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 eacl 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 th 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

(pink)	modifed between 8 November 2010 and 4 January 2011
(green)	modified between 4 January 2011 and 28 March 2011.
(blue)	modified between 28 March 2011 and 10 June 2011.
(yellow)	modified after 10 June 2011.

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, day, 6hrLev, 6hrPlev, 3hr, Oclim, Oyr, Omon, cfMon, cfOff, cfDay, cf3hr	longitude	lon		longitude	longitude	X	degrees_ east			yes	increasing	0
fx, Amon, Lmon, LImon, OImon, aero, day, 6hrLev, 6hrPlev, 3hr, Oclim, Oyr, Omon, cfMon, cfOff, cfDay, cf3hr	latitude	lat		latitude	latitude	Y	degrees_ north			yes	increasing	-90
Amon	plevs	plev	There are 17 mandatory levels and up to 6 additional levels requested of models with sufficient resolution in the stratosphere.	air_pressure	pressure	Z	Pa			no	decreasing	
day	plev8	plev		air_pressure	pressure	Z	Pa			no	decreasing	
6hrPlev	plev3	plev		air_pressure	pressure	Z	Pa			no	decreasing	
cfMon, cfDay	plev7	plev	7 pressure layers defined by ISCCP simulator	air_pressure	pressure	Z	Pa			yes	decreasing	
cfDay	p500	plev	500 hPa	air_pressure	pressure	Z	Pa			no	decreasing	
cfDay	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, cfDay, cf3hr, cfSites	alevel	lev	generic atmospheric model vertical coordinate (nondimensional or dimensional)		atmospheric model level	Z		ok		yes		
Amon, cfMon, cfDay, cf3hr, cfSites	alevhalf	lev	atmospheric model "half" level		atmospheric model half-level	Z		ok		no		
aero	alev1	lev	atmospheric model's lowest level		lowest atmospheric model level	Z		ok		yes		

valid_ max	type	positive	value	bounds _values	requested	bounds_ requested	tol_on_requests: variance from requested values that is tolerated	grid?
360	double							
90	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			90000. 74000. 62000. 50000. 37500. 24500. 9000.	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.	44000. 0.0				
	double	down	56000.	68000. 44000.				
	double	down	84000.	100000. 68000.				
	double	up						
	double	up						
	double							

cfMon, cfOff, cfDay, cf3hr	alt40	alt40	CloudSat vertical coordinate heights	altitude	altitude	Z	m			yes	increasing	
Oyr, Amon, Lmon, LImon, OImon, aero, day, 3hr, Omon, cfMon, cfOff, cfDay, 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	
Amon, day, 3hr, cf3hr, cfSites	height2m	height	~2 m standard surface air temperature and surface humidity height	height	height	Z	m			no	increasing	1
Amon, day, 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, day, 3hr	sdepth1	depth	coordinate value for topmost 0.1 meter layer of soil	depth	depth	Z	m			yes	increasing	0
cfMon, cfDay	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, cfDay, 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 119 stations (standard) and 73 stations (aquaplanet)		site index			ok		no		
Omon	basin	basin		region	ocean basin				region	no		
Omon	rho	rho	potential density referenced to 2000 dbar	sea_water_potential_density	potential density referenced to 2000 dbar	Z	kg m^{-3}			yes	increasing	
fx, Oclim, Oyr, Omon	olevel	lev	generic ocean model vertical coordinate (nondimensional or dimensional)		ocean model level	Z		ok		yes		

	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. 18720. 19200.	0.001	
	double							
	double							
	double							
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				0.005 0.605 2.1 4. 6. 8.5 12.5 17.5 22.5 27.5 35. 45. 55. 70. 50040.	0. 0.01 0.01 1.2 1.2 3. 3. 5. 5. 7. 7. 10. 10. 15. 15. 20. 20. 25. 25. 30. 30. 40. 40. 50. 50. 60. 60. 80. 80. 100000.	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. -45. -40. -40. -35. -35. -30. -30. -25. -25. -20. -20. -15. -15. -10. -10. -5. -5. 0. 0. 5. 5. 10. 10. 15. 15. 20. 20. 25.	0.001	
	double				0. 20. 40. 60. 80.		0.001	
	integer							yes
	character				atlantic_arctic_ocean indian_pacific_ocean global_ocean			
	double	down						
	double	down						

Omon	oline	line	opening, passage, strait, channel, etc.	region	ocean passage				passage	no		
cf3hr	location	loc	COSP profile in instantaneous curtain mode		location index			ok		no	increasing	
Lmon	vegtype	type	plant functional type. Several plant functional types have been defined in the area_type table available at: cf-pcmdi.llnl.gov/documents/cf-standard-names/area-type-table/current/	area_type	plant functional type				type_description	no		
Lmon	typebare	type		area_type	surface type				type_description	no		
Lmon	typepdec	type		area_type	surface type				type_description	no		
Lmon	typepever	type		area_type	surface type				type_description	no		
Lmon	typesdec	type		area_type	surface type				type_description	no		
Lmon	typesever	type		area_type	surface type				type_description	no		
Lmon	typec3pft	type		area_type	surface type				type_description	no		
Lmon	typec4pft	type		area_type	surface type				type_description	no		
Omon	olayer100m	depth	coordinate for 100 m ocean surface layer	depth	depth	Z	m			no	increasing	0
Omon	depth100m	depth	coordinate value for 100 m ocean depth	depth	depth	Z	m			no	increasing	80
Omon	depth0m	depth	vertical coordinate for ocean surface	depth	depth	Z	m			no	increasing	0

	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_throughflow mozambique_channel taiwan_luzon_straits windward_passage	
	integer					yes
	character					
	character		bare_ground			
	character		primary_deciduous_trees			
	character		primary_evergreen_trees			
	character		secondary_decidous_trees			
	character		secondary_evergreen_trees			
	character		c3_plant_functional_types			
	character		c4_plant_functional_types			
100	double	down	50.	0. 100.		
120	double	down	100.			
100	double	down	0.			

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 & notes	output variable name	standard name
1	Atmosphere Grid-Cell Area	m^2		For atmospheres with more than 1 mesh (e.g., staggered grids), report areas that apply to surface vertical fluxes of energy.	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). Reported here is the height above the present-day geoid (0.0 over ocean).		orog	surface_altitude
1	Land Area Fraction	%		For atmospheres with more than 1 mesh (e.g., staggered grids), report areas that apply to surface vertical fluxes of energy.	sftlf	land_area_fraction
1	Fraction of Grid Cell Covered with Glacier	%	fraction of grid cell occupied by "permanent" ice (i.e., glaciers).	For atmospheres with more than 1 mesh (e.g., staggered grids), report areas that apply to surface vertical fluxes of energy.	sftgif	land_ice_area_fraction
1	Capacity of Soil to Store Water	kg m^{-2}	reported "where land": divide the total water holding capacity of all the soil in the grid cell by the land area in the grid cell; reported 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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
m2			real	longitude latitude	areacella	atmos land				
m			real	longitude latitude	orog	atmos		area: areacella		
%			real	longitude latitude	sftlf	atmos		area: areacella		
%			real	longitude latitude	sftgif	land		area: areacella		
kg m-2			real	longitude latitude	mrsofc	land		area: areacella		
m			real	longitude latitude	rootd	land		area: areacella		

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 & notes	output variable name	standard name
1	Sea Floor Depth	m	Ocean bathymetry. Reported here is the sea floor depth for present day. Reported as missing for land grid cells.		deptho	sea_floor_depth_below_geoid
1	Ocean Grid-Cell Volume	m^3	grid-cell volume ca. 2000.	a 3-d field: For oceans with more than 1 mesh, report on grid that applies to temperature	volcello	ocean_volume
1	Ocean Grid-Cell Area	m^2		For oceans with more than 1 mesh (e.g., staggered grids), report areas that apply to surface vertical fluxes of energy.	areacello	cell_area
1	Sea Area Fraction	%	This is the area fraction at the ocean surface.	Should this be recorded as a function of depth? 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.	sftof	sea_area_fraction
1	Region Selection Index	1		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.	basin	region
2	Upward Geothermal Heat Flux at Sea Floor	W m^{-2}		If this field is time-dependent then save it instead as one of your Omon fields (see the Omon table)	hfgeou	upward_geothermal_heat_flux_at_sea_floor
2	Ocean Model Cell Thickness	m		If this field is time-dependent then save it instead as one of your Omon fields (see the Omon table)	thkcello	cell_thickness
				eliminated basinv because it can be estimated from basin; also some models would also need a basinu for completeness		

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
m			real	longitude latitude	deptho	ocean		area: areacello		
m3			real	longitude latitude olevel	volcello	ocean				
m2			real	longitude latitude	areacello	ocean				
%			real	longitude latitude	sftof	ocean		area: areacello		
1			integer	longitude latitude	basin	ocean		area: areacello	0 1 2 3 4 5 6 7 8 9 10	global_land southern_ocean atlantic_ocean pacific_ocean arctic_ocean indian_ocean mediterranean_sea black_sea hudson_bay baltic_sea red_sea
W m-2	area: mean where sea	up	real	longitude latitude	hfgeou	ocean		area: areacello		
m	time: mean		real	longitude latitude olevel	thkcello	ocean		area: areacello volume: volcello		

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 (except the last field, zlayer) can be found in Griffies et al., available at http://www.clivar.org/organization/wgomd/references/WGOMD_CMIP5_ocean_fields.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 & notes	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	ocean_vertical_salt_diffusivity
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

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unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	difvho	ocean		area: areacello volume: volcello		
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	difvso	ocean		area: areacello volume: volcello		
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	difvtrbo	ocean		area: areacello volume: volcello		
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	difvtrto	ocean		area: areacello volume: volcello		
W m-2	time: mean within years time: mean over years		real	longitude latitude olevel time2	tnpeo	ocean		area: areacello volume: volcello		
W m-2	time: mean within years time: mean over years		real	longitude latitude olevel time2	tnpeot	ocean		area: areacello volume: volcello		
W m-2	time: mean within years time: mean over years		real	longitude latitude olevel time2	tnpeotb	ocean		area: areacello volume: volcello		
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	difvmo	ocean		area: areacello volume: volcello		
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	difvmbo	ocean		area: areacello volume: volcello		

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

m2 s-1	time: mean within years time: mean over years	real	longitude latitude olevel time2	difvmto	ocean	area: areacello volume: volcello
m2 s-1	time: mean within years time: mean over years	real	longitude latitude olevel time2	difvmfdo	ocean	area: areacello volume: volcello
W m-2	time: mean within years time: mean over years	real	longitude latitude olevel time2	dispkevfo	ocean	area: areacello volume: volcello

In CMOR Table Oclim: *WGOMD Table 2.10*

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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	diftrblo	ocean		area: areacello volume: volcello		
m4 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	diftrbbo	ocean		area: areacello volume: volcello		
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	diftrelo	ocean		area: areacello volume: volcello		
m4 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	diftrebo	ocean		area: areacello volume: volcello		
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	diftrxylo	ocean		area: areacello volume: volcello		
m4 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	diftrxybo	ocean		area: areacello volume: volcello		
W m-2	time: mean within years time: mean over years		real	longitude latitude olevel time2	tnkebto	ocean		area: areacello volume: volcello		
m2 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	difmxylo	ocean		area: areacello volume: volcello		
m4 s-1	time: mean within years time: mean over years		real	longitude latitude olevel time2	difmxybo	ocean		area: areacello volume: volcello		
W m-2	time: mean within years time: mean over years		real	longitude latitude olevel time2	dispkexyfo	ocean		area: areacello volume: volcello		

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

m2 s-1	time: mean within years time: mean over years	real	longitude latitude time2	diftrblo2d	ocean	area: areacello
m4 s-1	time: mean within years time: mean over years	real	longitude latitude time2	diftrbbo2d	ocean	area: areacello
m2 s-1	time: mean within years time: mean over years	real	longitude latitude time2	diftrelo2d	ocean	area: areacello
m4 s-1	time: mean within years time: mean over years	real	longitude latitude time2	diftrebo2d	ocean	area: areacello
m2 s-1	time: mean within years time: mean over years	real	longitude latitude time2	diftrxylo2d	ocean	area: areacello
m4 s-1	time: mean within years time: mean over years	real	longitude latitude time2	diftrxybo2d	ocean	area: areacello
W m-2	time: mean within years time: mean over years	real	longitude latitude time2	tnkebto2d	ocean	area: areacello
m2 s-1	time: mean within years time: mean over years	real	longitude latitude time2	difmxylo2d	ocean	area: areacello
m4 s-1	time: mean within years time: mean over years	real	longitude latitude time2	difmxybo2d	ocean	area: areacello
W m-2	time: mean within years time: mean over years	real	longitude latitude time2	dispkexyfo2d	ocean	area: areacello

Ocean layer depth field requested only from models where it can't be calculated from the vertical coordinate information stored in the file.

priority	long name	units	comment	questions & notes	output variable name	standard name
1	Depth Below Geoid of Ocean Layer	m		This 3-d time dependent field should only be saved for models where it can't be calculated from the vertical coordinate information stored in the file.	zfull	depth_below_geoid
1	Depth Below Geoid of Interfaces Between Ocean Layers	m		This 3-d time dependent field should only be saved for models where it can't be calculated from the vertical coordinate information stored in the file.	zhalf	depth_below_geoid

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
m	time: mean within years time: mean over years		real	longitude latitude olevel time2	zfull	ocean		area: areacello		
m	time: mean within years time: mean over years		real	longitude latitude olevel time2	zhalf	ocean		area: areacello		

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 & notes	output variable name	standard name
1	Dissolved Inorganic Carbon Concentration	mol m^{-3}	Dissolved inorganic carbon (CO3+HCO3+H2CO3) concentration		dissic	mole_concentration_of_dissolved_inorganic_carbon_in_sea_water
2	Dissolved Organic Carbon Concentration	mol m^{-3}			dissoc	mole_concentration_of_dissolved_organic_carbon_in_sea_water
2	Phytoplankton Carbon Concentration	mol 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	mole_concentration_of_phytoplankton_expressed_as_carbon_in_sea_water
2	Zooplankton Carbon Concentration	mol m^{-3}	sum of zooplankton carbon component concentrations		zooc	mole_concentration_of_zooplankton_expressed_as_carbon_in_sea_water
3	Bacterial Carbon Concentration	mol m^{-3}	sum of bacterial carbon component concentrations		bacc	mole_concentration_of_bacteria_expressed_as_carbon_in_sea_water
2	Detrital Organic Carbon Concentration	mol m^{-3}	sum of detrital organic carbon component concentrations		detoc	mole_concentration_of_organic_detritus_expressed_as_carbon_in_sea_water
2	Calcite Concentration	mol m^{-3}	sum of particulate calcite component concentrations (e.g. Phytoplankton, Detrital, etc.)		calc	mole_concentration_of_calcite_expressed_as_carbon_in_sea_water
2	Aragonite Concentration	mol m^{-3}	sum of particulate aragonite components (e.g. Phytoplankton, Detrital, etc.)		arag	mole_concentration_of_aragonite_expressed_as_carbon_in_sea_water
3	Mole Concentration of Diatoms expressed as Carbon in Sea Water	mol m^{-3}	carbon from the diatom phytoplankton component concentration alone		phydiat	mole_concentration_of_diatoms_expressed_as_carbon_in_sea_water
3	Mole Concentration of Diazotrophs Expressed as Carbon in Sea Water	mol m^{-3}	carbon concentration from the diazotrophic phytoplankton component alone		phydiaz	mole_concentration_of_diazotrophs_expressed_as_carbon_in_sea_water
3	Mole Concentration of Calcareous Phytoplankton expressed as Carbon in Sea Water	mol m^{-3}	carbon concentration from calcareous (calcite-producing) phytoplankton component alone		phycalc	mole_concentration_of_calcareous_phytoplankton_expressed_as_carbon_in_sea_water
3	Mole Concentration of Picophytoplankton expressed as Carbon in Sea Water	mol m^{-3}	carbon concentration from the picophytoplankton (<2 um) component alone		phypico	mole_concentration_of_picophytoplankton_expressed_as_carbon_in_sea_water
3	Mole Concentration of Miscellaneous Phytoplankton expressed as Carbon in Sea Water	mol m^{-3}	carbon concentration from additional phytoplankton component alone		phymisc	mole_concentration_of_miscellaneous_phytoplankton_expressed_as_carbon_in_sea_water
3	Mole Concentration of Microzooplankton expressed as Carbon in Sea Water	mol m^{-3}	carbon concentration from the microzooplankton (<20 um) component alone		zmicro	mole_concentration_of_microzooplankton_expressed_as_carbon_in_sea_water
3	Mole Concentration of Mesozooplankton expressed as Carbon in Sea Water	mol m^{-3}	carbon concentration from mesozooplankton (20-200 um) component alone		zmeso	mole_concentration_of_mesozooplankton_expressed_as_carbon_in_sea_water

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	dissic	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	dissoc	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	phyc	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	zooc	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	bacc	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	detoc	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	calc	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	arag	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	phydiat	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	phydiaz	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	phycalc	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	phypico	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	phymisc	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	zmicro	ocnBgchem		area: areacello volume: volcello		
mol m-3	time: mean area: mean where sea		real	longitude latitude olevel time	zmeso	ocnBgchem		area: areacello volume: volcello		

3	Other Zooplankton Carbon Concentration	mol m^{-3}	carbon from additional zooplankton component concentrations alone (e.g. Micro, meso). Since the models all have different numbers of components, this variable has been included to provide a check for intercomparison between models since some phytoplankton groups are supersets.	zoocmisc	mole_concentration_of_miscellaneous_zooplankton_expressed_as_carbon_in_sea_water
1	Total Alkalinity	mol m^{-3}	total alkalinity equivalent concentration (including carbonate, nitrogen, silicate, and borate components)	talk	sea_water_alkalinity_expressed_as_mole_equivalent
1	pH	1	negative log of hydrogen ion concentration with the concentration expressed as mol H kg-1.	ph	sea_water_ph_reported_on_total_scale
1	Dissolve Oxygen Concentration	mol m^{-3}		o2	mole_concentration_of_molecular_oxygen_in_sea_water
1	Dissolved Nitrate Concentration	mol m^{-3}		no3	mole_concentration_of_nitrate_in_sea_water
2	Dissolved Ammonium Concentration	mol m^{-3}		nh4	mole_concentration_of_ammonium_in_sea_water
1	Dissolved Phosphate Concentration	mol m^{-3}		po4	mole_concentration_of_phosphate_in_sea_water
1	Dissolved Iron Concentration	mol m^{-3}	dissolved iron in sea water is meant to include both Fe2+ and Fe3+ ions (but not, e.g., particulate detrital iron)	dfe	mole_concentration_of_dissolved_iron_in_sea_water
1	Dissolved Silicate Concentration	mol m^{-3}		si	mole_concentration_of_silicate_in_sea_water
1	Total Chlorophyll Mass Concentration	kg 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	mass_concentration_of_phytoplankton_expressed_as_chlorophyll_in_sea_water
3	Diatom Chlorophyll Mass Concentration	kg m^{-3}	chlorophyll from diatom phytoplankton component concentration alone	chldiat	mass_concentration_of_diatoms_expressed_as_chlorophyll_in_sea_water
3	Mass Concentration of Diazotrophs expressed as Chlorophyll in Sea Water	kg m^{-3}	chlorophyll concentration from the diazotrophic phytoplankton component alone	chldiaz	mass_concentration_of_diazotrophs_expressed_as_chlorophyll_in_sea_water
3	Mass Concentration of Calcareous Phytoplankton expressed as Chlorophyll in Sea Water	kg m^{-3}	chlorophyll concentration from the calcite-producing phytoplankton component alone	chlcalc	mass_concentration_of_calcareous_phytoplankton_expressed_as_chlorophyll_in_sea_water
3	Mass Concentration of Picophytoplankton expressed as Chlorophyll in Sea Water	kg m^{-3}	chlorophyll concentration from the picophytoplankton (<2 um) component alone	chlpico	mass_concentration_of_picophytoplankton_expressed_as_chlorophyll_in_sea_water
3	Other Phytoplankton Chlorophyll Mass Concentration	kg m^{-3}	chlorophyll from additional phytoplankton component concentrations alone	chlmisc	mass_concentration_of_miscellaneous_phytoplankton_expressed_as_chlorophyll_in_sea_water
3	Particulate Organic Nitrogen Concentration	mol m^{-3}	sum of particulate organic nitrogen component concentrations	pon	mole_concentration_of_particulate_organic_matter_expressed_as_nitrogen_in_sea_water
3	Particulate Organic Phosphorus Concentration	mol m^{-3}	sum of particulate organic phosphorus component concentrations	pop	mole_concentration_of_particulate_organic_matter_expressed_as_phosphorus_in_sea_water
3	Particulate Biogenic Iron Concentration	mol m^{-3}	sum of particulate organic iron component concentrations	bfe	mole_concentration_of_particulate_organic_matter_expressed_as_iron_in_sea_water
3	Particulate Biogenic Silica Concentration	mol m^{-3}	sum of particulate silica component concentrations	bsi	mole_concentration_of_particulate_matter_expressed_as_silicon_in_sea_water
3	Phytoplankton Nitrogen Concentration	mol m^{-3}	sum of phytoplankton nitrogen component concentrations	phyn	mole_concentration_of_phytoplankton_expressed_as_nitrogen_in_sea_water
3	Phytoplankton Phosphorus Concentration	mol m^{-3}	sum of phytoplankton phosphorus components	phyp	mole_concentration_of_phytoplankton_expressed_as_phosphorus_in_sea_water

mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	zoocmisc	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	talk	ocnBgchem	area: areacello volume: volcello
1	time: mean area: mean where sea	real	longitude latitude olevel time	ph	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	o2	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	no3	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	nh4	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	po4	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	dfe	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	si	ocnBgchem	area: areacello volume: volcello
kg m-3	time: mean area: mean where sea	real	longitude latitude olevel time	chl	ocnBgchem	area: areacello volume: volcello
kg m-3	time: mean area: mean where sea	real	longitude latitude olevel time	chldiat	ocnBgchem	area: areacello volume: volcello
kg m-3	time: mean area: mean where sea	real	longitude latitude olevel time	chldiaz	ocnBgchem	area: areacello volume: volcello
kg m-3	time: mean area: mean where sea	real	longitude latitude olevel time	chlcalc	ocnBgchem	area: areacello volume: volcello
kg m-3	time: mean area: mean where sea	real	longitude latitude olevel time	chlpico	ocnBgchem	area: areacello volume: volcello
kg m-3	time: mean area: mean where sea	real	longitude latitude olevel time	chlmisc	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	pon	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	pop	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	bfe	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	bsi	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	phyn	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	phyp	ocnBgchem	area: areacello volume: volcello

3	Phytoplankton Iron Concentration	mol m^{-3}	sum of phytoplankton iron component concentrations	phyfe	mole_concentration_of_phytoplankton_expressed_as_iron_in_sea_water
3	Phytoplankton Silica Concentration	mol m^{-3}	sum of phytoplankton silica component concentrations	physi	mole_concentration_of_phytoplankton_expressed_as_silicon_in_sea_water
3	Dimethyl Sulphide Concentration	mol m^{-3}		dms	mole_concentration_of_dimethyl_sulfide_in_sea_water
2	Mole Concentration of Carbonate expressed as Carbon in Sea Water	mol m^{-3}		co3	mole_concentration_of_carbonate_expressed_as_carbon_in_sea_water
2	Mole Concentration of Calcite expressed as Carbon in Sea Water at Saturation	mol m^{-3}		co3satcalc	mole_concentration_of_calcite_expressed_as_carbon_in_sea_water_at_saturation
2	Mole Concentration of Aragonite expressed as Carbon in Sea Water at Saturation	mol m^{-3}		co3satarag	mole_concentration_of_aragonite_expressed_as_carbon_in_sea_water_at_saturation

mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	phyfe	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	physi	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	dms	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	co3	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	co3satcalc	ocnBgchem	area: areacello volume: volcello
mol m-3	time: mean area: mean where sea	real	longitude latitude olevel time	co3satarag	ocnBgchem	area: areacello volume: volcello

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

priority	long name	units	comment	questions & notes	output variable name	standard name
3	Primary Carbon Production by Phytoplankton	mol m^{-3} s^{-1}	total primary (organic carbon) production by phytoplankton		pp	tendency_of_mole_concentration_of_particulate_organic_matter_expressed_as_carbon_in_sea_water_due_to_net_primary_production
3	Primary Carbon Production by Phytoplankton due to Nitrate Uptake Alone	mol m^{-3} s^{-1}	Primary (organic carbon) production by phytoplankton due to nitrate uptake alone		pnitrate	tendency_of_mole_concentration_of_particulate_organic_matter_expressed_as_carbon_in_sea_water_due_to_nitrate_utilization
3	Biogenic Iron Production	mol m^{-3} s^{-1}			pbfe	tendency_of_mole_concentration_of_iron_in_sea_water_due_to_biological_production
3	Biogenic Silica Production	mol m^{-3} s^{-1}			pbsi	tendency_of_mole_concentration_of_silicon_in_sea_water_due_to_biological_production
3	Calcite Production	mol m^{-3} s^{-1}			pcalc	tendency_of_mole_concentration_of_calcite_expressed_as_carbon_in_sea_water_due_to_biological_production
3	Aragonite Production	mol m^{-3} s^{-1}			parag	tendency_of_mole_concentration_of_aragonite_expressed_as_carbon_in_sea_water_due_to_biological_production
3	Sinking Particulate Organic Carbon Flux	mol m^{-2} s^{-1}			expc	sinking_mole_flux_of_particulate_organic_matter_expressed_as_carbon_in_sea_water
3	Sinking Particulate Organic Nitrogen Flux	mol m^{-2} s^{-1}			expn	sinking_mole_flux_of_particulate_organic_nitrogen_in_sea_water
3	Sinking Particulate Organic Phosphorus Flux	mol m^{-2} s^{-1}			expp	sinking_mole_flux_of_particulate_organic_phosphorus_in_sea_water
3	Sinking Particulate Iron Flux	mol m^{-2} s^{-1}			expcfe	sinking_mole_flux_of_particulate_iron_in_sea_water
3	Sinking Particulate Silica Flux	mol m^{-2} s^{-1}			expsi	sinking_mole_flux_of_particulate_silicon_in_sea_water
3	Sinking Calcite Flux	mol m^{-2} s^{-1}			expcalc	sinking_mole_flux_of_calcite_expressed_as_carbon_in_sea_water
3	Sinking Aragonite Flux	mol m^{-2} s^{-1}			exparag	sinking_mole_flux_of_aragonite_expressed_as_carbon_in_sea_water
3	Calcite Dissolution	mol m^{-3} s^{-1}			dcalc	tendency_of_mole_concentration_of_calcite_expressed_as_carbon_in_sea_water_due_to_dissolution
3	Aragonite Dissolution	mol m^{-3} s^{-1}			darag	tendency_of_mole_concentration_of_aragonite_expressed_as_carbon_in_sea_water_due_to_dissolution
3	Diatom Primary Carbon Production	mol m^{-3} s^{-1}	Primary (organic carbon) production by the diatom component alone		pdi	tendency_of_mole_concentration_of_particulate_organic_matter_expressed_as_carbon_in_sea_water_due_to_net_primary_production_by_diatoms
3	Tendency of Mole Concentration of Organic Carbon in Sea Water due to Net Primary Production by Diazotrophs	mol m^{-3} s^{-1}	Primary (organic carbon) production by the diazotrophic phytoplankton component alone		dpocdtdiaz	tendency_of_mole_concentration_of_particulate_organic_matter_expressed_as_carbon_in_sea_water_due_to_net_primary_production_by_diazotrophs
3	Tendency of Mole Concentration of Organic Carbon in Sea Water due to Net Primary Production by Picophytoplankton	mol m^{-3} s^{-1}	Primary (organic carbon) production by the calcite-producing phytoplankton component alone		dpocdtcalc	tendency_of_mole_concentration_of_particulate_organic_matter_expressed_as_carbon_in_sea_water_due_to_net_primary_production_by_calcareous_phytoplankton

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	pp	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	pnitrate	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	pbfe	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	pbsi	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	pcalc	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	parag	ocnBgchem		area: areacello volume: volcello		
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude olevel time	expc	ocnBgchem		area: areacello volume: volcello		
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude olevel time	expn	ocnBgchem		area: areacello volume: volcello		
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude olevel time	expp	ocnBgchem				
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude olevel time	expcfe	ocnBgchem				
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude olevel time	expsi	ocnBgchem		area: areacello volume: volcello		
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude olevel time	expcalc	ocnBgchem		area: areacello volume: volcello		
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude olevel time	exparag	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	dcalc	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	darag	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	pdi	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	dpocdtdiaz	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	dpocdtcalc	ocnBgchem		area: areacello volume: volcello		

3	Tendency of Mole Concentration of Organic Carbon in Sea Water due to Net Primary Production by Picophytoplankton	mol m^{-3} s^{-1}	Primary (organic carbon) production by the picophytoplankton (<2 um) component alone		dpocdtpico	tendency_of_mole_concentration_of_particulate_organic_matter_expressed_as_carbon_in_sea_water_due_to_net_primary_production_by_picophytoplankton
3	Other Phytoplankton Carbon Production	mol 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	tendency_of_mole_concentration_of_particulate_organic_matter_expressed_as_carbon_in_sea_water_due_to_net_primary_production_by_miscellaneous_phytoplankton
3	Rate of Change of Dissolved Inorganic Carbon due to Biological Activity	mol m^{-3} s^{-1}	Net of biological terms in time rate of change of dissolved inorganic carbon		bddtdic	tendency_of_mole_concentration_of_dissolved_inorganic_carbon_in_sea_water_due_to_biological_processes
3	Rate of Change of Nitrogen Nutrient due to Biological Activity	mol m^{-3} s^{-1}	Net of biological terms in time rate of change of nitrogen nutrients (e.g. NO3+NH4)		bddtdin	tendency_of_mole_concentration_of_dissolved_inorganic_nitrogen_in_sea_water_due_to_biological_processes
3	Rate of Change of Dissolved Phosphate due to Biological Activity	mol m^{-3} s^{-1}	Net of biological terms in time rate of change of dissolved phosphate		bddtdip	tendency_of_mole_concentration_of_dissolved_inorganic_phosphate_in_sea_water_due_to_biological_processes
3	Rate of Change of Dissolved Inorganic Iron due to Biological Activity	mol m^{-3} s^{-1}	Net of biological terms in time rate of change of dissolved inorganic iron		bddtdife	tendency_of_mole_concentration_of_dissolved_inorganic_iron_in_sea_water_due_to_biological_processes
3	Rate of Change of Dissolved Inorganic Silicate due to Biological Activity	mol m^{-3} s^{-1}	Net of biological terms in time rate of change of dissolved inorganic silicate		bddtdisi	tendency_of_mole_concentration_of_dissolved_inorganic_silicate_in_sea_water_due_to_biological_processes
3	Rate of Change of Alkalinity due to Biological Activity	mol m^{-3} s^{-1}	Net of biological terms in time rate of change of alkalinity		bddtalk	tendency_of_sea_water_alkalinity_expressed_as_mole_equivalent_due_to_biological_processes
3	Nonbiogenic Iron Scavenging	mol m^{-3} s^{-1}	Dissolved Fe removed through nonbiogenic scavenging onto particles		fescav	tendency_of_mole_concentration_of_dissolved_iron_in_sea_water_due_to_scavenging_by_inorganic_particles
3	Particle Source of Dissolved Iron	mol m^{-3} s^{-1}	Dissolution, remineralization and desorption of iron back to the dissolved phase		fediss	tendency_of_mole_concentration_of_dissolved_iron_in_sea_water_due_to_dissolution_from_inorganic_particles
3	Total Grazing of Phytoplankton by Zooplankton	mol m^{-3} s^{-1}			graz	tendency_of_mole_concentration_of_dissolved_iron_in_sea_water_due_to_grazing_of_phytoplankton

Ocean layer depth field requested only from models where it can't be calculated from the vertical coordinate information stored in the file.

priority	long name	units	comment	questions & notes	output variable name	standard name
1	Depth Below Geoid of Ocean Layer	m		This 3-d time dependent field should only be saved for models where it can't be calculated from the vertical coordinate information stored in the file.	zfull	depth_below_geoid
1	Depth Below Geoid of Interfaces Between Ocean Layers	m		This 3-d time dependent field should only be saved for models where it can't be calculated from the vertical coordinate information stored in the file.	zhalf	depth_below_geoid

mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	dpocdtpico	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	phypmisc	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdic	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdin	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdip	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdife	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtdisi	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	bddtalk	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	fescav	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	fediss	ocnBgchem		area: areacello volume: volcello		
mol m-3 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	graz	ocnBgchem		area: areacello volume: volcello		

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
m	time: mean area: mean where sea		real	longitude latitude olevel time	zfull	ocean		area: areacello		
m	time: mean area: mean where sea		real	longitude latitude olevel time	zhalf	ocean		area: areacello		

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 & notes	output variable name	standard name
1	Near-Surface Air Temperature	K		normally, the temperature should be reported at the 2 meter height	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 air temperature.	normally, this should be reported at the 2 meter height.	tasmin	air_temperature
1	Daily Maximum Near-Surface Air Temperature	K	monthly mean of the daily-maximum near-surface air temperature.	normally, this should be reported at the 2 meter height.	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	$m\ s^{-1}$		normally, the the wind component should be reported at the 10 meter height	uas	eastward_wind
1	Northward Near-Surface Wind	$m\ s^{-1}$		normally, the the wind component should be reported at the 10 meter height	vas	northward_wind
1	Near-Surface Wind Speed	$m\ s^{-1}$	This is the mean of the speed, not the speed computed from the mean u and v components of wind	normally, the the wind should be reported at the 10 meter height	sfcWind	wind_speed
1	Near-Surface 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.	express as a percentage. Normally, the relative humidity should be reported at the 2 meter height	hurs	relative_humidity
1	Near-Surface Specific Humidity	1		Normally, the specific humidity should be reported at the 2 meter height	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.	This differs from sbl appearing in table Limon in that the flux is averaged over the entire grid cell, not just the land portion.	sbl	surface_snow_and_ice_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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
K	time: mean		real	longitude latitude time height2m	tas	atmos		area: areacella		
K	time: mean		real	longitude latitude time	ts	atmos		area: areacella		
K	time: minimum within days time: mean over days		real	longitude latitude time height2m	tasmin	atmos		area: areacella		
K	time: maximum within days time: mean over days		real	longitude latitude time height2m	tasmax	atmos		area: areacella		
Pa	time: mean		real	longitude latitude time	psl	atmos		area: areacella		
Pa	time: mean		real	longitude latitude time	ps	atmos		area: areacella		
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		area: areacella		
1	time: mean		real	longitude latitude time height2m	huss	atmos		area: areacella		
						atmos		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	pr	atmos		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	prsn	atmos		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	prc	atmos		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	evspsbl	atmos		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	sbl	atmos		area: areacella		
						atmos		area: areacella		
Pa	time: mean	down	real	longitude latitude time	tauu	atmos				
Pa	time: mean	down	real	longitude latitude time	tauv	atmos				

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
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}	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}	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). Includes 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}	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). Includes 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. This is reported only if it differs from the net downward radiative flux at the top of the atmosphere.	rtmt	net_downward_radiative_flux_at_top_of_atmosphere_model

						atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	hfls	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	hfss	atmos	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rlds	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rlus	atmos	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rsds	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rsus	atmos	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rsdscs	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rsuscs	atmos	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rldscs	atmos	area: areacella
						atmos	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rsdt	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rsut	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rlut	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rlutcs	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rsutcs	atmos	area: areacella
			real			atmos	area: areacella
kg m-2	time: mean		real	longitude latitude time	prw	atmos	area: areacella
%	time: mean		real	longitude latitude time	clt	atmos	area: areacella
kg m-2	time: mean		real	longitude latitude time	clwvi	atmos	area: areacella
kg m-2	time: mean		real	longitude latitude time	clivi	atmos	area: areacella
						atmos	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rtmt	atmos	area: areacella

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	convection_time_fraction
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	shallow_convection_time_fraction
1	Carbon Mass Flux into Atmosphere Due to All Anthropogenic Emissions of CO2	kg m^{-2} s^{-1}	This is requested only for the emission-driven coupled carbon climate model runs. Does not include natural fire sources but, includes all anthropogenic sources, including fossil fuel use, cement production, agricultural burning, and sources associated with anthropogenic land use change excluding forest regrowth.		fco2antt	tendency_of_atmosphere_mass_content_of_carbon_dioxide_expressed_as_carbon_due_to_anthropogenic_emission
1	Carbon Mass Flux into Atmosphere Due to Fossil Fuel Emissions of CO2	kg m^{-2} s^{-1}	This is the prescribed anthropogenic CO2 flux from fossil fuel use, including cement production, and flaring (but not from land-use changes, agricultural burning, forest regrowth, etc.)	This is requested only for the emission-driven coupled carbon climate model runs.	fco2fos	tendency_of_atmosphere_mass_content_of_carbon_dioxide_expressed_as_carbon_due_to_emission_from_fossil_fuel_combustion
1	Surface Carbon Mass Flux into the Atmosphere Due to Natural Sources	kg m^{-2} s^{-1}	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 ecosystem biospheric productivity", for land, and "air to sea CO2 flux", for ocean.)	Report from all simulations (both emission-driven and concentration-driven) performed by models with fully interactive and responsive carbon cycles.	fco2nat	surface_upward_mass_flux_of_carbon_dioxide_expressed_as_carbon_due_to_emission_from_natural_sources

Pa	time: mean		real	longitude latitude time	ccb	atmos	area: areacella
Pa	time: mean		real	longitude latitude time	cct	atmos	area: areacella
1	time: mean		real	longitude latitude time	ci	atmos	area: areacella
1	time: mean		real	longitude latitude time	sci	atmos	area: areacella
							area: areacella
kg m-2 s-1	time: mean	up	real	longitude latitude time	fco2antt	atmos	area: areacella
kg m-2 s-1	time: mean	up	real	longitude latitude time	fco2fos	atmos	area: areacella
kg m-2 s-1	time: mean	up	real	longitude latitude time	fco2nat	atmos	area: areacella

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 & notes**	**output variable name**	**standard name**
1	Cloud Area Fraction	%	Includes both large-scale and convective cloud.	Report on model layers (not standard pressures).	cl	cloud_area_fraction_in_atmosphere_layer
1	Mass Fraction of Cloud Liquid Water	1	Includes 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. Precipitating hydrometeors are included ONLY if the precipitating hydrometeors affect the calculation of radiative transfer in model.	Report on model layers (not standard pressures).	clw	mass_fraction_of_cloud_liquid_water_in_air
1	Mass Fraction of Cloud Ice	1	Includes both large-scale and convective cloud. This is calculated 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. It includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect the calculation of radiative transfer in model.	Report on model layers (not standard pressures).	cli	mass_fraction_of_cloud_ice_in_air
1	Convective Mass Flux	kg m^{-2} s^{-1}	The net mass flux should represent the difference between the updraft and downdraft components. The flux is computed as the mass divided by the area of the grid cell.	Report on model half-levels (i.e., model layer bounds and not standard pressures).	mc	atmosphere_net_upward_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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
%	time: mean		real	longitude latitude alevel time	cl	atmos		area: areacella		
1	time: mean		real	longitude latitude alevel time	clw	atmos		area: areacella		
1	time: mean		real	longitude latitude alevel time	cli	atmos		area: areacella		
kg m-2 s-1	time: mean	up	real	longitude latitude alevhalf time	mc	atmos		area: areacella		
K	time: mean		real	longitude latitude plevs time	ta	atmos		area: areacella		
m s-1	time: mean		real	longitude latitude plevs time	ua	atmos				
m s-1	time: mean		real	longitude latitude plevs time	va	atmos				
1	time: mean		real	longitude latitude plevs time	hus	atmos		area: areacella		
%	time: mean		real	longitude latitude plevs time	hur	atmos		area: areacella		
Pa s-1	time: mean		real	longitude latitude plevs time	wap	atmos		area: areacella		
m	time: mean		real	longitude latitude plevs time	zg	atmos		area: areacella		

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
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	atmosphere_mass_of_carbon_dioxide
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	atmosphere_mass_of_carbon_dioxide

1e-9	time: mean	real	longitude latitude plevs time	tro3	atmos atmosChem		area: areacella
1e-9	time: mean within years time: mean over years	real	longitude latitude plevs time2	tro3Clim	atmos atmosChem	monClim	area: areacella
1e-6	time: mean	real	longitude latitude plevs time	co2	atmos		area: areacella
1e-6	time: mean within years time: mean over years	real	longitude latitude plevs time2	co2Clim	atmos	monClim	area: areacella
kg	time: mean	real	time	co2mass	atmos		
kg	time: mean within years time: mean over years	real	time2	co2massClim	atmos	monClim	

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
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

1e-9	time: mean	real	longitude latitude plevs time	ch4	atmos atmosChem		area: areacella
1e-9	time: mean within years time: mean over years	real	longitude latitude plevs time2	ch4Clim	atmos atmosChem	monClim	area: areacella
1e-9	time: mean	real	time	ch4global	atmos atmosChem		
1e-9	time: mean within years time: mean over years	real	time2	ch4globalClim	atmos atmosChem	monClim	

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
3	Global Mean Mole Fraction of CFC11	1e-12		cfc11global	mole_fraction_of_cfc11_in_air
3	Global Mean Mole Fraction of CFC12	1e-12		cfc12global	mole_fraction_of_cfc12_in_air
3	Global Mean Mole Fraction of HCFC22	1e-12		hcfc22global	mole_fraction_of_hcfc22_in_air
3	Global Mean Mole Fraction of CFC113	1e-12		cfc113global	mole_fraction_of_cfc113_in_air

1e-9	time: mean	real	longitude latitude plevs time	n2o	atmos atmosChem		area: areacella
1e-9	time: mean within years time: mean over years	real	longitude latitude plevs time2	n2oClim	atmos atmosChem	monClim	area: areacella
1e-9	time: mean	real	time	n2oglobal	atmos atmosChem		
1e-9	time: mean within years time: mean over years	real	time2	n2oglobalClim	atmos atmosChem	monClim	
1e-12	time: mean	real	time	cfc11global	atmos atmosChem		
1e-12	time: mean	real	time	cfc12global	atmos atmosChem		
1e-12	time: mean	real	time	hcfc22global	atmos atmosChem		
1e-12	time: mean	real	time	cfc113global	atmos atmosChem		

priority	long name	units	comment	questions & notes	output variable name	standard name
1	Mole Fraction of Other Radiatively Important Trace Gases (That Are Evolving in Time).	1		Please let me know what (if any) other trace gas concentrations should be included. 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.)		

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 & notes	output variable name	standard name
1	Pressure on Model Levels	Pa			pfull	air_pressure
1	Pressure on Model Half-Levels	Pa			phalf	air_pressure

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

These fields are derived from fields in the first table above. They have been "bias-corrected" to remove some of the unrealistic behavior caused by the initialization procedure. See recommendations for how this should be done at http://eprints.soton.ac.uk/171975/1/150_Bias_Correction.pdf (Also see http://www.wcrp-climate.org/decadal/ .) ***These fields should be reported only for decadal hindcast/forecast experiments.***

priority	long name	units	comment	questions & notes	output variable name	standard name
1	Bias-Corrected Near-Surface Air Temperature	K		normally, the temperature should be reported at the 2 meter height	tasAdjust	air_temperature
1	Bias-Corrected Surface Temperature	K	"skin" temperature (i.e., SST for open ocean)		tsAdjust	surface_temperature
1	Bias-Corrected Sea Level Pressure	Pa	not, in general, the same as surface pressure		pslAdjust	air_pressure_at_sea_level
1	Bias-Corrected Precipitation	kg m^{-2} s^{-1}	at surface; includes both liquid and solid phases from all types of clouds (both large-scale and convective)		prAdjust	precipitation_flux

1			real	longitude latitude plevs time	0	atmos atmosChem		area: areacella		

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
Pa	time: mean within years time: mean over years		real	longitude latitude alevel time2	pfull	atmos	monClim	area: areacella		
Pa	time: mean within years time: mean over years		real	longitude latitude alevhalf time2	phalf	atmos	monClim	area: areacella		

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
K	time: mean		real	longitude latitude time height2m	tasAdjust	atmos		area: areacella		
K	time: mean		real	longitude latitude time	tsAdjust	atmos		area: areacella		
Pa	time: mean		real	longitude latitude time	pslAdjust	atmos		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	prAdjust	atmos		area: areacella		

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 & notes	output variable name	standard name
2	Surface Concentration of (+name of tracer)	mol m^{-3} or kg m^{-3} or 1, consistent with first table in Oyr		Concentrations of all 3D tracers in the uppermost ocean layer. 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 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	net_primary_mole_productivity_of_carbon_by_phytoplankton
2	Primary Organic Carbon Production by Phytoplankton Based on Nitrate Uptake Alone	mol m^{-2} s^{-1}	Vertically integrated primary (organic carbon) production by phytoplankton based on nitrate uptake alone		intpnitrate	net_primary_mole_productivity_of_carbon_due_to_nitrate_utilization
2	Primary Organic Carbon Production by Diatoms	mol m^{-2} s^{-1}	Vertically integrated primary (organic carbon) production by the diatom phytoplankton component alone		intpdiat	net_primary_mole_productivity_of_carbon_by_diatoms
3	Net Primary Mole Productivity of Carbon by Diazotrophs	mol m^{-2} s^{-1}			intpdiaz	net_primary_mole_productivity_of_carbon_by_diazotrophs
3	Net Primary Mole Productivity of Carbon by Calcareous Phytoplankton	mol m^{-2} s^{-1}			intpcalc	net_primary_mole_productivity_of_carbon_by_calcareous_phytoplankton
3	Net Primary Mole Productivity of Carbon by Picophytoplankton	mol m^{-2} s^{-1}			intppico	net_primary_mole_productivity_of_carbon_by_picophytoplankton
3	Primary Organic Carbon Production by Other Phytoplankton	mol m^{-2} s^{-1}	Vertically integrated total primary (organic carbon) production by other phytoplankton components alone		intpmisc	net_primary_mole_productivity_of_carbon_by_miscellaneous_phytoplankton
3	Iron Production	mol m^{-2} s^{-1}	Vertically integrated biogenic iron production		intpbfe	tendency_of_ocean_mole_content_of_iron_due_to_biological_production
3	Silica Production	mol m^{-2} s^{-1}	Vertically integrated biogenic silica production		intpbsi	tendency_of_ocean_mole_content_of_silicon_due_to_biological_production
3	Calcite Production	mol m^{-2} s^{-1}	Vertically integrated calcite production		intpcalcite	tendency_of_ocean_mole_content_of_calcite_expressed_as_carbon_due_to_biological_production
3	Aragonite Production	mol m^{-2} s^{-1}	Vertically integrated aragonite production		intparag	tendency_of_ocean_mole_content_of_aragonite_expressed_as_carbon_due_to_biological_production
1	Downward Flux of Particle Organic Carbon	mol m^{-2} s^{-1}		at 100 m depth.	epc100	sinking_mole_flux_of_particulate_organic_matter_expressed_as_carbon_in_sea_water
3	Downward Flux of Particulate Iron	mol m^{-2} s^{-1}		at 100 m depth.	epfe100	sinking_mole_flux_of_particulate_iron_in_sea_water
3	Downward Flux of Particulate Silica	mol m^{-2} s^{-1}		at 100 m depth.	epsi100	sinking_mole_flux_of_particulate_silicon_in_sea_water

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
mol m-3 or kg m-3 or 1, consistent with first table in Oyr	time: mean area: mean where sea		real	longitude latitude time depth0m		ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	intpp	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time	intpnitrate	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	intpdiat	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time	intpdiaz	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time	intpcalc	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time	intppico	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time	intpmisc	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	intpbfe	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time	intpbsi	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	intpcalcite	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time	intparag	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude time depth100m	epc100	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: where sea	down	real	longitude latitude time depth100m	epfe100	ocnBgchem		area: areacello		
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude time depth100m	epsi100	ocnBgchem		area: areacello		

1	Downward Flux of Calcite	mol $m^{-2} s^{-1}$		at 100 m depth.	epcalc100	sinking_mole_flux_of_calcite_expressed_as_carbon_in_sea_water
1	Downward Flux of Aragonite	mol $m^{-2} s^{-1}$		at 100 m depth.	eparag100	sinking_mole_flux_of_aragonite_expressed_as_carbon_in_sea_water
2	Dissolved Inorganic Carbon Content	kg m^{-2}	Vertically integrated DIC		intdic	ocean_mass_content_of_dissolved_inorganic_carbon
1	Surface Aqueous Partial Pressure of CO2	Pa			spco2	surface_partial_pressure_of_carbon_dioxide_in_sea_water
3	Delta PCO2	Pa		Difference between atmospheric and oceanic partial pressure of CO2 (positive meaning ocean > atmosphere)	dpco2	surface_carbon_dioxide_partial_pressure_difference_between_sea_water_and_air
3	Delta PO2	Pa		Difference between atmospheric and oceanic partial pressure of O2 (positive meaning ocean > atmosphere)	dpo2	surface_molecular_oxygen_partial_pressure_difference_between_sea_water_and_air
1	Surface Downward CO2 Flux	kg $m^{-2} s^{-1}$	Gas exchange flux of CO2 (positive into ocean)		fgco2	surface_downward_mass_flux_of_carbon_dioxide_expressed_as_carbon
1	Surface Downward O2 Flux	mol $m^{-2} s^{-1}$	Gas exchange flux of O2 (positive into ocean)		fgo2	surface_downward_mole_flux_of_molecular_oxygen
3	Surface Upward DMS Flux	mol $m^{-2} s^{-1}$	Gas exchange flux of DMS (positive into atmosphere)		fgdms	surface_upward_mole_flux_of_dimethyl_sulfide
3	Flux of Carbon Into Ocean Surface by Runoff and Sediment Dissolution	mol $m^{-2} s^{-1}$	Carbon supply to ocean through runoff and sediment dissolution (neglects gas exchange)		fsc	tendency_of_ocean_mole_content_of_carbon_due_to_runoff_and_sediment_dissolution
3	Downward Carbon Flux at Ocean Bottom	mol $m^{-2} s^{-1}$	Carbon loss to sediments		frc	tendency_of_ocean_mole_content_of_carbon_due_to_sedimentation
3	Nitrogen Fixation Rate in Ocean	mol $m^{-2} s^{-1}$	Vertically integrated nitrogen fixation		intpn2	tendency_of_ocean_mole_content_of_elemental_nitrogen_due_to_fixation
3	Surface Downward Net Flux of Nitrogen	mol $m^{-2} s^{-1}$			fsn	tendency_of_ocean_mole_content_of_elemental_nitrogen_due_to_deposition_and_fixation_and_runoff
3	Nitrogen Loss to Sediments and through Denitrification	mol $m^{-2} s^{-1}$			frn	tendency_of_ocean_mole_content_of_elemental_nitrogen_due_to_denitrification_and_sedimentation
3	Surface Downward Net Flux of Iron	mol $m^{-2} s^{-1}$	Iron supply through deposition flux onto sea surface, runoff, coasts, sediments, etc		fsfe	tendency_of_ocean_mole_content_of_iron_due_to_deposition_and_runoff_and_sediment_dissolution
3	Iron Loss to Sediments	mol $m^{-2} s^{-1}$			frfe	tendency_of_ocean_mole_content_of_iron_due_to_sedimentation
3	Oxygen Minimum Concentration	mol m^{-3}			o2min	mole_concentration_of_dissolved_molecular_oxygen_in_sea_water_at_shallowest_local_minimum_in_vertical_profile
3	Depth of Oxygen Minimum Concentration	m	Depth of vertical minimum concentration of dissolved oxygen gas (if two, then the shallower)		zo2min	depth_at_shallowest_local_minimum_in_vertical_profile_of_mole_concentration_of_dissolved_molecular_oxygen_in_sea_water
3	Calcite Saturation Depth	m	Depth of calcite saturation horizon (0 if < surface, "missing" if > bottom, if two, then the shallower)		zsatcalc	minimum_depth_of_calcite_undersaturation_in_sea_water
3	Aragonite Saturation Depth	m	Depth of aragonite saturation horizon (0 if < surface, "missing" if > bottom, if two, then the shallower)		zsatarag	minimum_depth_of_aragonite_undersaturation_in_sea_water
3	Rate of Change of Net Dissolved Inorganic Carbon	mol $m^{-2} s^{-1}$		integral over upper 100 m only.	fddtdic	tendency_of_ocean_mole_content_of_dissolved_inorganic_carbon
3	Rate of Change of Net Dissolved Inorganic Nitrogen	mol $m^{-2} s^{-1}$	Net time rate of change of nitrogen nutrients (e.g. NO3+NH4)	integral over upper 100 m only.	fddtdin	tendency_of_ocean_mole_content_of_dissolved_inorganic_nitrogen
3	Rate of Change of Net Dissolved Inorganic Phosphate	mol $m^{-2} s^{-1}$	vertical integral of net time rate of change of phosphate	integral over upper 100 m only.	fddtdip	tendency_of_ocean_mole_content_of_dissolved_inorganic_phosphorus

mol m-2 s-1	time: mean area: where sea	down	real	longitude latitude time depth100m	epcalc100	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude time depth100m	eparag100	ocnBgchem	area: areacello
kg m-2	time: mean area: where sea		real	longitude latitude time	intdic	ocnBgchem	area: areacello
Pa	time: mean area: mean where sea		real	longitude latitude time	spco2	ocnBgchem	area: areacello
Pa	time: mean area: where sea		real	longitude latitude time	dpco2	ocnBgchem	area: areacello
Pa	time: mean area: mean where sea		real	longitude latitude time	dpo2	ocnBgchem	area: areacello
kg m-2 s-1	time: mean area: where sea	down	real	longitude latitude time	fgco2	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude time	fgo2	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea	up	real	longitude latitude time	fgdms	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	fsc	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea	down	real	longitude latitude time	frc	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	intpn2	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea	down	real	longitude latitude time	fsn	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	frn	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea	down	real	longitude latitude time	fsfe	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	frfe	ocnBgchem	area: areacello
mol m-3	time: mean area: where sea depth: minimum		real	longitude latitude time	o2min	ocnBgchem	area: areacello
m	time: mean area: mean where sea		real	longitude latitude time	zo2min	ocnBgchem	area: areacello
m	time: mean area: where sea		real	longitude latitude time	zsatcalc	ocnBgchem	area: areacello
m	time: mean area: mean where sea		real	longitude latitude time	zsatarag	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time olayer100m	fddtdic	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea		real	longitude latitude time olayer100m	fddtdin	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea		real	longitude latitude time olayer100m	fddtdip	ocnBgchem	area: areacello

3	Rate of Change of Net Dissolved Inorganic Iron	mol m^{-2} s^{-1}	vertical integral of net time rate of change of dissolved inorganic iron	integral over upper 100 m only.	fddtdife	tendency_of_ocean_mole_content_of_dissolved_inorganic_iron
3	Rate of Change of Net Dissolved Inorganic Silicate	mol m^{-2} s^{-1}	vertical integral of net time rate of change of dissolved inorganic silicate	integral over upper 100 m only.	fddtdisi	tendency_of_ocean_mole_content_of_dissolved_inorganic_silicon
3	Rate of Change of Alkalinity	mol m^{-2} s^{-1}	vertical integral of net time rate of change of alkalinity	integral over upper 100 m only.	fddtalk	integral_wrt_depth_of_tendency_of_sea_water_alkalinity_expressed_as_mole_equivalent
3	Rate of Change of Dissolved Inorganic Carbon due to Biological Activity	mol m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of dissolved inorganic carbon	integral over upper 100 m only.	fbddtdic	tendency_of_ocean_mole_content_of_dissolved_inorganic_carbon_due_to_biological_processes
3	Rate of Change of Dissolved Inorganic Nitrogen due to Biological Activity	mol m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of nitrogen nutrients (e.g. NO3+NH4)	integral over upper 100 m only.	fbddtdin	tendency_of_ocean_mole_content_of_dissolved_inorganic_nitrogen_due_to_biological_processes
3	Rate of Change of Dissolved Inorganic Phosphate due to Biological Activity	mol m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of phosphate	integral over upper 100 m only.	fbddtdip	tendency_of_ocean_mole_content_of_dissolved_inorganic_phosphorus_due_to_biological_processes
3	Rate of Change of Dissolved Inorganic Iron due to Biological Activity	mol m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of dissolved inorganic iron	integral over upper 100 m only.	fbddtdife	tendency_of_ocean_mole_content_of_dissolved_inorganic_iron_due_to_biological_processes
3	Rate of Change of Dissolved Inorganic Silicate due to Biological Activity	mol m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of dissolved inorganic silicate	integral over upper 100 m only.	fbddtdisi	tendency_of_ocean_mole_content_of_dissolved_inorganic_silicon_due_to_biological_processes
3	Rate of Change of Biological Alkalinity due to Biological Activity	mol m^{-2} s^{-1}	vertical integral of net biological terms in time rate of change of alkalinity	integral over upper 100 m only.	fbddtalk	integral_wrt_depth_of_tendency_of_sea_water_alkalinity_expressed_as_mole_equivalent_due_to_biological_processes

mol m-2 s-1	time: mean area: mean where sea	real	longitude latitude time olayer100m	fddtdife	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea	real	longitude latitude time olayer100m	fddtdisi	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea	real	longitude latitude time olayer100m	fddtalk	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea	real	longitude latitude time olayer100m	fbddtdic	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea	real	longitude latitude time olayer100m	fbddtdin	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea	real	longitude latitude time olayer100m	fbddtdip	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea	real	longitude latitude time olayer100m	fbddtdife	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: where sea	real	longitude latitude time olayer100m	fbddtdisi	ocnBgchem	area: areacello
mol m-2 s-1	time: mean area: mean where sea	real	longitude latitude time olayer100m	fbddtalk	ocnBgchem	area: areacello

Further explanation of the fields in the following tables can be found in Griffies et al., available at http://www.clivar.org/organization/wgomd/references/WGOMD_CMIP5_ocean_fields.pdf .

In CMOR Table Omon: *WGOMD Table 2.2*

priority	long name	units	comment	questions & notes	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_of_cfc11_per_unit_mass_in_sea_water

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
kg	time: mean area: sum where sea		real	time	masso	ocean				
dbar	time: mean		real	longitude latitude time	pbo	ocean		area: areacello		
dbar	time: mean		real	longitude latitude time	pso	ocean		area: areacello		
m3	time: mean area: sum where sea		real	time	volo	ocean				
m	time: mean		real	longitude latitude time	zos	ocean		area: areacello		
m2	time: mean		real	longitude latitude time	zossq	ocean		area: areacello		
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		area: areacello volume: volcello		
m	time: mean		real	longitude latitude olevel time	thkcello	ocean		area: areacello volume: volcello		
K	time: mean		real	longitude latitude olevel time	thetao	ocean		area: areacello volume: volcello		
K	time: mean area: mean where sea		real	time	thetaoga	ocean				
K	time: mean		real	longitude latitude time	tos	ocean		area: areacello		
K2	time: mean		real	longitude latitude time	tossq	ocean		area: areacello		
psu	time: mean		real	longitude latitude olevel time	so	ocean		area: areacello volume: volcello		
psu	time: mean area: mean where sea		real	time	soga	ocean				
psu	time: mean		real	longitude latitude time	sos	ocean		area: areacello		
kg m-3	time: mean		real	longitude latitude olevel time	rhopoto	ocean		area: areacello volume: volcello		
yr	time: mean		real	longitude latitude olevel time	agessc	ocean		area: areacello volume: volcello		
mol kg-1	time: mean		real	longitude latitude olevel time	cfc11	ocean		area: areacello volume: volcello		

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

In CMOR Table Omon: *WGOMD Table 2.3*

priority	long name	units	comment	questions & notes	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}	differs from CMIP3 because it includes mass.	function of latitude, Z, basin. For a model with a cartesian latxlon grid, this is the same as the "Ocean Y Overturning Mass Streamfunction", listed a few lines down, which should in this case be omitted. For other models, this transport should be approximated as the transport along zig-zag paths corresponding to latitudes with spacing between latitudes appropriate to the model's resolution.	msftmyz	ocean_meridional_overturning_mass_streamfunction
2	Ocean Meridional Overturning Mass Streamfunction	kg s^{-1}		function of of latitude, rho, basin. Also see note above.	msftmrhoz	ocean_meridional_overturning_mass_streamfunction
2	Ocean Y Overturning Mass Streamfunction	kg s^{-1}		function of Y, Z, basin. Also see note above.	msftyyz	ocean_y_overturning_mass_streamfunction
2	Ocean Y Overturning Mass Streamfunction	kg s^{-1}		function of Y, rho, basin. Also see note above.	msftyrhoz	ocean_y_overturning_mass_streamfunction
3	Ocean Meridional Overturning Mass Streamfunction due to Bolus Advection	kg s^{-1}		function of latitude, Z, basin. Also see note above.	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 latitude, rho, basin. Also see note above.	msftmrhozba	ocean_meridional_overturning_mass_streamfunction_due_to_bolus_advection

kg s-1	time: mean		real	longitude latitude time	msftbarot	ocean		area: areacello		
m	time: mean		real	longitude latitude time	mlotst	ocean		area: areacello		
m2	time: mean		real	longitude latitude time	mlotstsq	ocean		area: areacello		
m	time: maximum within days time: mean over days		real	longitude latitude time	omldamax	ocean		area: areacello		
m	time: maximum		real	longitude latitude time	omlmax	ocean		area: areacello		

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
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		area: areacello volume: volcello		
kg2 s-2	time: mean		real	longitude latitude olevel time	wmosq	ocean		area: areacello volume: volcello		
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				

3	Ocean Y Overturning Mass Streamfunction due to Bolus Advection	kg s^{-1}	function of Y, Z, basin. Also see note above.	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. Also see note above.	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", listed a few lines down, which should in this case be omitted. For other models, this transport should be approximated as the transport along zig-zag paths corresponding to latitudes with spacing between latitudes appropriate to the model's resolution.	hfnorth	northward_ocean_heat_transport
3	Northward Ocean Heat Transport due to Bolus Advection	W	see note above.	hfnorthba	northward_ocean_heat_transport_due_to_bolus_advection
3	Northward Ocean Heat Transport due to Diffusion	W	see note above.	hfnorthdiff	northward_ocean_heat_transport_due_to_diffusion
2	Ocean Heat X Transport	W		hfx	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", listed a few lines above, which should be saved instead of this.	hfy	ocean_heat_y_transport
3	Ocean Heat Y Transport due to Bolus Advection	W	see note above.	hfyba	ocean_heat_y_transport_due_to_bolus_advection
3	Ocean Heat Y Transport due to Diffussion	W	see note above.	hfydiff	ocean_heat_y_transport_due_to_diffusion
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
2	Northward Ocean Heat Transport	W	This differs from a similar, previous entry in that northward transport across individual basins is called for, rather than the fully gridded fields..	hfbasin	northward_ocean_heat_transport
3	Northward Ocean Heat Transport due to Bolus Advection	W		hfbasinba	northward_ocean_heat_transport_due_to_bolus_advection
3	Northward Ocean Heat Transport due to Diffusion	W		hfbasindiff	northward_ocean_heat_transport_due_to_diffusion
2	Northward Ocean Heat Transport due to Gyre	W	function of latitude, basin	htovgyre	northward_ocean_heat_transport_due_to_gyre
2	Northward Ocean Heat Transport due to Overturning	W	function of latitude, basin	htovovrt	northward_ocean_heat_transport_due_to_overturning
2	Northward Ocean Salt Transport due to Gyre	kg s^{-1}	function of latitude, basin	sltovgyre	northward_ocean_salt_transport_due_to_gyre
2	Northward Ocean Salt Transport due to Overturning	kg s^{-1}	function of latitude, basin	sltovovrt	northward_ocean_salt_transport_due_to_overturning

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	hfnorthba	ocean
W	time: mean	real	longitude latitude time	hfnorthdiff	ocean
W	time: mean	real	longitude latitude time	hfx	ocean
W	time: mean	real	longitude latitude time	hfy	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	hfxba	ocean
W	time: mean	real	longitude latitude time	hfxdiff	ocean
W	time: mean longitude: mean	real	latitude basin time	hfbasin	ocean
W	time: mean longitude: mean	real	latitude basin time	hfbasinba	ocean
W	time: mean longitude: mean	real	latitude basin time	hfbasindiff	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_throughflow, 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 & notes	output variable name	standard name
2	Sea Water Transport	$kg\ s^{-1}$			mfo	sea_water_transport_across_line

In CMOR Table Omon: *WGOMD Table 2.5*

priority	long name	units	comment	questions & notes	output variable name	standard name
2	Rainfall Flux where Ice Free Ocean over Sea	$kg\ m^{-2}\ s^{-1}$	computed 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	$kg\ m^{-2}\ s^{-1}$	computed 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	$kg\ m^{-2}\ s^{-1}$	computed 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	$kg\ m^{-2}\ s^{-1}$	computed 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	$kg\ m^{-2}\ s^{-1}$	computed 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
2	Water Flux into Sea Water From Icebergs	$kg\ m^{-2}\ s^{-1}$	computed as the iceberg melt water flux into the ocean divided by the area of the ocean portion of the grid cell.	If only the vertically integrated melt water flux is available, report as this 2-d field; otherwise the row above should be used.	ficeberg	water_flux_into_sea_water_from_icebergs
1	Water Flux into Sea Water due to Sea Ice Thermodynamics	$kg\ m^{-2}\ s^{-1}$	computed 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_thermodynamics
2	Water Flux into Sea Water	$kg\ m^{-2}\ s^{-1}$	computed 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	$kg\ m^{-2}\ s^{-1}$	computed as the water flux (without flux correction) into the ocean divided by the area of the ocean portion of the grid cell.	This should probably be the sum of the first 6 variables in this table.	wfonocorr	water_flux_into_sea_water_without_flux_correction

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
kg s-1	time: mean		real	oline time	mfo	ocean				

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
kg m-2 s-1	time: mean area: mean where ice_free_sea over sea		real	longitude latitude time	pr	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where ice_free_sea over sea		real	longitude latitude time	prsn	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where ice_free_sea over sea		real	longitude latitude time	evs	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	friver	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude olevel time	ficeberg	ocean		area: areacello volume: volcello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	ficeberg2d	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	fsitherm	ocean seaIce		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	wfo	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	wfonocorr	ocean		area: areacello		

2	Water Flux Correction	kg m^{-2} s^{-1}	Positive flux implies correction adds water to ocean.	If this does not vary from one year to the next, report only a single year.	wfcorr	water_flux_correction

In CMOR Table Omon: *WGOMD Table 2.6*

priority	long name	units	comment	questions & notes	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}			vsfcorr	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

kg m-2 s-1	time: mean area: mean where sea	down	real	longitude latitude time	wfcorr	ocean		area: areacello		

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	vsfpr	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	vsfevap	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	vsfriver	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	vsfsit	ocean seaIce		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	vsf	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	vsfcorr	ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	sfdsi	ocean seaIce		area: areacello		
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	sfriver	ocean		area: areacello		

In CMOR Table Omon: *WGOMD Table 2.7*

priority	long name	units	comment	questions & notes	output variable name	standard name
2	Upward Geothermal Heat Flux at Sea Floor	W m^{-2}		If this field is time-invariant, then save it instead as one of your "fixed" fields (see the fx table)	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., 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	Temperature Flux due to Runoff Expressed as Heat Flux into Sea Water	W m^{-2}		If only the vertically integrated runoff flux is available, report as this 2-d field; otherwise the row above should be used.	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
2	Heat Flux into Sea Water due to Snow Thermodynamics	W m^{-2}		If only the vertically integrated heat flux is available, report as this 2-d field; otherwise the row above should be used.	hfsnthermds	heat_flux_into_sea_water_due_to_snow_thermodynamics
1	Heat Flux into Sea Water due to Frazil Ice Formation	W m^{-2}		As of May 2010, the WGOMD document recommends that this field should be saved instead of the field listed 2-lines below. 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.	hfsifrazil	heat_flux_into_sea_water_due_to_freezing_of_frazil_ice

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
W m-2	time: mean area: mean where sea	up	real	longitude latitude time	hfgeou	ocean		area: areacello		
W m-2	time: mean area: mean where ice_free_sea over sea	down	real	longitude latitude time	hfrainds	ocean		area: areacello		
W m-2	time: mean area: mean where ice_free_sea over sea	up	real	longitude latitude time	hfevapds	ocean		area: areacello		
W m-2	time: mean area: mean where sea		real	longitude latitude olevel time	hfrunoffds	ocean		area: areacello volume: volcello		
W m-2	time: mean area: mean where sea		real	longitude latitude time	hfrunoffds2d	ocean		area: areacello		
W m-2	time: mean area: mean where sea		real	longitude latitude olevel time	hfsnthermds	ocean		area: areacello volume: volcello		
W m-2	time: mean area: mean where sea		real	longitude latitude time	hfsnthermds2d	ocean		area: areacello		
W m-2	time: mean area: mean where sea		real	longitude latitude olevel time	hfsifrazil	ocean seaIce		area: areacello volume: volcello		

1	Heat Flux into Sea Water due to Frazil Ice Formation	W m^{-2}		If only the vertically integrated heat flux is available, report as this 2-d field; otherwise the row above should be used.	hfsifrazil	heat_flux_into_sea_water_due_to_freezing_of_frazil_ice
1	Heat Flux into Sea Water due to Sea Ice Thermodynamics	W m^{-2}		The priority set by the WGOMD was 2 for this field. The sea-ice folks requested that the priority be raised to 1. As of May 2010, the WGOMD document recommends that instead of saving this field, the field listed 2-lines above should be saved instead. 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.	hfsithermds	heat_flux_into_sea_water_due_to_sea_ice_thermodynamics
1	Heat Flux into Sea Water due to Sea Ice Thermodynamics	W m^{-2}		If only the vertically integrated heat flux is available, report as this 2-d field; otherwise the row above should be used.	hfsithermds	heat_flux_into_sea_water_due_to_sea_ice_thermodynamics
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	Heat Flux into Sea Water due to Iceberg Thermodynamics	W m^{-2}		If only the vertically integrated heat flux is available, report as this 2-d field; otherwise the row above should be used.	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	net_downward_shortwave_flux_at_sea_water_surface

W m-2	time: mean area: mean where sea		real	longitude latitude time	hfsifrazil2d	ocean seaIce	area: areacello
W m-2	time: mean area: mean where sea		real	longitude latitude olevel time	hfsithermds	ocean seaIce	area: areacello volume: volcello
W m-2	time: mean area: mean where sea		real	longitude latitude time	hfsithermds2d	ocean seaIce	area: areacello
W m-2	time: mean area: mean where sea		real	longitude latitude olevel time	hfibthermds	ocean	area: areacello volume: volcello
W m-2	time: mean area: mean where sea		real	longitude latitude time	hfibthermds2d	ocean	area: areacello
W m-2	time: mean area: mean where ice_free_sea over sea	down	real	longitude latitude time	rlds	ocean	area: areacello
W m-2	time: mean area: mean where ice_free_sea over sea	down	real	longitude latitude time	hfls	ocean	area: areacello
W m-2	time: mean area: mean where ice_free_sea over sea	down	real	longitude latitude time	hfss	ocean	area: areacello
W m-2	time: mean area: mean where sea	down	real	longitude latitude time	rsntds	ocean	area: areacello

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	surface_downward_heat_flux_in_sea_water

In CMOR Table Omon: *WGOMD Table 2.8*

priority	long name	units	comment	questions & notes	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

Ocean layer depth field requested only from models where it can't be calculated from the vertical coordinate information stored in the file.

priority	long name	units	comment	questions & notes	output variable name	standard name
1	Depth Below Geoid of Ocean Layer	m		This 3-d time dependent field should only be saved for models where it can't be calculated from the vertical coordinate information stored in the file.	zfull	depth_below_geoid
1	Depth Below Geoid of Interfaces Between Ocean Layers	m		This 3-d time dependent field should only be saved for models where it can't be calculated from the vertical coordinate information stored in the file.	zhalf	depth_below_geoid

W m-2	time: mean area: mean where sea	down	real	longitude latitude olevel time	rsds	ocean		area: areacello volume: volcello		
W m-2	time: mean area: mean where sea	down	real	longitude latitude time	hfcorr	ocean		area: areacello		
W m-2	time: mean area: mean where sea	down	real	longitude latitude time	hfds	ocean		area: areacello		

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
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				

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
m	time: mean area: mean where sea		real	longitude latitude olevel time	zfull	ocean		area: areacello		
m	time: mean area: mean where sea		real	longitude latitude olevel time	zhalf	ocean		area: areacello		

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 & notes	output variable name	standard name
1	Moisture in Upper Portion of Soil Column	kg m^{-2}	the mass of water in all phases in a thin surface soil layer.	integrate over uppermost 10 cm	mrsos	moisture_content_of_soil_layer
1	Total Soil Moisture Content	kg m^{-2}	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}	the mass (summed over all all layers) of frozen water.		mrfso	soil_frozen_water_content
1	Surface Runoff	kg m^{-2} s^{-1}	the total surface runoff leaving the land portion of the grid cell.		mrros	surface_runoff_flux
1	Total Runoff	kg m^{-2} s^{-1}	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}	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}	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. Reported as "missing" for grid cells occupied entirely by "sea"	If soil layer thicknesses vary from one location to another, interpolate to a standard set of depths. Ideally, the interpolation should preserve the vertical integral.	mrlsl	moisture_content_of_soil_layer
2	Temperature of Soil	K	Temperature of each soil layer. Reported as "missing" for grid cells occupied entirely by "sea".	If soil layer thicknesses vary from one location to another, interpolate to a standard set of depths. Ideally, the interpolation should preserve the vertical integral.	tsl	soil_temperature
1	Tree Cover Fraction	%	fraction of entire grid cell that is covered by trees.	add scalar coordinate typetree and add "tree" to the CF area type table. Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	treeFrac	area_fraction
1	Natural Grass Fraction	%	fraction of entire grid cell that is covered by natural grass.	add scalar coordinate typegrass and add "natural_grass" to the CF area type table. Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	grassFrac	area_fraction

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
kg m-2	time: mean area: mean where land		real	longitude latitude time sdepth1	mrsos	land		area: areacella		
kg m-2	time: mean area: mean where land		real	longitude latitude time	mrso	land		area: areacella		
kg m-2	time: mean area: mean where land		real	longitude latitude time	mrfso	land landIce		area: areacella		
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	mrros	land		area: areacella		
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	mrro	land		area: areacella		
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	prveg	land		area: areacella		
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	evspsblveg	land		area: areacella		
								area: areacella		
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	evspsblsoi	land		area: areacella		
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	tran	land		area: areacella		
kg m-2	time: mean area: mean where land		real	longitude latitude sdepth time	mrlsl	land		area: areacella		
K	time: mean		real	longitude latitude sdepth time	tsl	land		area: areacella		
%	time: mean		real	longitude latitude time	treeFrac	land		area: areacella		
%	time: mean		real	longitude latitude time	grassFrac	land		area: areacella		

1	Shrub Fraction	%	fraction of entire grid cell that is covered by shrub.	add scalar coordinate typeshrub and add "shrub" to the CF area type table. Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	shrubFrac	area_fraction
1	Crop Fraction	%	fraction of entire grid cell that is covered by crop.	add scalar coordinate typecrop and add "crop" to the CF area type table.Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	cropFrac	area_fraction
1	Anthropogenic Pasture Fraction	%	fraction of entire grid cell that is covered by anthropogenic pasture.	add scalar coordinate typepasture and add "pasture" to the CF area type table. Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	pastureFrac	area_fraction
1	Bare Soil Fraction	%	fraction of entire grid cell that is covered by bare soil.	Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	baresoilFrac	area_fraction
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.)	add scalar coordinate type???and add "???" to the CF area type table.	residualFrac	area_fraction
1	Burnt Area Fraction	%	fraction of entire grid cell that is covered by burnt vegetation.	add scalar coordinate typeburnt and add "burnt_vegetation" to the CF area type table. Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	burntArea	area_fraction
	Land Carbon & Biogeochemistry					
1	Carbon Mass in Vegetation	kg m^{-2}			cVeg	vegetation_carbon_content
1	Carbon Mass in Litter Pool	kg m^{-2}			cLitter	litter_carbon_content
1	Carbon Mass in Soil Pool	kg m^{-2}			cSoil	soil_carbon_content
1	Carbon Mass in Products of Land Use Change	kg m^{-2}			cProduct	carbon_content_of_products_of_anthropogenic_land_use_change
1	Leaf Area Index	1	a ratio obtained by dividing the total upper leaf surface area of vegetation by the (horizontal) surface area of the land on which it grows.	Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	lai	leaf_area_index
1	Carbon Mass Flux out of Atmosphere due to Gross Primary Production on Land	kg m^{-2} s^{-1}			gpp	gross_primary_productivity_of_carbon
1	Carbon Mass Flux into Atmosphere due to Autotrophic (Plant) Respiration on Land	kg m^{-2} s^{-1}			ra	plant_respiration_carbon_flux
1	Carbon Mass Flux out of Atmosphere due to Net Primary Production on Land	kg m^{-2} s^{-1}		needed for any model that does not compute GPP	npp	net_primary_productivity_of_carbon

%	time: mean		real	longitude latitude time	shrubFrac	land	area: areacella
%	time: mean		real	longitude latitude time	cropFrac	land	area: areacella
%	time: mean		real	longitude latitude time	pastureFrac	land	area: areacella
%	time: mean		real	longitude latitude time typebare	baresoilFrac	land	area: areacella
%	time: mean		real	longitude latitude time	residualFrac	land	area: areacella
%	time: mean		real	longitude latitude time	burntArea	land	area: areacella
						land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cVeg	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cLitter	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cSoil	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cProduct	land	area: areacella
1	time: mean area: mean where land		real	longitude latitude time	lai	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	gpp	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	ra	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	npp	land	area: areacella

1	Carbon Mass Flux into Atmosphere due to Heterotrophic Respiration on Land	kg m^{-2} s^{-1}			rh	heterotrophic_respiration_carbon_flux
1	Carbon Mass Flux into Atmosphere due to CO2 Emission from Fire	kg m^{-2} s^{-1}	CO2 emissions (expressed as a carbon mass flux) 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	surface_upward_mass_flux_of_carbon_dioxide_expressed_as_carbon_due_to_emission_from_fires_excluding_anthropogenic_land_use_change
1	Carbon Mass Flux into Atmosphere due to Grazing on Land	kg m^{-2} s^{-1}			fGrazing	surface_upward_mass_flux_of_carbon_dioxide_expressed_as_carbon_due_to_emission_from_grazing
1	Carbon Mass Flux into Atmosphere due to Crop Harvesting	kg m^{-2} s^{-1}			fHarvest	surface_upward_mass_flux_of_carbon_dioxide_expressed_as_carbon_due_to_emission_from_crop_harvesting
1	Net Carbon Mass Flux into Atmosphere due to Land Use Change	kg m^{-2} s^{-1}	human changes to land (excluding forest regrowth) accounting possibly for different time-scales related to fate of the wood, for example.		fLuc	surface_net_upward_mass_flux_of_carbon_dioxide_expressed_as_carbon_due_to_emission_from_anthropogenic_land_use_change
1	Carbon Mass Flux out of Atmosphere due to Net Biospheric Production on Land	kg m^{-2} s^{-1}	This is the net mass flux of carbon between land and atmosphere calculated 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	surface_net_downward_mass_flux_of_carbon_dioxide_expressed_as_carbon_due_to_all_land_processes
1	Total Carbon Mass Flux from Vegetation to Litter	kg m^{-2} s^{-1}			fVegLitter	litter_carbon_flux
1	Total Carbon Mass Flux from Litter to Soil	kg m^{-2} s^{-1}			fLitterSoil	carbon_mass_flux_into_soil_from_litter
1	Total Carbon Mass Flux from Vegetation Directly to Soil	kg 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	carbon_mass_flux_into_soil_from_vegetation_excluding_litter
2	Carbon Mass in Leaves	kg m^{-2}		This field and some of the following may sum to yield some of the more generic carbon pool totals given above.	cLeaf	leaf_carbon_content
2	Carbon Mass in Wood	kg m^{-2}	including sapwood and hardwood.		cWood	wood_carbon_content
2	Carbon Mass in Roots	kg m^{-2}	including fine and coarse roots.		cRoot	root_carbon_content
2	Carbon Mass in Other Living Compartments on Land	kg m^{-2}	e.g., labile, fruits, reserves, etc.		cMisc	miscellaneous_living_matter_carbon_content
2	Carbon Mass in Coarse Woody Debris	kg m^{-2}			cCwd	wood_debris_carbon_content
2	Carbon Mass in Above-Ground Litter	kg m^{-2}			cLitterAbove	surface_litter_carbon_content
2	Carbon Mass in Below-Ground Litter	kg m^{-2}			cLitterBelow	subsurface_litter_carbon_content
2	Carbon Mass in Fast Soil Pool	kg m^{-2}	fast is meant as lifetime of less than 10 years for reference climate conditions (20 C, no water limitations).		cSoilFast	fast_soil_pool_carbon_content
2	Carbon Mass in Medium Soil Pool	kg 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	medium_soil_pool_carbon_content
2	Carbon Mass in Slow Soil Pool	kg m^{-2}	fast is meant as lifetime of more than 100 years for reference climate conditions (20 C, no water limitations)		cSoilSlow	slow_soil_pool_carbon_content

kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	rh	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	fFire	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	fGrazing	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	fHarvest	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	fLuc	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	nbp	land	area: areacella
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	fVegLitter	land	area: areacella
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	fLitterSoil	land	area: areacella
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	fVegSoil	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cLeaf	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cWood	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cRoot	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cMisc	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cCwd	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cLitterAbove	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cLitterBelow	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cSoilFast	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cSoilMedium	land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	cSoilSlow	land	area: areacella

2	Plant Functional Type Grid Fraction	%	The categories may differ from model to model, depending on their PFT definitions. This may include natural PFTs, anthropogenic PFTs, bare soil, lakes, urban areas, etc. Sum of all should equal the fraction of the grid-cell that is land.	need to explain how to define vegtype. To facilitate model comparison, it is also requested that the aggregated land cover types called for in lines 28 to 35 be archived (but not in this variable). Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing). Note that the "types" will be model dependent and for each type there should be a full description of the PFT (plant functional type).	landCoverFrac	area_fraction
2	Total Primary Deciduous Tree Fraction	%	This is the fraction of the entire grid cell that is covered by "total primary deciduous trees."	Agregation of model PFTs as defined in 1st priority to aid model intercomparison. Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	treeFracPrimDec	area_fraction
2	Total Primary Evergreen Tree Cover Fraction	%	fraction of entire grid cell that is covered by primary evergreen trees.	Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	treeFracPrimEver	area_fraction
2	Total Secondary Deciduous Tree Cover Fraction	%	fraction of entire grid cell that is covered by secondary deciduous trees.	Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	treeFracSecDec	area_fraction
2	Total Secondary Evergreen Tree Cover Fraction	%	fraction of entire grid cell that is covered by secondary evergreen trees.	Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	treeFracSecEver	area_fraction
2	Total C3 PFT Cover Fraction	%	fraction of entire grid cell that is covered by C3 PFTs (including grass, crops, and trees).	Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	c3PftFrac	area_fraction
2	Total C4 PFT Cover Fraction	%	fraction of entire grid cell that is covered by C4 PFTs (including grass and crops).	Note that if this variable is independent of time, it should be stored only for a single time (of the user's choosing).	c4PftFrac	area_fraction
2	Carbon Mass Flux into Atmosphere due to Growth Autotrophic Respiration on Land	kg 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	surface_upward_carbon_mass_flux_due_to_plant_respiration_for_biomass_growth
2	Carbon Mass Flux into Atmosphere due to Maintenance Autotrophic Respiration on Land	kg 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	surface_upward_carbon_mass_flux_due_to_plant_respiration_for_biomass_maintenance

%	time: mean		real	longitude latitude vegtype time	landCoverFrac	land	area: areacella
%	time: mean		real	longitude latitude time typepdec	treeFracPrimDec	land	area: areacella
%	time: mean		real	longitude latitude time typepever	treeFracPrimEver	land	area: areacella
%	time: mean		real	longitude latitude time typesdec	treeFracSecDec	land	area: areacella
%	time: mean		real	longitude latitude time typesever	treeFracSecEver	land	area: areacella
%	time: mean		real	longitude latitude time typec3pft	c3PftFrac	land	area: areacella
%	time: mean		real	longitude latitude time typec4pft	c4PftFrac	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	rGrowth	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	up	real	longitude latitude time	rMaint	land	area: areacella

2	Carbon Mass Flux due to NPP Allocation to Leaf	kg m^{-2} s^{-1}	This is the rate of carbon uptake by leaves due to NPP	nppLeaf	net_primary_productivity_of_carbon_accumulated_in_leaves
2	Carbon Mass Flux due to NPP Allocation to Wood	kg m^{-2} s^{-1}	This is the rate of carbon uptake by wood due to NPP	nppWood	net_primary_productivity_of_carbon_accumulated_in_wood
2	Carbon Mass Flux due to NPP Allocation to Roots	kg m^{-2} s^{-1}	This is the rate of carbon uptake by roots due to NPP	nppRoot	net_primary_productivity_of_carbon_accumulated_in_roots
1	Net Carbon Mass Flux out of Atmophere due to Net Ecosystem Productivity on Land.	kg m^{-2} s^{-1}	Natural flux of CO2 (expressed as a mass flux of carbon) from the atmosphere to the land calculated as the difference between uptake associated will photosynthesis and the release of CO2 from the sum of plant and soil respiration and fire. Positive flux is into the land. 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).	nep	surface_net_downward_mass_flux_of_carbon_dioxide_expressed_as_carbon_due_to_all_land_processes_excluding_anthropogenic_land_use_change

kg m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	nppLeaf	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	nppWood	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	nppRoot	land	area: areacella
kg m-2 s-1	time: mean area: mean where land	down	real	longitude latitude time	nep	land	area: areacella

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 & notes	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}	Computed as the mass of surface snow on the land portion of the grid cell divided by the land area in the grid cell; reported as 0.0 where the land fraction is 0; excluded is snow on vegetation canopy or on sea ice.		snw	surface_snow_amount
1	Snow Depth	m	where land over land, this is computed as the mean thickness of snow in the land portion of the grid cell (averaging over the entire land portion, including the snow-free fraction). Reported 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: this is computed as 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
2	Snow Soot Content	kg m^{-2}	the entire land portion of the grid cell is considered, with snow soot content set to 0.0 in regions free of snow.		sootsn	soot_content_of_surface_snow
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. Reported as "missing in regions free of snow on land.		agesno	age_of_surface_snow
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, 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. Reported as "missing in regions free of snow on land.		tsn	temperature_in_surface_snow
1	Surface Snow Melt	kg m^{-2} s^{-1}	Computed 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. Computed as the total sublimation on the land portion of the grid cell divided by the land area in the grid cell; reported as 0.0 for snow-free land regions; reported as 0.0 where the land fraction is 0.		sbl	surface_snow_and_ice_sublimation_flux

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
%	time: mean		real	longitude latitude time	snc	landIce land		area: areacella		
kg m-2	time: mean area: mean where land		real	longitude latitude time	snw	landIce land		area: areacella		
m	time: mean area: mean where land		real	longitude latitude time	snd	landIce land		area: areacella		
kg m-2	time: mean area: mean where land		real	longitude latitude time	lwsnl	landIce land		area: areacella		
								area: areacella		
kg m-2	time: mean area: mean where land		real	longitude latitude time	sootsn	landIce land		area: areacella		
day	time: mean (with samples weighted by snow mass) area: mean where land		real	longitude latitude time	agesno	landIce land		area: areacella		
K	time: mean (with samples weighted by snow mass) area: mean where land		real	longitude latitude time	tsn	landIce land		area: areacella		
								area: areacella		
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	snm	landIce land		area: areacella		
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	sbl	landIce land		area: areacella		

1	Downward Heat Flux into Snow Where Land over Land	W m^{-2}	the net downward heat flux from the atmosphere into the snow that lies on land divided by the land area in the grid cell; reported as 0.0 for snow-free land regions or where the land fraction is 0.		hfdsn	surface_downward_heat_flux_in_snow
3	Permafrost Layer Thickness	m	where land over land: This is the mean thickness of the permafrost layer in the land portion of the grid cell. Reported as 0.0 in permafrost-free regions.		tpf	permafrost_layer_thickness
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.	Why do you want to know mass of liquid water? Are you studying the seaasonal melting/freezing cycle? Don't you care about how much frozen water is tied up as permafrost?	pflw	liquid_water_content_of_permafrost_layer

W m-2	time: mean area: mean where land	down	real	longitude latitude time	hfdsn	landIce land	area: areacella
m	time: mean area: mean where land		real	longitude latitude time	tpf	landIce land	area: areacella
kg m-2	time: mean area: mean where land		real	longitude latitude time	pflw	landIce land	area: areacella

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 & notes	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	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). Reported as 0.0 in regions free of sea ice.		sit	sea_ice_thickness
1	Sea Ice Plus Surface Snow Amount	kg m^{-2}	the mass per unit area of sea ice plus snow in the ocean portion of the grid cell (averaging over the entire ocean portion, including the ice-free fraction). Reported as 0.0 in regions free of sea ice.		sim	sea_ice_and_surface_snow_amount
1	Water Evaporation Flux from Sea Ice	kg m^{-2} s^{-1}	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. Reported as 0.0 in regions free of sea ice. [This was computed differently in CMIP3.]		evap	water_evaporation_flux
1	Snow Depth	m	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). Reported 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	Sea Ice Albedo	1	Reported 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	sea_ice_albedo
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. Reported as "missing" in regions free of sea ice.		ssi	sea_ice_salinity
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. Reported 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	surface_temperature

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
%	time: mean		real	longitude latitude time	sic	seaIce ocean		area: areacello		
m	time: mean area: mean where sea		real	longitude latitude time	sit	seaIce ocean		area: areacello		
kg m-2	time: mean area: mean where sea		real	longitude latitude time	sim	seaIce ocean		area: areacello		
kg m-2 s-1	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	evap	seaIce		area: areacello		
m	time: mean area: mean where sea		real	longitude latitude time	snd	seaIce		area: areacello		
%	time: mean		real	longitude latitude time	snc	seaIce		area: areacello		
1	time: mean area: mean where sea_ice		real	longitude latitude time	ialb	seaIce		area: areacello		
								area: areacello		
psu	time: mean (weighted by mass of sea ice)		real	longitude latitude time	ssi	seaIce		area: areacello		
K	time: mean (weighted by area of sea ice)		real	longitude latitude time	tsice	seaIce		area: areacello		

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. Reported as "missing" in regions free of snow-covered sea ice.		tsnint	sea_ice_surface_temperature
1	Surface Rainfall Rate into the Sea Ice Portion of the Grid Cell	kg m^{-2} s^{-1}	where sea ice over sea: this is 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). Reported as 0. in regions free of sea ice.		pr	rainfall_flux
1	Surface Snowfall Rate into the Sea Ice Portion of the Grid Cell	kg m^{-2} s^{-1}	where sea ice over sea: this is computed as 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). Reported as 0. in regions free of sea ice.		prsn	snowfall_flux
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. Reported as "missing" in regions free of sea ice.		ageice	age_of_sea_ice
1	Frazil Sea Ice Growth (Leads) Rate	kg m^{-2} s^{-1}	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. Reported as 0.0 in regions free of sea ice.		grFrazil	tendency_of_sea_ice_amount_due_to_frazil_ice_accumulation_in_leads
1	Congelation Sea Ice Growth Rate	kg m^{-2} s^{-1}	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. Reported as 0.0 in regions free of sea ice.		grCongel	tendency_of_sea_ice_amount_due_to_congelation_ice_accumulation
1	Lateral Sea Ice Growth Rate	kg m^{-2} s^{-1}	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. Reported as 0.0 in regions free of sea ice.		grLateral	tendency_of_sea_ice_amount_due_to_lateral_growth_of_ice_floes
1	Snow-Ice Formation Rate	kg m^{-2} s^{-1}	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. Reported as 0.0 in regions free of snow-covered sea ice.		snoToIce	tendency_of_sea_ice_amount_due_to_snow_conversion
1	Snow Melt Rate	kg m^{-2} s^{-1}	the rate of change of snow mass due to melting, divided by the area of the ocean portion of the grid cell. Reported as 0.0 in regions free of sea ice. Includes falling snow that melts on impact with the surface.		snomelt	surface_snow_melt_flux
1	Rate of Melt at Upper Surface of Sea Ice	kg m^{-2} s^{-1}	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. Reported as 0.0 in regions free of sea ice. Does not include rate of change of snow mass.		tmelt	tendency_of_sea_ice_amount_due_to_surface_melting
1	Rate of Melt at Sea Ice Base	kg m^{-2} s^{-1}	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. Reported as 0.0 in regions free of sea ice.		bmelt	tendency_of_sea_ice_amount_due_to_basal_melting
2	Sea Ice Heat Content	J m^{-2}	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. Reported as "missing in regions free of sea ice. Does not include heat content of snow.		hcice	integral_of_sea_ice_temperature_wrt_depth_expressed_as_heat_content
1	Downwelling Shortwave over Sea Ice	W m^{-2}	the downwelling 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

K	time: mean (weighted by area of snow-covered sea ice)		real	longitude latitude time	tsnint	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea_ice over sea		real	longitude latitude time	pr	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea_ice over sea		real	longitude latitude time	prsn	seaIce	area: areacello
years	time: mean (weighted b mass of sea ice)		real	longitude latitude time	ageice	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	grFrazil	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	grCongel	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	grLateral	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	snoToIce	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	snomelt	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	tmelt	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea		real	longitude latitude time	bmelt	seaIce	area: areacello
J m-2	time: mean (weighted by mass of sea ice)		real	longitude latitude time	hcice	seaIce	area: areacello
W m-2	time: mean area: mean where sea_ice over sea	down	real	longitude latitude time	rsdssi	seaIce	area: areacello

1	Upward Shortwave over Sea Ice	W m^{-2}	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	Downwelling Long Wave over Sea Ice	W m^{-2}	the downwelling 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}	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}	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}	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} s^{-1}	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	X-Component of Sea Ice Mass Transport	kg s^{-1}	The sea ice mass transport is 0.0 in ice-free regions of the ocean. Snow is included in calculation of mass.		transix	sea_ice_x_transport
1	Y-Component of Sea Ice Mass Transport	kg s^{-1}	The sea ice mass transport is 0.0 in ice-free regions of the ocean. Snow is included in calculation of mass.		transiy	sea_ice_y_transport
2	Sea Ice Mass Transport Through Fram Strait	kg s^{-1}			transifs	sea_ice_transport_across_line
2	X-Component of 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. Reported as "missing" in regions free of sea ice.		strairx	surface_downward_x_stress
2	Y-Component of 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. Reported as "missing" in regions free of sea ice.		strairy	surface_downward_y_stress
2	X-Component of 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	upward_x_stress_at_sea_ice_base
2	Y-Component of 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. Reported as "missing" in regions free of sea ice.		strocny	upward_y_stress_at_sea_ice_base
2	Compressive Sea Ice Strength	N m^{-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. Reported as "missing" in regions free of sea ice.		streng	compressive_strength_of_sea_ice
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. Reported as "missing" in regions free of sea ice.		divice	divergence_of_sea_ice velocity
2	Eastward Derivative of Northward Sea Ice Velocity	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. Reported as "missing" in regions free of sea ice.		eshrice	eastward_derivative_of_northward_sea_ice_velocity

W m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	rsussi	seaIce	area: areacello
W m-2	time: mean area: mean where sea_ice over sea	down	real	longitude latitude time	rldssi	seaIce	area: areacello
W m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	rlussi	seaIce	area: areacello
W m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	hfssi	seaIce	area: areacello
W m-2	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	hflssi	seaIce	area: areacello
kg m-2 s-1	time: mean area: mean where sea_ice over sea	up	real	longitude latitude time	sblsi	seaIce	area: areacello
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	time	transifs	seaIce	
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-1	time: mean (weighted by area of sea ice)		real	longitude latitude time	streng	seaIce	area: areacello
s-1	time: mean (weighted by area of sea ice)		real	longitude latitude time	divice	seaIce	area: areacello
s-1	time: mean (weighted by area of sea ice)		real	longitude latitude time	eshrice	seaIce	area: areacello

2	Northward Derivative of Eastward Sea Ice Velocity	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. Reported as "missing" in regions free of sea ice.	nshrice	northward_derivative_of_eastward_sea_ice_velocity
2	Sea Ice Ridging Rate	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. Reported as "missing" in regions free of sea ice.	ridgice	tendency_of_sea_ice_area_fraction_due_to_ridging

s-1	time: mean (weighted by area of sea ice)	real	longitude latitude time	nshrice	seaIce	area: areacello
s-1	time: mean (weighted by area of sea ice)	real	longitude latitude time	ridgice	seaIce	area: areacello

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 & notes	output variable name	standard name
	Aerosol Optics					
1	Ambient Aerosol Optical Thickness at 550 nm	1	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 Optical Thickness at 550 nm	1	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			abs550aer	atmosphere_absorption_optical_thickness_due_to_ambient_aerosol
2	Ambient Aerosol Optical Thickness at 870 nm	1	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). "Mass" refers to the mass of organic matter, not mass of organic carbon alone.	This should only be reported if POA and SOA cannot be separately reported.	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_emission
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 the sum of POA and SOA emissions is reported 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}			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). "Mass" refers to the mass of organic matter, not mass of organic carbon alone.	This should only be reported if POA and SOA cannot be separately reported.	dryoa	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}			drypoa	tendency_of_atmosphere_mass_content_of_primary_particulate_organic_matter_dry_aerosol_due_to_dry_deposition

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
1	time: mean		real	longitude latitude time	od550aer	aerosol		area: areacella		
1	time: mean		real	longitude latitude time	od550lt1aer	aerosol		area: areacella		
1	time: mean		real	longitude latitude time	abs550aer	aerosol		area: areacella		
1	time: mean		real	longitude latitude time	od870aer	aerosol		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	emioa	aerosol		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	emipoa	aerosol		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	chepsoa	aerosol		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	emibc	aerosol		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	dryoa	aerosol		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	drypoa	aerosol		area: areacella		

3	Dry Deposition Rate of Dry Aerosol Secondary Organic Matter	kg m^{-2} s^{-1}			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}			drybc	tendency_of_atmosphere_mass_content_of_black_carbon_dry_aerosol_due_to_dry_deposition
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). "Mass" refers to the mass of organic matter, not mass of organic carbon alone.	This should only be reported if POA and SOA cannot be separately reported.	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}			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}			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}			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}			emiso2	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_emission
1	Total Direct Emission Rate of SO4	kg m^{-2} s^{-1}	expressed as a tendency of atmosphere mass content of SO4. Direct emission does not include secondary sulfate production.		emiso4	tendency_of_atmosphere_mass_content_of_sulfate_dry_aerosol_due_to_emission
1	Total Emission Rate of DMS	kg m^{-2} s^{-1}			emidms	tendency_of_atmosphere_mass_content_of_dimethyl_sulfide_due_to_emission
3	Dry Deposition Rate of SO2	kg m^{-2} s^{-1}			dryso2	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_dry_deposition
1	Dry Deposition Rate of SO4	kg m^{-2} s^{-1}			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}		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}			wetso4	tendency_of_atmosphere_mass_content_of_sulfate_expressed_as_sulfur_dry_aerosol_due_to_wet_deposition
3	Wet Deposition Rate of SO2	kg m^{-2} s^{-1}			wetso2	tendency_of_atmosphere_mass_content_of_sulfur_dioxide_due_to_wet_deposition
3	Wet Deposition Rate of DMS	kg m^{-2} s^{-1}		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}			eminh3	tendency_of_atmosphere_mass_content_of_ammonia_due_to_emission
3	Dry Deposition Rate of NH3	kg m^{-2} s^{-1}			drynh3	tendency_of_atmosphere_mass_content_of_ammonia_due_to_dry_deposition
1	Dry Deposition Rate of NH4	kg m^{-2} s^{-1}			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}			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}			emiss	tendency_of_atmosphere_mass_content_of_seasalt_dry_aerosol_due_to_emission

kg m-2 s-1	time: mean	real	longitude latitude time	drysoa	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	drybc	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetoa	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetpoa	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetsoa	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetbc	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	emibb	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	emiso2	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	emiso4	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	emidms	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	dryso2	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	dryso4	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	drydms	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetso4	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetso2	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetdms	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	eminh3	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	drynh3	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	drynh4	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetnh4	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	emiss	aerosol	area: areacella

3	Dry Deposition Rate of Seasalt	kg m^{-2} s^{-1}			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}			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}			emidust	tendency_of_atmosphere_mass_content_of_dust_dry_aerosol_due_to_emission
1	Dry Deposition Rate of Dust	kg m^{-2} s^{-1}			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}			wetdust	tendency_of_atmosphere_mass_content_of_dust_dry_aerosol_due_to_wet_deposition
	Aerosol Loads					
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).	This should only be reported if the components specified in the next two entries of this table 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}			loadpoa	atmosphere_mass_content_of_primary_particulate_organic_matter_dry_aerosol
1	Load of Dry Aerosol Secondary Organic Matter	kg m^{-2}			loadsoa	atmosphere_mass_content_of_secondary_particulate_organic_matter_dry_aerosol
1	Load of Black Carbon Aerosol	kg m^{-2}			loadbc	atmosphere_mass_content_of_black_carbon_dry_aerosol
1	Load of SO4	kg m^{-2}		Is this "dry" or "ambient"?	loadso4	atmosphere_mass_content_of_sulfate_dry_aerosol
1	Load of Dust	kg m^{-2}			loaddust	atmosphere_mass_content_of_dust_dry_aerosol
1	Load of Seasalt	kg m^{-2}			loadss	atmosphere_mass_content_of_seasalt_dry_aerosol
1	Load of NO3	kg m^{-2}			loadno3	atmosphere_mass_content_of_nitrate_dry_aerosol
3	Load of NH4	kg m^{-2}			loadnh4	atmosphere_mass_content_of_ammonium_dry_aerosol
	Surface Concentrations					
3	Surface Concentration of Dry Aerosol Organic Matter	kg m^{-3}	mass concentration of particulate organic matter dry 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 particulate organic matter dry 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 particulate organic matter dry aerosol in air in model lowest layer. If the model lumps SOA with POA, then their sum is reported as POA.	The location of the model's lowest layer should be recorded in the netCDF output file.	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 dry 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 dry 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 dry 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

kg m-2 s-1	time: mean	real	longitude latitude time	dryss	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetss	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	emidust	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	drydust	aerosol	area: areacella
kg m-2 s-1	time: mean	real	longitude latitude time	wetdust	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loadoa	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loadpoa	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loadsoa	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loadbc	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loadso4	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loaddust	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loadss	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loadno3	aerosol	area: areacella
kg m-2	time: mean	real	longitude latitude time	loadnh4	aerosol	area: areacella
kg m-3	time: mean	real	longitude latitude alev1 time	sconcoa	aerosol	area: areacella
kg m-3	time: mean	real	longitude latitude alev1 time	sconcpoa	aerosol	area: areacella
kg m-3	time: mean	real	longitude latitude alev1 time	sconcsoa	aerosol	area: areacella
kg m-3	time: mean	real	longitude latitude alev1 time	sconcbc	aerosol	area: areacella
kg m-3	time: mean	real	longitude latitude alev1 time	sconcso4	aerosol	area: areacella
kg m-3	time: mean	real	longitude latitude alev1 time	sconcdust	aerosol	area: areacella

3	Surface Concentration of Seasalt	kg m^{-3}	mass concentration of seasalt dry 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 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 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_ai r
	Clouds and Radiation					
2	Surface Diffuse Downwelling Shortwave Radiation	W m^{-2}			rsdsdiff	surface_diffuse_downwelling_shortwave_flux_in_air
2	Surface Diffuse Downwelling Clear Sky Shortwave Radiation	W m^{-2}			rsdscsdiff	surface_diffuse_downwelling_shortwave_flux_in_air_a ssuming_clear_sky
1	Cloud-Top Effective Droplet Radius	m	Droplets are liquid only. This is the effective radius "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, or for some models it is the sum over all liquid cloud tops, no matter where they occur, as long as they are seen from the top of the atmosphere. Reported values are weighted by total liquid cloud top fraction of (as seen from TOA) each time sample when computing monthly mean.		reffclwtop	effective_radius_of_cloud_liquid_water_particle_at_liq uid_water_cloud_top
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	number_concentration_of_cloud_liquid_water_particle s_in_air_at_liquid_water_cloud_top
1	Ice Crystal Number Concentration of Cloud Tops	m^{-3}	concentration "as seen from space" over ice-cloud portion of grid cell. This is the value from uppermost model layer with ice cloud or, if available, it is the 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	number_concentration_of_ice_crystals_in_air_at_ice_c loud_top
1	Column Integrated Cloud Droplet Number	m^{-2}	Droplets are liquid only. Values are weighted by liquid cloud fraction in each layer when vertically integrating, and for monthly means the samples are weighted by total liquid cloud fraction (as seen from TOA).		cldnvi	atmosphere_number_content_of_cloud_droplets

kg m-3	time: mean	real	longitude latitude alev1 time	sconcss	aerosol	area: areacella
kg m-3	time: mean	real	longitude latitude alev1 time	sconcno3	aerosol	area: areacella
kg m-3	time: mean	real	longitude latitude alev1 time	sconcnh4	aerosol	area: areacella
W m-2	time: mean	real	longitude latitude time	rsdsdiff	aerosol land	area: areacella
W m-2	time: mean	real	longitude latitude time	rsdscsdiff	aerosol land	area: areacella
m	time: mean	real	longitude latitude time	reffclwtop	aerosol	area: areacella
m-3	time: mean	real	longitude latitude time	cldncl	aerosol	area: areacella
m-3	time: mean	real	longitude latitude time	cldnci	aerosol	area: areacella
m-2	time: mean	real	longitude latitude time	cldnvi	aerosol	area: areacella

In CMOR Table aero: *3-D aerosol-related concentrations and properties on model levels*

Report 1-year samples for years: 1850, 1870, 1890, ..., 1950, 1960, 1970, ... 2000 of the historical run, and 2010, 2020, 2040, 2060, 2080, 2100 of the RCP runs. For AMIP runs, report 1-year samples every 10 years (1980, 1990, ..., 2010). For 2030 time-slice run, report 1-year sample for year 2035. For decadal runs, report 10th year only for 10-year predictions or hindcasts, and report year 10, 20, and 30 for 30-year predictions and hindcasts. Also report years 2010, 2011, and 2012 for years with hypothetical volcanic eruption in 2010. For the preindustrial control, report the years that correspond to years 1850, 1870, 1890, ..., 1950, 1960, 1970, ... 2000 of the historical run and years 2010, 2040, 2060, 2080, & 2100 of the RCP runs.

priority	long name	units	comment	questions & notes	output variable name	standard name
1	Ambient Aerosol Extinction at 550 nm	m^{-1}	"ambient" means "wetted".	This and other fields in this table are 3-D.	ec550aer	volume_extinction_coefficient_in_air_due_to_ambient_aerosol
1	Concentration of Dry Aerosol Organic Matter	kg m^{-3}		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}			concpoa	mass_concentration_of_primary_particulate_organic_matter_dry_aerosol_in_air
1	Concentration of Dry Aerosol Secondary Organic Matter	kg m^{-3}		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}			concbb	mass_concentration_of_biomass_burning_dry_aerosol_in_air
1	Concentration of Black Carbon Aerosol	kg m^{-3}			concbc	mass_concentration_of_black_carbon_dry_aerosol_in_air
1	Concentration of Aerosol Water	kg m^{-3}	"ambient" means "wetted"		concaerh2o	mass_concentration_of_water_in_ambient_aerosol_in_air
1	Concentration of SO4	kg m^{-3}			concso4	mass_concentration_of_sulfate_dry_aerosol_in_air
1	Mole Fraction of SO2	1			concso2	mole_fraction_of_sulfur_dioxide_in_air
1	Mole Fraction of DMS	1			concdms	mole_fraction_of_dimethyl_sulfide_in_air
1	Concentration of NO3 Aerosol	kg m^{-3}			concno3	mass_concentration_of_nitrate_dry_aerosol_in_air
1	Concentration of NH4	kg m^{-3}			concnh4	mass_concentration_of_ammonium_dry_aerosol_in_air
1	Concentration of Seasalt	kg m^{-3}			concss	mass_concentration_of_seasalt_dry_aerosol_in_air
1	Concentration of Dust	kg m^{-3}			concdust	mass_concentration_of_dust_dry_aerosol_in_air
2	Aerosol Number Concentration	m^{-3}			conccn	number_concentration_of_ambient_aerosol_in_air
3	Number Concentration of Nucleation Mode Aerosol	m^{-3}	includes all particles with diameter smaller than 3 nm		concnmcn	number_concentration_of_nucleation_mode_ambient_aerosol_in_air
2	Number Concentration Coarse Mode Aerosol	m^{-3}	includes all particles with diameter larger than 1 micron		conccmcn	number_concentration_of_coarse_mode_ambient_aerosol_in_air

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
m-1	time: mean			longitude latitude alevel time	ec550aer	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concoa	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concpoa	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concsoa	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concbb	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concbc	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concaerh2o	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concso4	aerosol		area: areacella		
1	time: mean			longitude latitude alevel time	concso2	aerosol		area: areacella		
1	time: mean			longitude latitude alevel time	concdms	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concno3	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concnh4	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concss	aerosol		area: areacella		
kg m-3	time: mean			longitude latitude alevel time	concdust	aerosol		area: areacella		
m-3	time: mean			longitude latitude alevel time	conccn	aerosol		area: areacella		
m-3	time: mean			longitude latitude alevel time	concnmcn	aerosol		area: areacella		
m-3	time: mean			longitude latitude alevel time	conccmcn	aerosol		area: areacella		

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 liquid cloud fraction.	cdnc	number_concentration_of_cloud_liquid_water_particles_in_air
1	Ice Crystal Number Concentration	m^{-3}	Ice Crystal number concentration in ice clouds	Weighted by the ice cloud fraction.	inc	number_concentration_of_ice_crystals_in_air

m	time: mean	longitude latitude alevel time	reffclws	aerosol	area: areacella
m	time: mean	longitude latitude alevel time	reffclwc	aerosol	area: areacella
m-3	time: mean	longitude latitude alevel time	cdnc	aerosol	area: areacella
m-3	time: mean	longitude latitude alevel time	inc	aerosol	area: areacella

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

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

In CMOR Table day: *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 & notes	output variable name	standard name
1	Near-Surface Specific Humidity	1		normally, report this at 2 meters above the surface	huss	specific_humidity
1	Daily Minimum Near-Surface Air Temperature	K		normally report this at 2 meters above the surface	tasmin	air_temperature
1	Daily Maximum Near-Surface Air Temperature	K		normally report this at 2 meters above the surface	tasmax	air_temperature
1	Near-Surface Air Temperature	K		normally report this at 2 meters above the surface	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 Near-Surface Wind Speed	m s^{-1}		normally report this at 10 meters above the surface	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. Note that the correct standard_name for this variable is "sea_surface_temperature", not "surface_temperature", but this was discovered too late to correct. To maintain consistency across CMIP5 models, the wrong standard_name will continue to be used.	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		Report on the ocean grid. This variable appears in WGOMD Table 2.2	omldamax	ocean_mixed_layer_thickness_defined_by_mixing_scheme

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
1	time: mean		real	longitude latitude time height2m	huss	atmos		area: areacella		
K	time: minimum		real	longitude latitude time height2m	tasmin	atmos		area: areacella		
K	time: maximum		real	longitude latitude time height2m	tasmax	atmos		area: areacella		
K	time: mean		real	longitude latitude time height2m	tas	atmos		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	pr	atmos		area: areacella		
Pa	time: mean		real	longitude latitude time	psl	atmos		area: areacella		
m s-1	time: mean		real	longitude latitude time height10m	sfcWind	atmos				
K2	time:mean		real	longitude latitude time	tossq	ocean		area: areacello		
K	time: mean		real	longitude latitude time	tos	ocean		area: areacello		
m	time: maximum		real	longitude latitude time	omldamax	ocean		area: areacello		

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 & 2030 time-slice run	all years

In CMOR Table day: ***2-D daily-mean atmospheric and surface fields*** (All fields should be reported on the atmospheric grid except (as noted below) the sea ice fields, which should be reported on the ocean grid.)

priority	long name	units	comment	questions & notes	output variable name	standard name
1	Moisture in Upper Portion of Soil Column	kg m^{-2}	the mass of water in all phases in a thin surface soil layer.	integrate over uppermost 10 cm	mrsos	moisture_content_of_soil_layer
1	Near-Surface 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.	normally report this at 2 meters above the surface	rhs	relative_humidity
1	Surface Daily 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.	normally report this at 2 meters above the surface	rhsmin	relative_humidity
1	Surface Daily 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.	normally report this at 2 meters above the surface	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. Includes 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.		tslsi	surface_temperature
1	Surface Snow Amount	kg m^{-2}	the mass of surface snow on the land portion of the grid cell divided by the land area in the grid cell; reported as 0.0 where the land fraction is 0; excludes 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}	computed 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 Near-Surface Wind	m s^{-1}		normally, report this at 10 meters above the surface	uas	eastward_wind
1	Northward Near-Surface Wind	m s^{-1}		normally, report this at 10 meters above the surface	vas	northward_wind
1	Daily Maximum Near-Surface Wind Speed	m s^{-1}		normally, report this at 10 meters above the surface	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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
kg m-2	time: mean area: mean where land		real	longitude latitude time sdepth1	mrsos	land		area: areacella		
%	time: mean		real	longitude latitude time height2m	rhs	atmos		area: areacella		
%	time: minimum		real	longitude latitude time height2m	rhsmin	atmos		area: areacella		
%	time: maximum		real	longitude latitude time height2m	rhsmax	atmos		area: areacella		
%	time: mean		real	longitude latitude time	snc	landIce land		area: areacella		
%	time: mean		real	longitude latitude time	clt	atmos		area: areacella		
K	time: mean		real	longitude latitude time	tslsi	land		area: areacella		
kg m-2	time: mean area: mean where land		real	longitude latitude time	snw	landIce land		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	prc	atmos		area: areacella		
kg m-2 s-1	time: mean		real	longitude latitude time	prsn	atmos		area: areacella		
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	mrro	land		area: areacella		
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		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	hfss	atmos		area: areacella		

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	X-Component of Sea Ice Velocity	m s^{-1}	Reported as "missing" in regions free of sea ice.	Report on ocean's grid.	usi	sea_ice_x_velocity
1	Y-Component of Sea Ice Velocity	m s^{-1}	Reported as "missing" in regions free of sea ice.	Report on ocean's grid.	vsi	sea_ice_y_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	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). Reported as 0.0 in regions free of sea ice.	Report on ocean's grid.	sit	sea_ice_thickness

W m-2	time: mean	down	real	longitude latitude time	rlds	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rlus	atmos	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rsds	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rsus	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rlut	atmos	area: areacella
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	area: areacello
m	time: mean area: mean where sea		real	longitude latitude time	sit	seaIce ocean	area: areacello

In CMOR Table day: 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 & notes**	**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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
K	time: mean		real	longitude latitude plev8 time	ta	atmos		area: areacella		
%	time: mean		real	longitude latitude plev8 time	hur	atmos		area: areacella		
1	time: mean		real	longitude latitude plev8 time	hus	atmos		area: areacella		
Pa s-1	time: mean		real	longitude latitude plev8 time	wap	atmos		area: areacella		
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		area: areacella		

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 synoptic *"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, late 1980, and late 1990	all years	3 for each period	lower

priority	long name	units	comment	questions & notes	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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
K			real	longitude latitude alevel time1	ta	atmos		area: areacella		
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		area: areacella		
Pa			real	longitude latitude time1	ps	atmos		area: areacella		

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 & 2030 time-slice	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 & notes	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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
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		area: areacella		
Pa			real	longitude latitude time1	psl	atmos		area: areacella		

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 & future 2030 time-slice	all years
future simulations driven by RCP concentrations or emissions	Jan 2026 - Dec 2045, Jan 2081-Dec 2100, 2181-2200, and 2281-2300
pre-industrial control	30 years (ideally the years corresponding to the last 30 years of abrupt 4xCO2 run)
1 percent per year CO2	last 30 years
control SST climatology (6.2a)	all years
CO2 forcing (6.2b), anthropogenic aerosol forcing (6.4a), and sulfate aerosol forcing (6.4b)	all years
abrupt 4XCO2 (6.3)	first 5 years and years 121-150 years
abrupt 4XCO2 ensemble (6.3-E)	all years

priority	long name	units	comment	questions & notes	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	This is sampled synoptically.	normally, report at 2 meters above the surface	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}	This is sampled synoptically.		uas	eastward_wind
1	Northward Near-Surface Wind Speed	m s^{-1}	This is sampled synoptically.		vas	northward_wind

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
kg m-2 s-1	time:mean		real	longitude latitude time	pr	atmos		area: areacella		
K	time: point		real	longitude latitude time1 height2m	tas	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	hfls	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	hfss	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude time	rlds	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rlus	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude time	rsds	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rsus	atmos		area: areacella		
						atmos		area: areacella		
m s-1	time: point		real	longitude latitude time1 height10m	uas	atmos				
m s-1	time: point		real	longitude latitude time1 height10m	vas	atmos				

1	Near-Surface Specific Humidity	1	This is sampled synoptically.	normally, report at 2 meters above the surface	huss	specific_humidity
1	Moisture in Upper Portion of Soil Column	kg m^{-2}	the mass of water in all phases in a thin surface soil layer.	integrate over uppermost 10 cm	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.		tslsi	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}	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.		rsuscs	surface_upwelling_shortwave_flux_in_air_assuming_clear_sky
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 Diffuse Downwelling Shortwave Radiation	W m^{-2}	This is a 3-hour mean flux.		rsdsdiff	surface_diffuse_downwelling_shortwave_flux_in_air

1	time: point		real	longitude latitude time1 height2m	huss	atmos	area: areacella
kg m-2	time: point area: mean where land		real	longitude latitude time1 sdepth1	mrsos	land	area: areacella
K	time: point		real	longitude latitude time1	tslsi	land	area: areacella
K	time: point area: mean where sea		real	longitude latitude time1	tso	ocean	area: areacella
kg m-2 s-1	time:mean		real	longitude latitude time	prc	atmos	area: areacella
kg m-2 s-1	time:mean		real	longitude latitude time	prsn	atmos	area: areacella
kg m-2 s-1	time: mean area: mean where land		real	longitude latitude time	mrro	land	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rldscs	atmos	area: areacella
W m-2	time: mean	down	real	longitude latitude time	rsdscs	atmos	area: areacella
W m-2	time: mean	up	real	longitude latitude time	rsuscs	atmos	area: areacella
Pa	time: point		real	longitude latitude time1	ps	atmos	area: areacella
%	time: mean		real	longitude latitude time	clt	atmos	area: areacella
W m-2	time: mean		real	longitude latitude time	rsdsdiff	atmos	area: areacella

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).* **Different GCMs will have different cloud tendency terms due to different model formulations. Please submit the terms which are necessary to close the stratiform cloud water budget of your model. If your model contains terms not listed here, please email mark.webb@metoffice.gov.uk to request an update to the table.**

priority	long name	units	comment	questions & notes	output variable name	standard name
1	Upwelling Longwave Radiation	W m^{-2}	Includes also the fluxes at the surface and TOA.		rlu	upwelling_longwave_flux_in_air
1	Upwelling Shortwave Radiation	W m^{-2}	Includes also the fluxes at the surface and TOA.		rsu	upwelling_shortwave_flux_in_air
1	Downwelling Longwave Radiation	W m^{-2}	Includes also the fluxes at the surface and TOA.		rld	downwelling_longwave_flux_in_air
1	Downwelling Shortwave Radiation	W m^{-2}	Includes also the fluxes at the surface and TOA.		rsd	downwelling_shortwave_flux_in_air
1	Upwelling Clear-Sky Longwave Radiation	W m^{-2}	Includes 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}	Includes 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}	Includes 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}	Includes 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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
W m-2	time: mean	up	real	longitude latitude alevhalf time	rlu	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude alevhalf time	rsu	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude alevhalf time	rld	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude alevhalf time	rsd	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude alevhalf time	rlucs	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude alevhalf time	rsucs	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude alevhalf time	rldcs	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude alevhalf time	rsdcs	atmos		area: areacella		
K	time: mean		real	longitude latitude alevel time	ta	atmos		area: areacella		
K s-1	time: mean		real	longitude latitude alevel time	tnt	atmos		area: areacella		
K s-1	time: mean		real	longitude latitude alevel time	tnta	atmos		area: areacella		
K s-1	time: mean		real	longitude latitude alevel time	tntmp	atmos		area: areacella		
K s-1	time: mean		real	longitude latitude alevel time	tntscpbl	atmos		area: areacella		
K s-1	time: mean		real	longitude latitude alevel time	tntr	atmos		area: areacella		
K s-1	time: mean		real	longitude latitude alevel time	tntc	atmos		area: areacella		

1	Relative Humidity	%		hur	relative_humidity
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
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 includes sources and sinks from parametrized physics (e.g. convection, stratiform condensation/evaporation, etc.) and excludes 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	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect 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	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect 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	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect 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	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect the calculation of radiative transfer in model.	clis	mass_fraction_of_stratiform_cloud_ice_in_air

%	time: mean	real	longitude latitude alevel time	hur	atmos	area: areacella
1	time: mean	real	longitude latitude alevel time	hus	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnhus	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnhusa	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnhusc	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnhusd	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnhusscpbl	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnhusmp	atmos	area: areacella
	time: mean					
m2 s-1	time: mean	real	longitude latitude alevel time	eviscu	atmos	area: areacella
m2 s-1	time: mean	real	longitude latitude alevel time	evisct	atmos	area: areacella
						area: areacella
%	time: mean	real	longitude latitude alevel time	clc	atmos	area: areacella
1	time: mean	real	longitude latitude alevel time	clwc	atmos	area: areacella
1	time: mean	real	longitude latitude alevel time	clic	atmos	area: areacella
%	time: mean	real	longitude latitude alevel time	cls	atmos	area: areacella
1	time: mean	real	longitude latitude alevel time	clws	atmos	area: areacella
1	time: mean	real	longitude latitude alevel time	clis	atmos	area: areacella

2	Updraft Convective Mass Flux	kg m^{-2} s^{-1}	Calculated as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	Report on model half-levels (i.e., model layer bounds and not standard pressures).	mcu	atmosphere_updraft_convective_mass_flux
2	Downdraft Convective Mass Flux	kg m^{-2} s^{-1}	Calculated as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	Report on model half-levels (i.e., model layer bounds and not standard pressures).	mcd	atmosphere_downdraft_convective_mass_flux
2	Shallow Convective Mass Flux	kg m^{-2} s^{-1}	The net mass flux represents the difference between the updraft and downdraft components. For models with a distinct shallow convection scheme, this is calculated as convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	Report on model half-levels (i.e., model layer bounds and not standard pressures).	smc	atmosphere_net_upward_shallow_convective_mass_flux
2	Deep Convective Mass Flux	kg m^{-2} s^{-1}	The net mass flux represents the difference between the updraft and downdraft components. This is calculated as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	Report on model half-levels (i.e., model layer bounds and not standard pressures).	dmc	atmosphere_net_upward_deep_convective_mass_flux
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water In Air	s^{-1}			tnsclw	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water In Air Due To Cloud Microphysics	s^{-1}			tnsclwcm	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_cloud_microphysics
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water In Air Due To Boundary Layer Mixing	s^{-1}			tnsclwbl	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_boundary_layer_mixing
2	Tendency of Mass Fraction of Stratiform Cloud Liquid Water In Air Due To Bergeron Findeisen Process To Cloud Ice	s^{-1}			tnsclwbfpcli	tendency_of_mass_fraction_of_stratiform_cloud_liquid_water_in_air_due_to_bergeron_findeisen_process_to_cloud_ice
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
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

kg m-2 s-1	time: mean	up	real	longitude latitude alevhalf time	mcu	atmos	area: areacella
kg m-2 s-1	time: mean	down	real	longitude latitude alevhalf time	mcd	atmos	area: areacella
kg m-2 s-1	time: mean	up	real	longitude latitude alevhalf time	smc	atmos	area: areacella
kg m-2 s-1	time: mean	up	real	longitude latitude alevhalf time	dmc	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclw	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwcm	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwbl	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwbfpcli	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwce	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwcd	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwhon	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwhen	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwri	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwar	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwas	atmos	area: areacella
s-1	time: mean		real	longitude latitude alevel time	tnsclwmi	atmos	area: areacella

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 In Air	s^{-1}	tnscli	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air
2	Tendency of Mass Fraction of Stratiform Cloud Ice In Air Due To Cloud Microphysics	s^{-1}	tnsclicm	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_cloud_microphysics
2	Tendency of Mass Fraction of Stratiform Cloud Ice In Air Due To Boundary Layer Mixing	s^{-1}	tnsclibl	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_boundary_layer_mixing
2	Tendency of Mass Fraction of Stratiform Cloud Ice In Air Due To Bergeron Findeisen Process from Cloud Liquid	s^{-1}	tnsclibfpcl	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_bergeron_findeisen_process_from_cloud_liquid
2	Tendency of Mass Fraction of Stratiform Cloud Ice Due Convective Detrainment	s^{-1}	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_water
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}	tnscliricl	tendency_of_mass_fraction_of_stratiform_cloud_ice_in_air_due_to_riming_from_cloud_liquid_water
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

s-1	time: mean	real	longitude latitude alevel time	tnsclwac	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclwa	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnscli	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclicm	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclibl	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclibfpcl	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclicd	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclihon	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclihencl	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclihenv	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnscliricl	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclirir	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclids	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnscliag	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclias	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnscliemi	atmos	area: areacella

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_water
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 In Air	s^{-1}		tnsccw	tendency_of_mass_fraction_of_stratiform_cloud_condensed_water_in_air
2	Tendency of Mass Fraction of Stratiform Cloud Condensed Water In Air Due To Cloud Microphysics	s^{-1}		tnsccwcm	tendency_of_mass_fraction_of_stratiform_cloud_condensed_water_in_air_due_to_cloud_microphysics
2	Tendency of Mass Fraction of Stratiform Cloud Condensed Water In Air Due To Boundary Layer Mixing	s^{-1}		tnsccwbl	tendency_of_mass_fraction_of_stratiform_cloud_condensed_water_in_air_due_to_boundary_layer_mixing
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
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

s-1	time: mean	real	longitude latitude alevel time	tnsclimr	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclimcl	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnscliif	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsclia	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsccw	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsccwcm	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsccwbl	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsccwce	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsccwacr	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsccwacs	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsccwif	atmos	area: areacella
s-1	time: mean	real	longitude latitude alevel time	tnsccwa	atmos	area: areacella

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 & notes	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 & notes	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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
W m-2	time: mean	up	real	longitude latitude time	rsut4co2	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rlut4co2	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rsutcs4co2	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rlutcs4co2	atmos		area: areacella		

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
W m-2	time: mean	up	real	longitude latitude alevhalf time	rlu4co2	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude alevhalf time	rsu4co2	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude alevhalf time	rld4co2	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude alevhalf time	rsd4co2	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude alevhalf time	rlucs4co2	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude alevhalf time	rsucs4co2	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude alevhalf time	rldcs4co2	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude alevhalf time	rsdcs4co2	atmos		area: areacella		

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

priority	long name	units	comment	questions & notes	output variable name	standard name
1	ISCCP Total Cloud Fraction	%			cltisccp	cloud_area_fraction
1	ISCCP Mean Cloud Albedo	1	time-means weighted by the ISCCP Total Cloud Fraction - see http://www.cfmip.net/README		albisccp	cloud_albedo
1	ISCCP Mean Cloud Top Pressure	Pa	time-means weighted by the ISCCP Total Cloud Fraction - see http://www.cfmip.net/README		pctisccp	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	This is reflectance as seen at the top of the atmosphere.	5 bins of solar zenith angle.	parasolRefl	toa_bidirectional_reflectance

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
%	time: mean		real	longitude latitude time	cltisccp	atmos		area: areacella		
1	time: mean		real	longitude latitude time	albisccp	atmos		area: areacella		
Pa	time: mean		real	longitude latitude time	pctisccp	atmos		area: areacella		
%	time: mean		real	longitude latitude plev7 tau time	clisccp	atmos		area: areacella		
								area: areacella		
%	time: mean		real	longitude latitude time	cltcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time p840	cllcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time p560	clmcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time p220	clhcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude alt40 time	clcalipso	atmos		area: areacella		
1	time: mean		real	longitude latitude sza5 time	parasolRefl	atmos		area: areacella		

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 & notes	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	%	Clouds detected by CALIPSO but below the detectability threshold of CloudSat	40 height levels	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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
%	time: mean		real	longitude latitude alt40 time	clcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude alt40 time	clcalipso2	atmos		area: areacella		
1	time: mean		real	longitude latitude alt40 dbze time	cfadDbze94	atmos		area: areacella		
1	time: mean		real	longitude latitude alt40 scatratio time	cfadLidarsr532	atmos		area: areacella		
1	time: mean		real	longitude latitude sza5 time	parasolRefl	atmos		area: areacella		
%	time: mean		real	longitude latitude time	cltcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time p840	cllcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time p560	clmcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time p220	clhcalipso	atmos		area: areacella		

CMOR Table cfDay: CFMIP Daily-Mean Cloud Diagnostic Fields cfDay day

(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 cfDay: "CFMIP daily 2D" -- daily mean 2-D fields including inline ISCCP/CloudSat/CALIPSO/ PARASOL simulator output

priority	long name	units	comment	questions & notes	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	surface_upwelling_shortwave_flux_in_air_assuming_clear_sky
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. Includes 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). This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect 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). This includes precipitating frozen hydrometeors ONLY if the precipitating hydrometeors affect 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			ccb	air_pressure_at_convective_cloud_base
1	Air Pressure at Convective Cloud Top	Pa			cct	air_pressure_at_convective_cloud_top

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
Pa	time: mean		real	longitude latitude time	ps	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude time	rsdt	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rsut	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude time	rsdscs	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rsuscs	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude time	rldscs	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rlutcs	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rsutcs	atmos		area: areacella		
%	time: mean		real	longitude latitude time	clt	atmos		area: areacella		
kg m-2	time: mean		real	longitude latitude time	clwvi	atmos		area: areacella		
kg m-2	time: mean		real	longitude latitude time	clivi	atmos		area: areacella		
Pa s-1	time: mean		real	longitude latitude time p500	wap500	atmos		area: areacella		
K	time: mean		real	longitude latitude time p700	ta700	atmos		area: areacella		
Pa	time: mean		real	longitude latitude time	ccb	atmos		area: areacella		
Pa	time: mean		real	longitude latitude time	cct	atmos		area: areacella		

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
1	ISCCP Mean Cloud Albedo	1	time-means are weighted by the ISCCP Total Cloud Fraction - see http://www.cfmip.net/README		albisccp	cloud_albedo
1	ISCCP Mean Cloud Top Pressure	Pa	time-means are weighted 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).		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

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

priority	long name	units	comment	questions & notes	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

kg m-2 s-1	time: mean		real	longitude latitude time	prc	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	hfls	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	hfss	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude time	rlds	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rlus	atmos		area: areacella		
W m-2	time: mean	down	real	longitude latitude time	rsds	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rsus	atmos		area: areacella		
W m-2	time: mean	up	real	longitude latitude time	rlut	atmos		area: areacella		
%	time: mean		real	longitude latitude time	cltisccp	atmos		area: areacella		
1	time: mean		real	longitude latitude time	albisccp	atmos		area: areacella		
Pa	time: mean		real	longitude latitude time	pctisccp	atmos		area: areacella		
1	time: mean		real	longitude latitude sza5 time	parasolRefl	atmos		area: areacella		
%	time: mean		real	longitude latitude time	cltcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time	cllcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time	clmcalipso	atmos		area: areacella		
%	time: mean		real	longitude latitude time	clhcalipso	atmos		area: areacella		

unformatted units	**cell_methods**	**positive**	**type**	**CMOR dimensions**	**CMOR variable name**	**realm**	**frequency**	**cell_measures**	**flag_values**	**flag_meanings**
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		area: areacella		
1	time: mean		real	longitude latitude alevel time	hus	atmos		area: areacella		
Pa s-1	time: mean		real	longitude latitude alevel time	wap	atmos		area: areacella		
m	time: mean		real	longitude latitude alevel time	zg	atmos		area: areacella		
%	time: mean		real	longitude latitude alevel time	hur	atmos		area: areacella		
%	time: mean		real	longitude latitude alevel time	cl	atmos		area: areacella		

1	Mass Fraction of Cloud Liquid Water	1	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect the calculation of radiative transfer in model.		clw	mass_fraction_of_cloud_liquid_water_in_air
1	Mass Fraction of Cloud Ice	1	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect the calculation of radiative transfer in model.		cli	mass_fraction_of_cloud_ice_in_air
1	Convective Mass Flux	$kg\ m^{-2}\ s^{-1}$	The net mass flux should represent the difference between the updraft and downdraft components. This is calculated as the convective mass flux divided by the area of the whole grid cell (not just the area of the cloud).	Report on model half-levels (i.e., model layer bounds and not standard pressures).	mc	atmosphere_net_upward_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	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

1	time: mean		real	longitude latitude alevel time	clw	atmos	area: areacella
1	time: mean		real	longitude latitude alevel time	cli	atmos	area: areacella
kg m-2 s-1	time: mean	up	real	longitude latitude alevhalf time	mc	atmos	area: areacella
%	time: mean		real	longitude latitude alt40 time	clcalipso	atmos	area: areacella
%	time: mean		real	longitude latitude plev7 tau time	clisccp	atmos	area: areacella
Pa	time: mean		real	longitude latitude alevel time	pfull	atmos	area: areacella
Pa	time: mean		real	longitude latitude alevhalf time	phalf	atmos	area: areacella

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 & notes	output variable name	standard name
1	CALIPSO Cloud Area Fraction	%		at 40 height levels	clcalipso	cloud_area_fraction_in_atmosphere_layer
1	CALIPSO Cloud Fraction Undetected by CloudSat	%	Clouds detected by CALIPSO but below the detectability threshold of CloudSat	at 40 height levels	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 levels x 15 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 levels x 15 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		is a function of time. Note that the CF convention and CMOR2 require that this field will be included in each file that contains a variable that is a function of the "location" dimension, so there is no need to save this field by itself.	lon	longitude
1	Latitude	degrees_north		the above comment also applies to latitude.	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

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
%	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	longitude	atmos				
degrees_north	time: point		real	location time1	latitude	atmos				
day			real	location time1	toffset	atmos				

In CMOR Table cf3hr: ***"CFMIP 3-hourly inline" -- 2-D fields as specified in the Amon table plus convective cloud fraction and 3-D f ields 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 & notes	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	
1	Convective Cloud Fraction	%	for the whole atmospheric column, as seen from the surface or the top of the atmosphere. Includes 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. Includes 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	includes all phases of water		h2o	mass_fraction_of_water_in_air
2	Mass Fraction of Stratiform Cloud Liquid Water	1	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect the calculation of radiative transfer in model.		clws	mass_fraction_of_stratiform_cloud_liquid_water_in_air

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
	time: point		real	longitude latitude time1		atmos		area: areacella		
%	time: point		real	longitude latitude time1	cltc	atmos		area: areacella		
m	time: point		real	longitude latitude alevel time1	zfull	atmos		area: areacella		
m	time: point		real	longitude latitude alevhalf time1	zhalf	atmos		area: areacella		
Pa	time: point		real	longitude latitude alevel time1	pfull	atmos		area: areacella		
Pa	time: point		real	longitude latitude alevhalf time1	phalf	atmos		area: areacella		
K	time: point		real	longitude latitude alevel time1	ta	atmos		area: areacella		
1	time: point		real	longitude latitude alevel time1	h2o	atmos		area: areacella		
1	time: point		real	longitude latitude alevel time1	clws	atmos		area: areacella		

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	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect 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	Calculated 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect 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
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

1	time: point	real	longitude latitude alevel time1	clis	atmos	area: areacella
1	time: point	real	longitude latitude alevel time1	clwc	atmos	area: areacella
1	time: point	real	longitude latitude alevel time1	clic	atmos	area: areacella
m	time: point	real	longitude latitude alevel time1	reffclws	atmos	area: areacella
m	time: point	real	longitude latitude alevel time1	reffclis	atmos	area: areacella
m	time: point	real	longitude latitude alevel time1	reffclwc	atmos	area: areacella
m	time: point	real	longitude latitude alevel time1	reffclic	atmos	area: areacella
kg m-2 s-1	time: point	real	longitude latitude alevel time1	grpllsprof	atmos	area: areacella
kg m-2 s-1	time: point	real	longitude latitude alevel time1	prcprof	atmos	area: areacella
kg m-2 s-1	time: point	real	longitude latitude alevel time1	prlsprof	atmos	area: areacella
kg m-2 s-1	time: point	real	longitude latitude alevel time1	prsnc	atmos	area: areacella
kg m-2 s-1	time: point	real	longitude latitude alevel time1	prlsns	atmos	area: areacella
m	time: point	real	longitude latitude alevel time1	reffgrpls	atmos	area: areacella
m	time: point	real	longitude latitude alevel time1	reffrainc	atmos	area: areacella

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
2	Convective Cloud Area Fraction	%		clc	convective_cloud_area_fraction_in_atmosphere_layer
2	Stratiform Cloud Area Fraction	%		cls	stratiform_cloud_area_fraction_in_atmosphere_layer

m	time: point	real	longitude latitude alevel time1	reffrains	atmos	area: areacella
m	time: point	real	longitude latitude alevel time1	reffsnowc	atmos	area: areacella
m	time: point	real	longitude latitude alevel time1	reffsnows	atmos	area: areacella
1	time: point	real	longitude latitude alevel time1	dtaus	atmos	area: areacella
1	time: point	real	longitude latitude alevel time1	dtauc	atmos	area: areacella
1	time: point	real	longitude latitude alevel time1	dems	atmos	area: areacella
1	time: point	real	longitude latitude alevel time1	demc	atmos	area: areacella
%	time: point	real	longitude latitude alevel time1	clc	atmos	area: areacella
%	time: point	real	longitude latitude alevel time1	cls	atmos	area: areacella

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 73 specified locations for aquaplanet experiments and 119 specified locations for other experiments (see http://cfmip.metoffice.com/cfmip2/pointlocations.txt). Note that the column labeled "CMOR dimensions" indicates that these variables are a function of longitude and latitude. When writing the data to the netCDF file, however, the axis for the 119 (or 73) locations will be a simple index named "site", and CMOR defines this as a "grid axis" that has associated longitudes and latitudes. See CMOR documentation for instructions on defining a 1-dimensional grid axis of this kind.

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 & notes	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	%	Includes both large-scale and convective cloud.		cl	cloud_area_fraction_in_atmosphere_layer
1	Mass Fraction of Cloud Liquid Water	1	Includes both large-scale and convective cloud. This is 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect the calculation of radiative transfer in model.		clw	mass_fraction_of_cloud_liquid_water_in_air
1	Mass Fraction of Cloud Ice	1	Includes both large-scale and convective cloud. This is 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. This includes precipitating hydrometeors ONLY if the precipitating hydrometeors affect the calculation of radiative transfer in model.		cli	mass_fraction_of_cloud_ice_in_air

unformatted units	cell_methods	positive	type	CMOR dimensions	CMOR variable name	realm	frequency	cell_measures	flag_values	flag_meanings
	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				

1	Convective Mass Flux	kg m^{-2} s^{-1}	The net mass flux should represent the difference between the updraft and downdraft components. This is calculated as the convective mass flux divided by the area of the whole grid cell (not just the area of the updrafts).	Report on model half-levels (i.e., model layer bounds and not standard pressures.	mc	atmosphere_net_upward_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	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

kg m-2 s-1	time: point	up	real	alevhalf 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
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

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
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	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
1	Longitude	degrees_east	Note that the CF convention and CMOR2 require that this field will be included in each file that contains a variable that is a function of the "site" dimension, so there is no need to save this field by itself. It is included here simply to indicate that longitudes should be stored for the site grid in each file written.	lon	longitude
1	Latitude	degrees_north	the above comment also applies to latitude.	lat	latitude

m2 s-1	time: point	real	alevel site time1	evu	atmos
m2 s-1	time: point	real	alevel site time1	edt	atmos
Pa	time: point	real	alevel site time1	pfull	atmos
Pa	time: point	real	alevel site time1	phalf	atmos
degrees_east		real	site	longitude	atmos
degrees_north		real	site	latitude	atmos

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/tan, none of the variables will be part of the subset of model output that will be replicated at several locations (except, as noted by * or ** -- see note at right-- this may apply only to lower priority variables)

"all*" indicates that although all *years* will be included in the "replicated" subset, only the high and 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
10-year predictions	10-year hindcasts/predictions	1.1		all*	all	all**	all	all	all	all	all	year 10
30-year predictions	30-year hindcasts/predictions	1.2		all*	all	all**	all	all	all	all	all	years 10, 20, & 30
10-year predictions	increased ensemble size of 1.1	1.1-E		all*	all	all**	all	all	all	all	all	year 10
30-year predictions	increased ensemble size of 1.2	1.2-E		all*	all	all**	all	all	all	all	all	years 10, 20, & 30
10-year predictions	additional start dates for expts. 1.1	1.1-I		all*	all	all**	all	all	all	all	all	year 10
AMIP	AMIP (1979-2008)	3.3			all			all	all	all	all	years 1980, 1990, 2000, & possibly 2010
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
1 percent per year CO2	1% per year CO2 rise imposed	6.1-S		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 10
prediction with 2010 volcano	Pinatubo-like eruption imposed	1.4		all*	all	all**	all	all	all	all	all	years 2010, 2011, 2012, and 2015
initialization alternatives	experiments to explore impact of different initialization procedures	1.5		all*	all	all**	all	all	all	all	all	year 10
chemistry-focused runs	near-term runs with enhanced chemistry/aerosol models	1.6										

day		6hrLev	6hrPlev	3hr
subset of fields saved for selected expts.	other			lon x lat
	all	for expts. initialized in late 1980, 1990, and 2005, all years	all	all
	all	for expts. initialized in late 1980 and 2005, all years	all	all
	all		all	all
	all		all	all
	all		all	all
all	all	all	all	all
	all			30
	all			last 30
	all		all	all
	all		all	all
	all		all	all

experiments focusing on the "longer-term"

Experiment	Description	Expt. #	Oclim	Oyr	Amon	Omon		Lmon	Limon	Oimon	aero	
						lon x lat x olev	other				lon x lat	lon x lat x alev
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 only 1 member of the ensemble of historical run and years 2010, 2020, 2040, 2060, 2080, & 2100 of only 1 member of the ensemble of each of the RCP cases
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
AMIP	AMIP (1979-2008)	3.3			all			all	all	all	all	1980, 1990, 2000, & possibly 2010
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
AMIP	increase ensemble size of expt. 3.3	3.3-E			all			all	all	all	all	1980, 1990, 2000, & possibly 2010
mid-Holocene	consistent with PMIP, impose Mid-Holocene conditions	3.4		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	
last millennium	consistent with PMIP, impose forcing for 850-1850	3.6		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
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
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
RCP6	future projection (2006-2100) forced by RCP6	4.4		all*	all	all**	all	all	all	all	all	2010, 2020, 2040, 2060, 2080, & 2100
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
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
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

day		6hrLev	6hrPlev	3hr
subset of fields saved for selected expts.	other			
20 years corresponding to years 1986-2005 of only 1 member of the ensemble of historical runs	all		30 years corresponding to 1979-2008 of historical run	30 years corresponding to years 111-140 of 1pctCO2
1950-2005	all	1950-2005	1950-2005	1960-2005
all	all	all	all	all
	all		1950-2005	1960-2005
	all		all	all
	all		last 30 years	
	all		last 30 years	
	all			
all	all	all	all	2026-2045, 2081-2100
all	all	all	all	2026-2045, 2081-2100
all	all			2026-2045, 2081-2100
all	all			2026-2045, 2081-2100
2181-2200, 2281-2300	all			2181-2200, 2281-2300
2181-2200, 2281-2300	all			2181-2200, 2281-2300
2181-2200, 2281-2300	all			2181-2200, 2281-2300

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
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
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
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	
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	
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	
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	
1 percent per year CO2	imposed 1%/yr increase in CO2 to quadrupling	6.1		all*	all	all**	all	all	all	all		
control SST climatology	An atmosphere-only run driven by prescribed climatological SST and sea ice.	6.2a			all			all	all	all	all	
CO2 forcing	as in expt. 6.2a, but with 4XCO2 imposed	6.2b			all			all	all	all		
abrupt 4XCO2	impose an instantaneous quadrupling of CO2, then hold fixed	6.3			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		
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	
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	
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		
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		
aqua planet: control run	consistent with CFMIP, impose zonally uniform SSTs on a planet without continents	6.7a			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							
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							
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		

20 years corresponding to years 1986-2005 of historical run	all			
1950-2005	all			1960-2005
all	all			2026-2045, 2081-2100
	all			
	all			
	all			
	all			
	all			last 30
	all			all
	all			all
	all			first 5 years and years 121-150
	all			all
	all			all
	all			all
	all			
	all			
	all			
	all			
	all			
	all			

natural-only	historical simulation but with natural forcing only	7.1		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		
other-only	historical simulation but with other individual forcing agents	7.3		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	
GHG-only	increase ensemble size of expt. 7.2	7.2-E		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			
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
AMIP	AMIP (1979-2008)	3.3			all			all	all	all	all	years 1980, 1990, 2000, & possibly 2010
2030 time-slice	conditions for 2026-2035 imposed	2.1			all			all	all	all	all	year 2035
AMIP	increase ensemble size of expt. 3.3	3.3-E			all			all	all	all	all	years 1980, 1990, 2000, & possibly 2010
2030 time-slice	increase ensemble size of expt. 2.1	2.1-E			all			all	all	all	all	year 2035
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		
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		
aqua planet: control run	consistent with CFMIP, impose zonally uniform SSTs on a planet without continents	6.7a			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							
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							
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		

day		6hrLev	6hrPlev	3hr
subset of fields saved for selected expts.	other			
all	all	all	all	all
all	all		all	all
	all		all	all
	all			
	all			
	all			
	all			
	all			
	all			
	all			

If a cell is shaded yellow/tan, none of the variables will be part of the subset of model output that will be replicated at several locations.

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

* The years specified for the pre-industrial experiment are relative to the point in the 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 cfDay				appearing in cf3hr				appearing in cfSites	
CFMIP monthly inline (A1d,f,g)		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)	
1*	20*			1*	20*								
121*	140*			121*	140*	121*	140*						
1979	2005			1979	2005								
1979	2008	2008	2008	1979	2008	1979	2008	2008	2008	2008	2008	1979	2008
121	140			121	140								
121	140			121	140								
121	140			121	140	121	140						
1	30			1	30								
1	30			1	30								
1	20			1	20								
121	140			121	140	121	140						
1	5			1	5								
1	30			1	30								
1	30			1	30								
1979	2008	2008	2008	1979	2008	1979	2008	2008	2008			1979	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			1	5	1	5					1	5
1979	2008	2008	2008	1979	2008	1979	2008	2008	2008			1979	2008