectivity	1	CFADs (Cloud Frequency Altitude Diagrams) are joint height - radar reflectivity (or lidar scattering ratio) distributions (40 levelsx15 bins) .		cfadDbze94	histogram_of_equivalent_reflectivity_factor_over_height_above_reference_ellipsoid
1	CALIPSO Scattering Ratio	1	CFADs (Cloud Frequency Altitude Diagrams) are joint height - radar reflectivity (or lidar scattering ratio) distributions (40 levelsx15 bins) .		cfadLidarsr532	histogram_of_backscattering_ratio_over_height_above_reference_ellipsoid
1	PARASOL Reflectance	1	Simulated reflectance from PARASOL as seen at the top of the atmosphere for 5 solar zenith angles. Valid only over ocean and for one viewing direction (viewing zenith angle of 30 degrees and relative azimuth angle 320 degrees).		parasolRefl	toa_bidirectional_reflectance
1	CALIPSO Total Cloud Fraction	%			cltcalipso	cloud_area_fraction
1	CALIPSO Low Level Cloud Fraction	%			cllcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO Mid Level Cloud Fraction	%			clmcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO High Level Cloud Fraction	%			clhcalipso	cloud_area_fraction_in_atmosphere_layer

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	%	time: mean						real	longitude latitude alt40 time	clcalipso	atmos	
	%	time: mean						real	longitude latitude alt40 time	clcalipso2	atmos	
	1	time: mean						real	longitude latitude alt40 dbze time	cfadDbze94	atmos	
	1	time: mean						real	longitude latitude alt40 scatratio time	cfadLidarsr532	atmos	
	1	time: mean						real	longitude latitude sza5 time	parasolRefl	atmos	
	%	time: mean						real	longitude latitude time	cltcalipso	atmos	
	%	time: mean						real	longitude latitude time p840	cllcalipso	atmos	
	%	time: mean						real	longitude latitude time p560	clmcalipso	atmos	
	%	time: mean						real	longitude latitude time p220	clhcalipso	atmos	

CMOR Table cfDa: CFMIP Daily-Mean Cloud Diagnostic Fields cfDa da

(All Saved on the Atmospheric Grid)

For further guidance, please see http://www.cfmip.net

The spread sheet "CFMIP output" specifies the simulations and time-periods for which the cloud diagnostic fields listed on this spread sheet should be saved.

In CMOR Table cfDa: *"CFMIP daily 2D" -- daily mean 2-D fields including inline ISCCP/CloudSat/CALIPSO/ PARASOL simulator output*

priority	long name	units	comment	questions	output variable name	standard name
1	Surface Air Pressure	Pa			ps	surface_air_pressure
1	TOA Incident Shortwave Radiation	W m^{-2}			rsdt	toa_incoming_shortwave_flux
1	TOA Outgoing Shortwave Radiation	W m^{-2}			rsut	toa_outgoing_shortwave_flux
1	Surface Downwelling Clear-Sky Shortwave Radiation	W m^{-2}			rsdscs	surface_downwelling_shortwave_flux_in_air_assuming_clear_sky
1	Surface Upwelling Clear-Sky Shortwave Radiation	W m^{-2}			rsuscs	
1	Surface Downwelling Clear-Sky Longwave Radiation	W m^{-2}			rldscs	surface_downwelling_longwave_flux_in_air_assuming_clear_sky
1	TOA Outgoing Clear-Sky Longwave Radiation	W m^{-2}			rlutcs	toa_outgoing_longwave_flux_assuming_clear_sky
1	TOA Outgoing Clear-Sky Shortwave Radiation	W m^{-2}			rsutcs	toa_outgoing_shortwave_flux_assuming_clear_sky
1	Total Cloud Fraction	%	for the whole atmospheric column, as seen from the surface or the top of the atmosphere. Include both large-scale and convective cloud.		clt	cloud_area_fraction
1	Condensed Water Path	kg m^{-2}	calculate mass of condensed (liquid + ice) water in the column divided by the area of the column (not just the area of the cloudy portion of the column). Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clwvi	atmosphere_cloud_condensed_water_content
1	Ice Water Path	kg m^{-2}	calculate mass of ice water in the column divided by the area of the column (not just the area of the cloudy portion of the column). Include precipitating frozen hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clivi	atmosphere_cloud_ice_content
1	omega (=dp/dt)	Pa s^{-1}	at 500 hPa level; commonly referred to as "omega", this represents the vertical component of velocity in pressure coordinates (positive down)		wap500	lagrangian_tendency_of_air_pressure
1	Air Temperature	K	at 700 hPa level		ta700	air_temperature
1	Air Pressure at Convective Cloud Base	Pa			pccb	air_pressure_at_convective_cloud_base
1	Air Pressure at Convective Cloud Top	Pa			pcct	air_pressure_at_convective_cloud_top
1	Convective Precipitation	kg m^{-2} s^{-1}			prc	convective_precipitation_flux
1	Surface Upward Latent Heat Flux	W m^{-2}			hfls	surface_upward_latent_heat_flux
1	Surface Upward Sensible Heat Flux	W m^{-2}			hfss	surface_upward_sensible_heat_flux
1	Surface Downwelling Longwave Radiation	W m^{-2}			rlds	surface_downwelling_longwave_flux_in_air
1	Surface Upwelling Longwave Radiation	W m^{-2}			rlus	surface_upwelling_longwave_flux_in_air
1	Surface Downwelling Shortwave Radiation	W m^{-2}			rsds	surface_downwelling_shortwave_flux_in_air
1	Surface Upwelling Shortwave Radiation	W m^{-2}			rsus	surface_upwelling_shortwave_flux_in_air
1	TOA Outgoing Longwave Radiation	W m^{-2}			rlut	toa_outgoing_longwave_flux
1	ISCCP Total Total Cloud Fraction	%			cltisccp	cloud_area_fraction

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	Pa	time: mean						real	longitude latitude time	ps	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rsdt	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsut	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rsdscs	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsuscs	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rldscs	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlutcs	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsutcs	atmos	
	%	time: mean						real	longitude latitude time	clt	atmos	
	kg m-2	time: mean						real	longitude latitude time	clwvi	atmos	
	kg m-2	time: mean						real	longitude latitude time	clivi	atmos	
	Pa s-1	time: mean						real	longitude latitude time p500	wap500	atmos	
	K	time: mean						real	longitude latitude time p700	ta700	atmos	
	Pa	time: mean						real	longitude latitude time	pccb	atmos	
	Pa	time: mean						real	longitude latitude time	pcct	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude time	prc	atmos	
	W m-2	time: mean					up	real	longitude latitude time	hfls	atmos	
	W m-2	time: mean					up	real	longitude latitude time	hfss	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rlds	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlus	atmos	
	W m-2	time: mean					down	real	longitude latitude time	rsds	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rsus	atmos	
	W m-2	time: mean					up	real	longitude latitude time	rlut	atmos	
	%	time: mean						real	longitude latitude time	cltisccp	atmos	

1	ISCCP Mean Cloud Albedo	1	When computing time-means, weight by the ISCCP Total Cloud Fraction - see http://www.cfmip.net/README		albisccp	cloud_albedo
1	ISCCP Mean Cloud Top Pressure	Pa	When computing time-means, weight by the ISCCP Total Cloud Fraction - see http://www.cfmip.net/README		pctisccp	air_pressure_at_cloud_top
1	PARASOL Reflectance	1	Simulated reflectance from PARASOL as seen at the top of the atmosphere for 5 solar zenith angles. Valid only over ocean and for one viewing direction (viewing zenith angle of 30 degrees and relative azimuth angle 320 degrees).		parsolRefl	toa_bidirectional_reflectance
1	CALIPSO Total Cloud Fraction	%			cltcalipso	cloud_area_fraction
1	CALIPSO Low Level Cloud Fraction	%			cllcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO Mid Level Cloud Fraction	%			clmcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO High Level Cloud Fraction	%			clhcalipso	cloud_area_fraction_in_atmosphere_layer

In CMOR Table cfDa: *"CFMIP daily 3D"* *--daily mean 3-D fields on model levels plus CALIPSO and ISCCP cloud fractions*

priority	long name	units	comment	questions	output variable name	standard name
1	Eastward Wind	$m\ s^{-1}$			ua	eastward_wind
1	Northward Wind	$m\ s^{-1}$			va	northward_wind
1	Air Temperature	K			ta	air_temperature
1	Specific Humidity	1			hus	specific_humidity
1	omega (=dp/dt)	$Pa\ s^{-1}$	commonly referred to as "omega", this represents the vertical component of velocity in pressure coordinates (positive down)		wap	lagrangian_tendency_of_air_pressure
1	Geopotential Height	m			zg	geopotential_height
1	Relative Humidity	%	This is the relative humidity with respect to liquid water for T> 0 C, and with respect to ice for T<0 C.		hur	relative_humidity
1	Cloud Area Fraction in Atmosphere Layer	%			cl	cloud_area_fraction_in_atmosphere_layer
1	Mass Fraction of Cloud Liquid Water	1	Calculate as the mass of cloud liquid water in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clw	mass_fraction_of_cloud_liquid_water_in_air
1	Mass Fraction of Cloud Ice	1	Calculate as the mass of cloud ice in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		cli	mass_fraction_of_cloud_ice_in_air
1	Convective Mass Flux	$kg\ m^{-2}\ s^{-1}$	Report on model half-levels (i.e., model layer bounds and not standard pressures). Calculate as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).		mc	atmosphere_convective_mass_flux
1	CALIPSO Cloud Fraction	%	40 levels		clcalipso	cloud_area_fraction_in_atmosphere_layer
1	ISCCP Cloud Area Fraction	%	7 levels x 7 tau		clisccp	cloud_area_fraction_in_atmosphere_layer
1	Pressure on Model Levels	Pa	This field is needed only for models in which the pressure can't be calculated from the vertical coordinate information stored already for each variable. Thus, the pressures are needed for height or theta-coordinate models, for example, but not sigma- or eta-coordinate models.		pfull	air_pressure

	1	time: mean						real	longitude latitude time	albisccp	atmos	
	Pa	time: mean						real	longitude latitude time	pctisccp	atmos	
	1	time: mean						real	longitude latitude sza5 time	parsolRefl	atmos	
	%	time: mean						real	longitude latitude time	cltcalipso	atmos	
	%	time: mean						real	longitude latitude time	cllcalipso	atmos	
	%	time: mean						real	longitude latitude time	clmcalipso	atmos	
	%	time: mean						real	longitude latitude time	clhcalipso	atmos	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	m s-1	time: mean						real	longitude latitude alevel time	ua	atmos	
	m s-1	time: mean						real	longitude latitude alevel time	va	atmos	
	K	time: mean						real	longitude latitude alevel time	ta	atmos	
	1	time: mean						real	longitude latitude alevel time	hus	atmos	
	Pa s-1	time: mean						real	longitude latitude alevel time	wap	atmos	
	m	time: mean						real	longitude latitude alevel time	zg	atmos	
	%	time: mean						real	longitude latitude alevel time	hur	atmos	
	%	time: mean						real	longitude latitude alevel time	cl	atmos	
	1	time: mean						real	longitude latitude alevel time	clw	atmos	
	1	time: mean						real	longitude latitude alevel time	cli	atmos	
	kg m-2 s-1	time: mean						real	longitude latitude alevbnds time	mc	atmos	
	%	time: mean						real	longitude latitude alt40 time	clcalipso	atmos	
	%	time: mean						real	longitude latitude tau plev7 time	clisccp	atmos	
	Pa	time: mean						real	longitude latitude alevel time	pfull	atmos	

1	Pressure on Model Half-Levels	Pa	This field is needed only for models in which the pressure can't be calculated from the vertical coordinate information stored already for each variable. Thus, the pressures are needed for height or theta-coordinate models, for example, but not sigma- or eta-coordinate models.	phalf	air_pressure

	Pa	time: mean		real	longitude latitude alevbnds time	phalf	atmos

CMOR Table cf3hr: CFMIP 3-Hourly Cloud Diagnostic Fields cf3hr 3hr

(All Saved on the Atmospheric Grid)

For further guidance, please see http://www.cfmip.net

The spread sheet "CFMIP output" specifies the simulations and time-periods for which the cloud diagnostic fields listed on this spread sheet should be saved.

In CMOR Table cf3hr: *"CFMIP 3-hourly orbital offline" -- CloudSat/CALIPSO/PARASOL simulator output in orbital curtain format*

(For most of these variables, extract simulator input variables from models along A-train orbits, and run COSP on these in 'offline' mode.)

priority	long name	units	comment	questions	output variable name	standard name
1	CALIPSO Cloud Area Fraction	%	(40 height levels)		clcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO Cloud Fraction Undetected by CloudSat	%	(40 height levels) Clouds detected by CALIPSO but below the detectability threshold of CloudSat		clcalipso2	cloud_area_fraction_in_atmosphere_layer
1	CloudSat Radar Reflectivity CFAD	1	CFADs (Cloud Frequency Altitude Diagrams) are joint height - radar reflectivity (or lidar scattering ratio) distributions (40 levelsx15 bins) .		cfadDbze94	histogram_of_equivalent_reflectivity_factor_over_height_above_reference_ellipsoid
1	CALIPSO Scattering Ratio CFAD	1	CFADs (Cloud Frequency Altitude Diagrams) are joint height - radar reflectivity (or lidar scattering ratio) distributions (40 levelsx15 bins) .		cfadLidarsr532	histogram_of_backscattering_ratio_over_height_above_reference_ellipsoid
1	PARASOL Reflectance	1	Simulated reflectance from PARASOL as seen at the top of the atmosphere for 5 solar zenith angles. Valid only over ocean and for one viewing direction (viewing zenith angle of 30 degrees and relative azimuth angle 320 degrees).		parasolRefl	toa_bidirectional_reflectance
1	CALIPSO Total Cloud Fraction	%			cltcalipso	cloud_area_fraction
1	CALIPSO Low Level Cloud Fraction	%			cllcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO Mid Level Cloud Fraction	%			clmcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO High Level Cloud Fraction	%			clhcalipso	cloud_area_fraction_in_atmosphere_layer
1	Longitude	degrees_east	function of time		lon	longitude
1	Latitude	degrees_north	function of time		lat	latitude
1	Offset Time	day	this "offset time" should be added to the value stored in the "time dimension" to get the actual time. This actual time is the time (UTC) of the corresponding point in the satellite orbit used to extract the model data.		toffset	time

In CMOR Table cf3hr: *"CFMIP 3-hourly inline" -- 2-D fields as specified in the Amon table plus convective cloud fraction and 3-D fields on model levels (or half levels, as indicated) sampled synoptically every 3 hours (i.e., not time-mean) at 0Z, 3Z, 6Z, 9Z, 12Z, 15Z, 18Z, and 21Z.*

priority	long name	units	comment	questions	output variable name	standard name
1	(use names for Amon 2D table)		This table includes all the 2-D variables listed in the Amon table, omitting, however, the daily maximum and minimum temperatures. All variables should be reported as synoptic fields, not daily means.		include Amon 2D	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
	%	time: point						real	location alt40 time1	clcalipso	atmos	
	%	time: point						real	location alt40 time1	clcalipso2	atmos	
	1	time: point						real	location alt40 dbze time1	cfadDbze94	atmos	
	1	time: point						real	location alt40 scatratio time1	cfadLidarsr532	atmos	
	1	time: point						real	location sza5 time1	parasolRefl	atmos	
	%	time: point						real	location time1	cltcalipso	atmos	
	%	time: point						real	location time1 p840	cllcalipso	atmos	
	%	time: point						real	location time1 p560	clmcalipso	atmos	
	%	time: point						real	location time1 p220	clhcalipso	atmos	
	degrees_east	time: point						real	location time1	lon	atmos	
	degrees_north	time: point						real	location time1	lat	atmos	
	day							real	location time1	toffset	atmos	

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
		time: point						real	longitude latitude time1		atmos	

1	Convective Cloud Fraction	%	for the whole atmospheric column, as seen from the surface or the top of the atmosphere. Include only convective cloud. Besides the quantities from the Amon table, this is the only other 2-D field in this table.		cltc	convective_cloud_area_fraction
2	Altitude of Model Full-Levels	m	This is actual height above mean sea level, not geopotential height		zfull	height_above_reference_ellipsoid
2	Altitude of Model Half-Levels	m	This is actual height above mean sea level, not geopotential height. This is actual height above mean sea level, not geopotential height. Include both the top of the model atmosphere and surface levels.		zhalf	height_above_reference_ellipsoid
2	Pressure at Model Full-Levels	Pa	provide this field for models in which the pressure can't be calculated from the vertical coordinate information stored already for each variable. Thus, the pressures are needed for height or theta-coordinate models, for example, but not sigma- or eta-coordinate models.		pfull	air_pressure
2	Pressure at Model Half-Levels	Pa	provide this field for models in which the pressure can't be calculated from the vertical coordinate information stored already for each variable. Thus, the pressures are needed for height or theta-coordinate models, for example, but not sigma- or eta-coordinate models.		phalf	air_pressure
2	Air Temperature	K			ta	air_temperature
2	Mass Fraction of Water	1	include all phases of water		h2o	mass_fraction_of_water_in_air
2	Mass Fraction of Stratiform Cloud Liquid Water	1	Calculate as the mass of stratiform cloud liquid water in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clws	mass_fraction_of_stratiform_cloud_liquid_water_in_air
2	Mass Fraction of Stratiform Cloud Ice	1	Calculate as the mass of stratiform cloud ice in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clis	mass_fraction_of_stratiform_cloud_ice_in_air
2	Mass Fraction of Convective Cloud Liquid Water	1	Calculate as the mass of convective cloud liquid water in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clwc	mass_fraction_of_convective_cloud_liquid_water_in_air
2	Mass Fraction of Convective Cloud Ice	1	Calculate as the mass of convective cloud ice in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clic	mass_fraction_of_convective_cloud_ice_in_air
2	Hydrometeor Effective Radius of Stratiform Cloud Liquid Water	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffclws	effective_radius_of_stratiform_cloud_liquid_water_particle
2	Hydrometeor Effective Radius of Stratiform Cloud Ice	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffclis	effective_radius_of_stratiform_cloud_ice_particle
2	Hydrometeor Effective Radius of Convective Cloud Liquid Water	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffclwc	effective_radius_of_convective_cloud_liquid_water_particle
2	Hydrometeor Effective Radius of Convective Cloud Ice	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffclic	effective_radius_of_convective_cloud_ice_particle
2	Stratiform Graupel Flux	kg $m^{-2} s^{-1}$	report on model half-levels		grpllsprof	large_scale_graupel_flux
2	Convective Rainfall Flux	kg $m^{-2} s^{-1}$	report on model half-levels		prcprof	convective_rainfall_flux
2	Stratiform Rainfall Flux	kg $m^{-2} s^{-1}$	report on model half-levels		prlsprof	large_scale_rainfall_flux
2	Convective Snowfall Flux	kg $m^{-2} s^{-1}$	report on model half-levels		prsnc	convective_snowfall_flux
2	Stratiform Snowfall Flux	kg $m^{-2} s^{-1}$	report on model half-levels		prlsns	large_scale_snowfall_flux
2	Hydrometeor Effective Radius of Stratiform Graupel	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffgrpls	effective_radius_of_stratiform_cloud_graupel_particle

%	time: point	0	100	real	longitude latitude time1	cltc	atmos
m	time: point			real	longitude latitude alevel time1	zfull	atmos
m	time: point			real	longitude latitude alevbnds time1	zhalf	atmos
Pa	time: point			real	longitude latitude alevel time1	pfull	atmos
Pa	time: point			real	longitude latitude alevbnds time1	phalf	atmos
K	time: point			real	longitude latitude alevel time1	ta	atmos
1	time: point			real	longitude latitude alevel time1	h2o	atmos
1	time: point			real	longitude latitude alevel time1	clws	atmos
1	time: point			real	longitude latitude alevel time1	#REF!	atmos
1	time: point			real	longitude latitude alevel time1	clis	atmos
1	time: point			real	longitude latitude alevel time1	clic	atmos
m	time: point			real	longitude latitude alevel time1	reffclws	atmos
m	time: point			real	longitude latitude alevel time1	reffclis	atmos
m	time: point			real	longitude latitude alevel time1	reffclwc	atmos
m	time: point			real	longitude latitude alevel time1	reffclic	atmos
kg m-2 s-1	time: point			real	longitude latitude alevel time1	grpllsprof	atmos
kg m-2 s-1	time: point			real	longitude latitude alevel time1	prcprof	atmos
kg m-2 s-1	time: point			real	longitude latitude alevel time1	prlsprof	atmos
kg m-2 s-1	time: point			real	longitude latitude alevel time1	prsnc	atmos
kg m-2 s-1	time: point			real	longitude latitude alevel time1	prlsns	atmos
m	time: point			real	longitude latitude alevel time1	reffgrpls	atmos

2	Hydrometeor Effective Radius of Convective Rainfall	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffrainc	effective_radius_of_convective_cloud_rain_particle
2	Hydrometeor Effective Radius of Stratiform Rainfall	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffrains	effective_radius_of_stratiform_cloud_rain_particle
2	Hydrometeor Effective Radius of Convective Snowfall	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffsnowc	effective_radius_of_convective_cloud_snow_particle
2	Hydrometeor Effective Radius of Stratiform Snowfall	m	This is defined as the in-cloud ratio of the third moment over the second moment of the particle size distribution (obtained by considering only the cloudy portion of the grid cell).		reffsnows	effective_radius_of_stratiform_cloud_snow_particle
2	Stratiform Cloud Optical Depth	1	This is the in-cloud optical depth obtained by considering only the cloudy portion of the grid cell.		dtaus	atmosphere_optical_thickness_due_to_stratiform_cloud
2	Convective Cloud Optical Depth	1	This is the in-cloud optical depth obtained by considering only the cloudy portion of the grid cell		dtauc	atmosphere_optical_thickness_due_to_convective_cloud
2	Stratiform Cloud Emissivity	1	This is the in-cloud emissivity obtained by considering only the cloudy portion of the grid cell.		dems	stratiform_cloud_longwave_emissivity
2	Convective Cloud Emissivity	1	This is the in-cloud emissivity obtained by considering only the cloudy portion of the grid cell.		demc	convective_cloud_longwave_emissivity

m	time: point		real	longitude latitude alevel time1	reffrainc	atmos
m	time: point		real	longitude latitude alevel time1	reffrains	atmos
m	time: point		real	longitude latitude alevel time1	reffsnowc	atmos
m	time: point		real	longitude latitude alevel time1	reffsnows	atmos
1	time: point		real	longitude latitude alevel time1	dtaus	atmos
1	time: point		real	longitude latitude alevel time1	dtauc	atmos
1	time: point		real	longitude latitude alevel time1	dems	atmos
1	time: point		real	longitude latitude alevel time1	demc	atmos

CMOR Table cfSites: CFMIP high frequency Cloud Diagnostic Fields cfSites subhr

(sampled only at specified locations)

For further guidance, please see http://www.cfmip.net

The spread sheet "CFMIP output" specifies the simulations and time-periods for which the cloud diagnostic fields listed on this spread sheet should be saved.

CMOR Table cfSites: "CFMIP Timestep Station Data" -- 2-D fields from the Amon table and 3-D fields on model levels sampled at 20 to 30 minute intervals at 118 specified locations (see http://cfmip.metoffice.com/cfmip2/pointlocations.txt)

The sampling interval should be the integer multiple of the model time-step that is nearest to 30 minutes and divides into 60 minutes with no remainder. e.g. (30->30,20->20,15->30,10->30). Outputs should be instantaneous (not time mean) and from nearest gridbox (no spatial interpolation.) Note that except for the quantities appearing in the Amon spreadsheet (first line of table below), all other fields are 3-D.

priority	long name	units	comment	questions	output variable name	standard name
1	(use names from Amon 2D table)		This table includes the 2-D variables listed in the "Amon" spreadsheet, omitting, however, the daily maximum and minimum temperatures. All variables should be reported as synoptic fields, not daily means.		include Amon 2D	
1	Cloud Area Fraction	%	Include both large-scale and convective cloud.		cl	cloud_area_fraction_in_atmosphere_layer
1	Mass Fraction of Cloud Liquid Water	1	Include both large-scale and convective cloud. Calculate as the mass of cloud liquid water in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		clw	mass_fraction_of_cloud_liquid_water_in_air
1	Mass Fraction of Cloud Ice	1	Include both large-scale and convective cloud. Calculate as the mass of cloud ice in the grid cell divided by the mass of air (including the water in all phases) in the grid cell. Include precipitating hydrometeors ONLY if the precipitating hydrometeor affects the calculation of radiative transfer in model.		cli	mass_fraction_of_cloud_ice_in_air
1	Convective Mass Flux	kg m^{-2} s^{-1}	Report on model half-levels (i.e., model layer bounds and not standard pressures). The atmosphere convective mass flux is the vertical transport of mass for a field of cumulus clouds or cloudless thermals, given by the product of air density and vertical velocity. Calculate as the convective mass flux divided by the area of the whole grid cell (not just the area of the updrafts).		mc	atmosphere_convective_mass_flux
1	Air Temperature	K			ta	air_temperature
1	Eastward Wind	m s^{-1}			ua	eastward_wind
1	Northward Wind	m s^{-1}			va	northward_wind
1	Specific Humidity	1			hus	specific_humidity
1	Relative Humidity	%	This is the relative humidity with respect to liquid water for T> 0 C, and with respect to ice for T<0 C.		hur	relative_humidity
1	omega (=dp/dt)	Pa s^{-1}	commonly referred to as "omega", this represents the vertical component of velocity in pressure coordinates (positive down)		wap	lagrangian_tendency_of_air_pressure
1	Geopotential Height	m			zg	geopotential_height

unconfirmed or proposed standard name	unformatted units	cell_methods	valid min	valid max	mean absolute min	mean absolute max	positive	type	CMOR dimensions	CMOR variable name	realm	frequency
		time: point						real	site, time1		atmos	
	%	time: point						real	alevel, site, time1	cl	atmos	
	1	time: point						real	alevel, site, time1	clw	atmos	
	1	time: point						real	alevel, site, time1	cli	atmos	
	kg m-2 s-1	time: point						real	alevbnds, site, time1	mc	atmos	
	K	time: point						real	alevel, site, time1	ta	atmos	
	m s-1	time: point						real	alevel, site, time1	ua	atmos	
	m s-1	time: point						real	alevel, site, time1	va	atmos	
	1	time: point						real	alevel, site, time1	hus	atmos	
	%	time: point						real	alevel, site, time1	hur	atmos	
	Pa s-1	time: point						real	alevel, site, time1	wap	atmos	
	m	time: point						real	alevel, site, time1	zg	atmos	

1	Upwelling Longwave Radiation	W m^{-2}	rlu	upwelling_longwave_flux_in_air
1	Upwelling Shortwave Radiation	W m^{-2}	rsu	upwelling_shortwave_flux_in_air
1	Downwelling Longwave Radiation	W m^{-2}	rld	downwelling_longwave_flux_in_air
1	Downwelling Shortwave Radiation	W m^{-2}	rsd	downwelling_shortwave_flux_in_air
1	Upwelling Clear-Sky Longwave Radiation	W m^{-2}	rlucs	upwelling_longwave_flux_in_air_assuming_clear_sky
1	Upwelling Clear-Sky Shortwave Radiation	W m^{-2}	rsucs	upwelling_shortwave_flux_in_air_assuming_clear_sky
1	Downwelling Clear-Sky Longwave Radiation	W m^{-2}	rldcs	downwelling_longwave_flux_in_air_assuming_clear_sky
1	Downwelling Clear-Sky Shortwave Radiation	W m^{-2}	rsdcs	downwelling_shortwave_flux_in_air_assuming_clear_sky
1	Tendency of Air Temperature	K s^{-1}	tnt	tendency_of_air_temperature
1	Tendency of Air Temperature due to Advection	K s^{-1}	tnta	tendency_of_air_temperature_due_to_advection
1	Tendency of Air Temperature due to Diabatic Processes	K s^{-1}	tntmp	tendency_of_air_temperature_due_to_model_physics
1	Tendency of Air Temperature due to Stratiform Cloud Condensation and Evaporation	K s^{-1}	tntscpbl	tendency_of_air_temperature_due_to_stratiform_cloud_and_precipitation_and_boundary_layer_mixing
1	Tendency of Air Temperature due to Radiative Heating	K s^{-1}	tntr	tendency_of_air_temperature_due_to_radiative_heating
1	Tendency of Air Temperature due to Moist Convection	K s^{-1}	tntc	tendency_of_air_temperature_due_to_convection
1	Tendency of Specific Humidity	s^{-1}	tnhus	tendency_of_specific_humidity
1	Tendency of Specific Humidity due to Advection	s^{-1}	tnhusa	tendency_of_specific_humidity_due_to_advection
1	Tendency of Specific Humidity due to Convection	s^{-1}	tnhusc	tendency_of_specific_humidity_due_to_convection
1	Tendency of Specific Humidity due to Diffusion	s^{-1}	tnhusd	tendency_of_specific_humidity_due_to_diffusion
1	Tendency of Specific Humidity due to Stratiform Cloud Condensation and Evaporation	s^{-1}	tnhusscpbl	tendency_of_specific_humidity_due_to_stratiform_cloud_and_precipitation_and_boundary_layer_mixing
1	Tendency of Specific Humidity due to Model Physics	s^{-1}	tnhusmp	tendency_of_specific_humidity_due_to_model_physics
1	Eddy Viscosity Coefficient for Momentum Variables	$m^2 s^{-1}$	evu	atmosphere_momentum_diffusivity
1	Eddy Diffusivity Coefficient for Temperature Variable	$m^2 s^{-1}$	edt	atmosphere_heat_diffusivity

W m-2	time: point	up	real	alevel, site, time1	rlu	atmos
W m-2	time: point	up	real	alevel, site, time1	rsu	atmos
W m-2	time: point	down	real	alevel, site, time1	rld	atmos
W m-2	time: point	down	real	alevel, site, time1	rsd	atmos
W m-2	time: point	up	real	alevel, site, time1	rlucs	atmos
W m-2	time: point	up	real	alevel, site, time1	rsucs	atmos
W m-2	time: point	down	real	alevel, site, time1	rldcs	atmos
W m-2	time: point	down	real	alevel, site, time1	rsdcs	atmos
K s-1	time: point		real	alevel, site, time1	tnt	atmos
K s-1	time: point		real	alevel, site, time1	tnta	atmos
K s-1	time: point		real	alevel, site, time1	tntmp	atmos
K s-1	time: point		real	alevel, site, time1	tntscpbl	atmos
K s-1	time: point		real	alevel, site, time1	tntr	atmos
K s-1	time: point		real	alevel, site, time1	tntc	atmos
s-1	time: point		real	alevel, site, time1	tnhus	atmos
s-1	time: point		real	alevel, site, time1	tnhusa	atmos
s-1	time: point		real	alevel, site, time1	tnhusc	atmos
s-1	time: point		real	alevel, site, time1	tnhusd	atmos
s-1	time: point		real	alevel, site, time1	tnhusscpbl	atmos
s-1	time: point		real	alevel, site, time1	tnhusmp	atmos
m2 s-1	time: point		real	alevel, site, time1	evu	atmos
m2 s-1	time: point		real	alevel, site, time1	edt	atmos

Reqeusted periods for saving special CFMIP model output

Experiment Name	Experiment Description	Experiment number	appearing in cfMon table							
			CFMIP monthly 3D (A1c_cfmip)		CFMIP monthly 4xCO2 2D		CFMIP monthly 4xCO2 3D		CFMIP monthly inline (A1d,f,g)	
pre-industrial control	coupled atmosphere/ocean control run	3.1			1*	20*			121*	140*
historical	simulation of recent past (1850-2005)	3.2							1979	2005
AMIP	AMIP (1979-at least 2008)	3.3	1979	2008	1979	2008	1979	2008	1979	2008
ESM fixed climate 1	radiation code "sees" control CO2, but carbon cycle sees 1%/yr rise	5.4-1							121	140
ESM feedback 1	carbon cycle "sees" control CO2, but radiatation sees 1%/yr rise	5.5-1							121	140
1 percent per year CO2	impose a 1%/yr increase in CO2 to quadrupling	6.1							121	140
control SST climatology	control run climatological SSTs & sea ice imposed.	6.2a			1	30			1	30
CO2 forcing	as in expt. 6.2a, but with 4XCO2 imposed	6.2b							1	30
abrupt 4XCO2	impose an instantaneous quadrupling of CO2, then hold fixed	6.3							1	20
abrupt 4XCO2	impose an instantaneous quadrupling of CO2, then hold fixed	6.3							121	140
abrupt 4XCO2	generate an ensemble of runs like expt. 6.3, initialized in different months, and terminated after 5 years	6.3-E							1	5
all aerosol forcing	as in expt. 6.2a, but with aerosols from year 2000 of expt. 3.2	6.4a							1	30
sulfate aerosol forcing	as in expt. 6.2a, but with sulfate aerosols from year 2000 of expt. 3.2	6.4b							1	30
4xCO2 AMIP	AMIP (1979-2008) conditions (expt. 3.3) but with 4xCO2	6.5	1979	2008					1979	2008
AMIP plus patterned anomaly	consistent with CFMIP, patterned SST anomalies added to AMIP conditions (expt. 3.3)	6.6	1979	2008					1979	2008
aqua planet control	consistent with CFMIP, zonally uniform SSTs for ocean-covered earth	6.7a	1	5	1	5	1	5	1	5
4xCO2 aqua planet	as in expt. 6.7a, but with 4XCO2	6.7b	1	5					1	5
aqua planet plus 4K anomaly	as in expt. 6.7a, but with a uniform 4K increase in SST	6.7c	1	5					1	5
AMIP plus 4K anomaly	as in expt. 3.3, but with a uniform 4K increase in SST	6.8	1979	2008					1979	2008

* The years specified for the pre-industrial experiment are relative to the point in this control where expts. 6.1 and 6.3 were initiated. 6.1 and 6.3 should be initiated from the same point in the control run, so that the control run sampled output can be compared directly to each of these runs, and any drift in the control can be accounted for.

appearing in cfOff		appearing in cfDa				appearing in cf3hr				appearing in cfSites	
CFMIP monthly offline (A1e)		CFMIP daily 2D (A2a,c,f)		CFMIP daily 3D (A2b,d,g)		CFMIP 3-hourly orbital offline (A2e)		CFMIP 3-hourly inline (A4)		CFMIP time-step station data (A3)	
		121*	140*	136*	140*						
		1979	2005								
2008	2008	1979	2008	1979	2008	2008	2008	2008	2008	1979	2008
		121	140								
		121	140								
		121	140	136	140						
		1	30								
		1	30								
		121	140	136	140						
		1	5								
		1	30								
		1	30								
2008	2008	1979	2008	1979	2008	2008	2008			1979	2008
2008	2008	1979	2008	1979	2008	2008	2008			1979	2008
		1	5	1	5					1	5
		1	5	1	5					1	5
		1	5	1	5					1	5
2008	2008	1979	2008	1979	2008	2008	2008			1979	2008

Requested output: years requested for each expt./output table combination (see CFMIP output sheet for information on time-periods for saving the special CFMIP-focused output.

red font means output should be reported for only a single member in the case of an ensemble of simulations

blue font means this is a lower priority request

If a cell is shaded yellow, some or all variables will *not* be part of the subset of model output that will be replicated at several locations (as noted by * or ** -- see note at right-- this may apply only to lower priority variables or only to *some* of the years)

"all*" indicates that although all *years* will be included in the "replicated" subset, only the high a medium priority *variables* will be included in the replicated subset.
"all**" indicates that although all *years* will be included in the "replicated" subset, only the highest priority *variables* will be included in the replicated subset

"decadal" prediction experiments

Experiment	Description	Expt. #	Oclim	Oyr	Amon	Omon: lon x lat x olev	Omon: other	Lmon	Limon	Oimon	aero: lon x lat	aero: lon x lat x alev	da: subset of fields saved for selected expts.	da: other
10-year predictions	10-year hindcasts/predictions	1.1		all*	all	all**	all	all	all	all	all	year 10		all
30-year predictions	30-year hindcasts/predictions	1.2		all*	all	all**	all	all	all	all	all	years 10, 20, & 30		all
10-year predictions	increased ensemble size of 1.1	1.1-E		all*	all	all**	all	all	all	all	all	year 10		all
30-year predictions	increased ensemble size of 1.2	1.2-E		all*	all	all**	all	all	all	all	all	years 10, 20, & 30		all
10-year predictions	additional start dates for expts. 1.1	1.1-I		all*	all	all**	all	all	all	all	all	year 10		all
AMIP	AMIP (1979-2008)	3.3			all			all	all	all	all	years 1980, 1990, 2000, & possibly 2010	all	all
pre-industrial control	control run, but possibly as short as 100 years	3.1-S		all*	all	all**	all	all	all	all	all	years 20, 40, 60, 80, & 100		all
1 percent per year CO2	1% per year CO2 rise imposed	6.1-S		all*	all	all**	all	all	all	all				all
volcano-free hindcasts	hindcasts but without volcanoes	1.3		all*	all	all**	all	all	all	all	all	year 2010, 2011, and 2012		all
prediction with 2010 volcano	Pinatubo-like eruption imposed	1.4		all*	all	all**	all	all	all	all	all	year 10		all
initialization alternatives	experiments to explore impact of different initialization procedures	1.5		all*	all	all**	all	all	all	all	all	year 10		all
chemistry-focused runs	near-term runs with enhanced chemistry/aerosol models	1.6												

6hrLev	6hrPlev	3hr
		lon x lat
for expt. initialized in late 1980, years late 1980-1990; for expt. initialized in late 2005, years late 2005-2015	all	all
for expt. initialized in late 1980, years 1991-2010; for expt. initialized in late 2005, years 2016-2035	all	all
	all	all
	all	all
	all	all
all	all	all
	all	all
	all	all
	all	all

experiments focusing on the "longer-term"

			Oclim	Oyr	Amon	Omon		Lmon	Limon	Oimon	aero		da	
Experiment	Description	Expt. #				lon x lat x olev	other				lon x lat	lon x lat x alev	subset of fields saved for selected expts.	other
pre-industrial control	coupled atmosphere/ocean control run	3.1		all*	all	all**	all	all	all	all	all	years corresponding to years 1850, 1870, 1890, … , 1950, 1960, 1970, …, 2000 of the historical run and years 2010, 2020, 2040, 2060, 2080, & 2100 of the RCP run	20 years corresponding to years 1986-2005 of historical run	all
historical	simulation of recent past (1850-2005)	3.2	1986-2005 monthly climatology	all*	all	all**	all	all	all	all	all	years 1850, 1870, 1890, … , 1950, 1960, 1970, …, 2000	1950-2005	all
AMIP	AMIP (1979-2008)	3.3			all			all	all	all	all	1980, 1990, 2000, & possibly 2010	all	all
historical	increase ensemble size of expt. 3.2	3.2-E		all*	all	all**	all	all	all	all	all	years 1850, 1870, 1890, … , 1950, 1960, 1970, …, 2000		all
AMIP	increase ensemble size of expt. 3.3	3.3-E			all			all	all	all	all	1980, 1990, 2000, & possibly 2010		all
mid-Holocene	consistent with PMIP, impose Mid-Holocene conditions	3.4		all*	all	all**	all	all	all	all	all			all
last glacial maximum	consistent with PMIP, impose last glacial maximum conditions	3.5		all*	all	all**	all	all	all	all	all			all
last millennium	consistent with PMIP, impose forcing for 850-1850	3.6		all*	all	all**	all	all	all	all	all			all
RCP4.5	future projection (2006-2100) forced by RCP4.5	4.1		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100	all	all
RCP8.5	future projection (2006-2100) forced by RCP8.5	4.2		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100	all	all
RCP2.6	future projection (2006-2100) forced by RCP2.6	4.3		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100	all	all
RCP6	future projection (2006-2100) forced by RCP6	4.4		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100	all	all
RCP4.5	extension of expt. 4.1 through 2300	4.1-L		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100	all	all
RCP8.5	extension of expt. 4.2 through 2300	4.2-L		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100	all	all
RCP2.6	extension of expt. 4.3 through 2300	4.3-L		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100	all	all
ESM pre-industrial control	as in expt. 3.1, but atmospheric CO2 determined by model	5.1		all*	all	all**	all	all	all	all	all	years corresponding to years 1850, 1870, 1890, … , 1950, 1960, 1970, …, 2000 of the historical run and years 2010, 2020, 2040, 2060, 2080, & 2100 of the RCP run	20 years corresponding to years 1986-2005 of historical run	all
Emission-driven historical	as in expt. 3.2, but with atmospheric CO2 determined by model	5.2		all*	all	all**	all	all	all	all	all	years 1850, 1870, 1890, … , 1950, 1960, 1970, …, 2000	1950-2005	all

6hrLev	6hrPlev	3hr
	30	
1950-2005	1950-2005	1960-2005
all	all	all
	1950-2005	1960-2005
	all	all
	last 30 years	
	last 30 years	
all	all	2026-2045, 2081-2100
all	all	2026-2045, 2081-2100
		2026-2045, 2081-2100
		2026-2045, 2081-2100
		2181-2200, 2281-2300
		2181-2200, 2281-2300
		2181-2200, 2281-2300
		1960-2005

emission-driven RCP8.5	as in expt. 4.2, but with atmospheric CO2 determined by model	5.3		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100	all	all
ESM fixed climate 1	radiation code "sees" control CO2, but carbon cycle sees 1%/yr rise	5.4-1		all*	all	all**	all	all	all	all	all			all
ESM fixed climate 2	radiation code "sees" control CO2, but carbon cycle sees historical followed by RCP4.5 rise in CO2	5.4-2		all*	all	all**	all	all	all	all	all			all
ESM feedback 1	carbon cycle "sees" control CO2, but radiatation sees 1%/yr rise	5.5-1		all*	all	all**	all	all	all	all	all			all
ESM feedback 2	carbon cycle "sees" control CO2, but radiatation sees historical followed by RCP4.5 rise in CO2	5.5-2		all*	all	all**	all	all	all	all	all			all
1 percent per year CO2	imposed 1%/yr increase in CO2 to quadrupling	6.1		all*	all	all**	all	all	all	all	0			all
control SST climatology	An atmosphere-only run driven by prescribed climatological SST and sea ice.	6.2a			all			all	all	all	all			all
CO2 forcing	as in expt. 6.2a, but with 4XCO2 imposed	6.2b			all			all	all	all	all			all
abrupt 4XCO2	impose an instantaneous quadrupling of CO2, then hold fixed	6.3			all	all**	all	all	all	all	all			all
abrupt 4XCO2	generate an ensemble of runs like expt. 6.3, initialized in different months, and terminated after 5 years	6.3-E			all	all**	all	all	all	all	all			all
anthropogenic aerosol forcing	as in expt. 6.2a, but with anthropogenic aerosols from year 2000 of expt. 3.2	6.4a			all			all	all	all	all			all
sulfate aerosol forcing	as in expt. 6.2a, but with sulfate aerosols from year 2000 of expt. 3.2	6.4b			all			all	all	all	all			all
Cloud response to imposed 4xCO2	consistent with CFMIP, impose AMIP (1979-2008) conditions (expt. 3.3) but with 4xCO2	6.5			all			all	all	all				all
Cloud response to an imposed change in SST pattern	consistent with CFMIP, add a patterned SST perturbation to AMIP SSTs of expt. 3.3.	6.6			all			all	all	all				all
aqua planet: control run	consistent with CFMIP, impose zonally uniform SSTs on a planet without continents	6.7a			all			all	all	all				all
aqua planet: cloud response to imposed 4xCO2	Consistent with CFMIP requirements, impose 4xCO_2 on the zonally uniform SSTs of expt. 6.7a	6.7b			all			all	all	all				all
Aqua-planet: cloud response to an imposed uniform change in SST.	Consistent with CFMIP requirements, add a uniform +4K to the zonally uniform SSTs of expt. 6.7a (which is the control for this run).	6.7c			all			all	all	all				all
Cloud response to an imposed uniform change in SST	Consistent with CFMIP requirements, add a uniform +4 K SST to the AMIP SSTs of expt. 3.3 (which is the “control” for this run).	6.8			all			all	all	all				all
natural-only	historical simulation but with natural forcing only	7.1		all*	all	all**	all	all	all	all	all			all
GHG-only	historical simulation but with greenhouse gas forcing only	7.2		all*	all	all**	all	all	all	all	all			all
other-only	historical simulation but with other individual forcing agents	7.3		all*	all	all**	all	all	all	all	all			all
natural-only	increase ensemble size of expt. 7.1	7.1-E		all*	all	all**	all	all	all	all	all			all
GHG-only	increase ensemble size of expt. 7.2	7.2-E		all*	all	all**	all	all	all	all	all			all
other-only	increase ensemble size of expt. 7.3	7.3-E		all*	all	all**	all	all	all	all	all			all

atmosphere-only experiments

Experiment	Description	Expt. #	Oclim	Oyr	Amon	Omon lon x lat x olev	Omon other	Lmon	Limon	Oimon	aero lon x lat	aero lon x lat x alev	da subset of fields saved for selected expts.	da other
AMIP	AMIP (1979-2008)	3.3			all			all	all	all	all	years 1980, 1990, 2000, & possibly 2010	all	all

		2026-2045, 2081-2100

6hrLev	**6hrPlev**	**3hr**
all	all	all

2030 time-slice	conditions for 2026-2035 imposed	2.1			all		all	all	all	all		all
AMIP	increase ensemble size of expt. 3.3	3.3-E			all		all	all	all	all	years 1980, 1990, 2000, & possibly 2010	all
2030 time-slice	increase ensemble size of expt. 2.1	2.1-E			all		all	all	all	all		all
Cloud response to imposed 4xCO2	consistent with CFMIP, impose AMIP (1979-2008) conditions (expt. 3.3) but with 4xCO2	6.5			all		all	all	all			all
Cloud response to an imposed change in SST pattern	consistent with CFMIP, add a patterned SST perturbation to AMIP SSTs of expt. 3.3.	6.6			all		all	all	all			all
aqua planet: control run	consistent with CFMIP, impose zonally uniform SSTs on a planet without continents	6.7a			all		all	all	all			all
aqua planet: cloud response to imposed 4xCO2	Consistent with CFMIP requirements, impose $4xCO_2$ on the zonally uniform SSTs of expt. 6.7a	6.7b			all		all	all	all			all
Aqua-planet: cloud response to an imposed uniform change in SST.	Consistent with CFMIP requirements, add a uniform +4K to the zonally uniform SSTs of expt. 6.7a (which is the control for this run).	6.7c			all		all	all	all			all
Cloud response to an imposed uniform change in SST	Consistent with CFMIP requirements, add a uniform +4 K SST to the AMIP SSTs of expt. 3.3 (which is the "control" for this run).	6.8			all		all	all	all			all
