

Namelist and Code Modifications

Part 1: Namelist Modifications

Part 2: Code Modifications

Part 3: Exercises and Quiz

Cecile Hannay, CAM Science Liaison
Atmospheric Modeling and Predictability Section
Climate and Global Dynamics Division

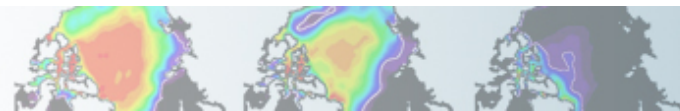


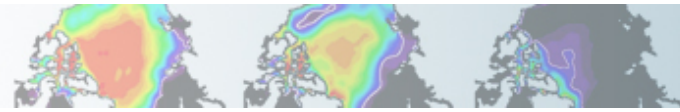
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**“I can only show you the door.
You're the one that has to walk through it”**

(The Matrix, 1999)





Part 1: Namelist Modifications

In this section, we will:

- review the “CESM flow” and how to make namelist changes,
- see where to find documentation for namelist variables
- as an illustration, we will customize the output history files to get high frequency output



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Review: The 4 commands to run CESM

Set of commands to build and run the model on a supported machine: "cheyenne"

```
# go into scripts directory into the source code download
cd /glade/p/cesm/tutorial/cesm2_0_alpha07c/cime/scripts

# (1) create a new case in the directory "cases" in your home directory
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# go into the case you just created in the last step
cd ~/cases/case01/

# (2) invoke case.setup
./case.setup

# (3) build the executable
./case.build

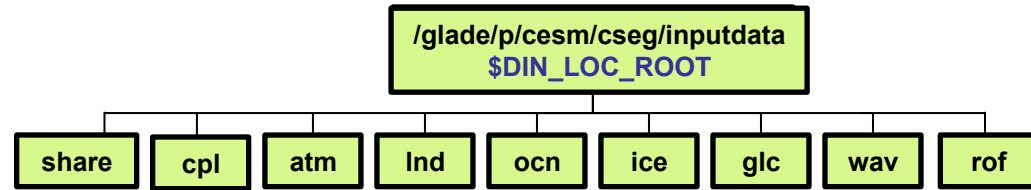
# (4) submit your run to the batch queue
./case.submit
```

Reminder: During the current tutorial, you need to build on a compute node.
The commands to build the executable are:

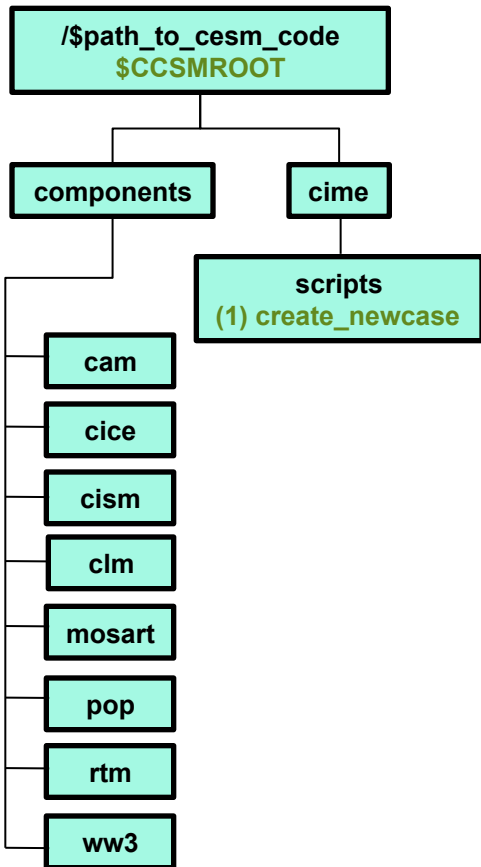
```
./compile_node.csh
./case.build
exit
```

Overview of CESM directories + 4 CESM commands

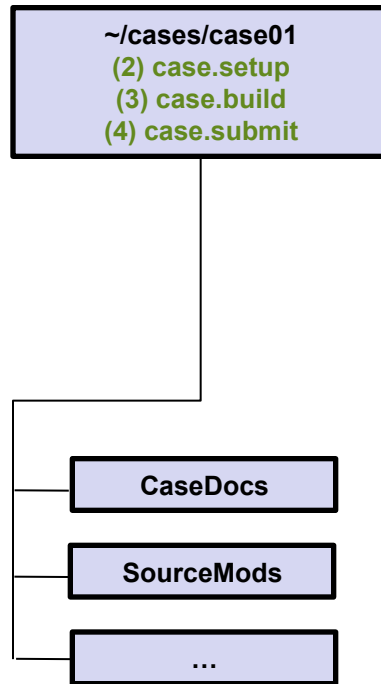
INPUTDATA Directory



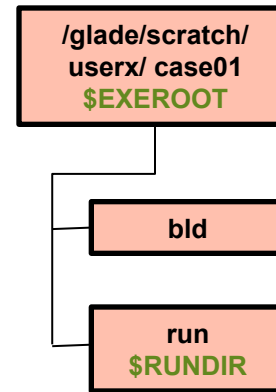
CESM Code



CASE Directory



Build/Run Directory



```

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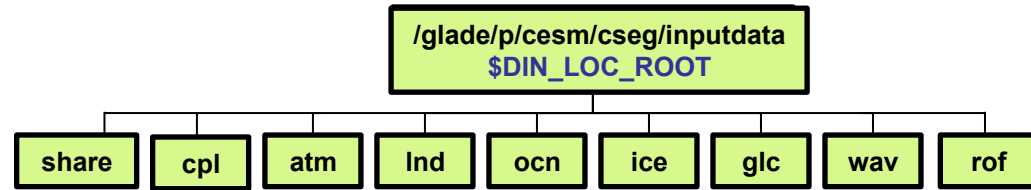
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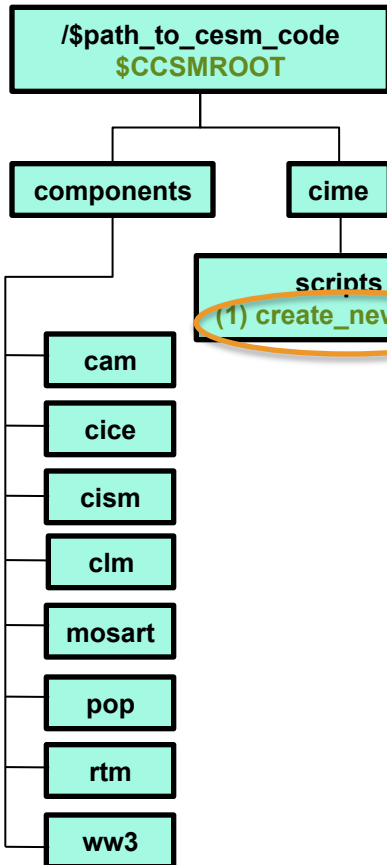
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```

Overview of CESM directories + 4 CESM commands

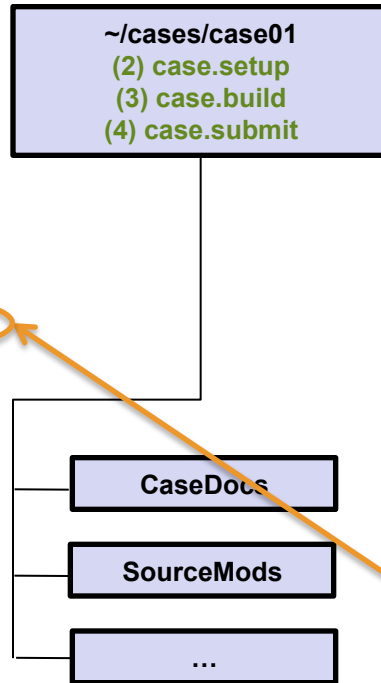
INPUTDATA Directory



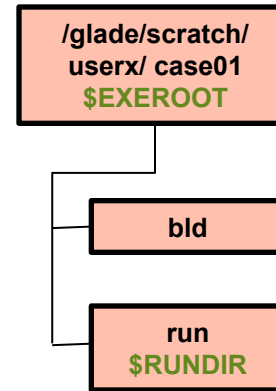
CESM Code



CASE Directory



Build/Run Directory



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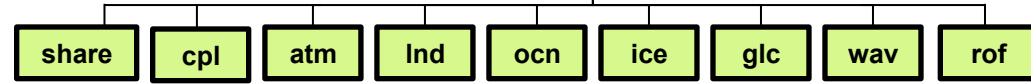
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./case.build

# (4) submit your run to the batch queue
./case.submit
  
```

Overview of CESM directories + 4 CESM commands

INPUTDATA Directory

/glade/p/cesm/cseg/inputdata
\$DIN_LOC_ROOT



CESM Code

/\$path_to_cesm_code
\$CCSMROOT

components

cime

scripts

(1) create_newcase

cam

cice

cism

clm

mosart

pop

rtm

ww3

CASE Directory

~/cases/case01
(2) case.setup
(3) case.build
(4) case.submit

CaseDocs

SourceMods

...

Build/Run Directory

/glade/scratch/
userx/ case01
\$EXERROOT

bld

run

\$RUNDIR

```

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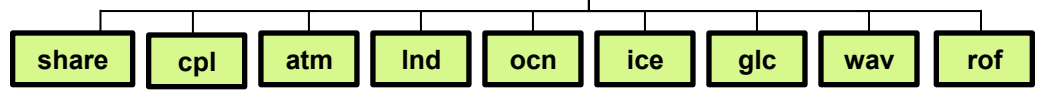
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```

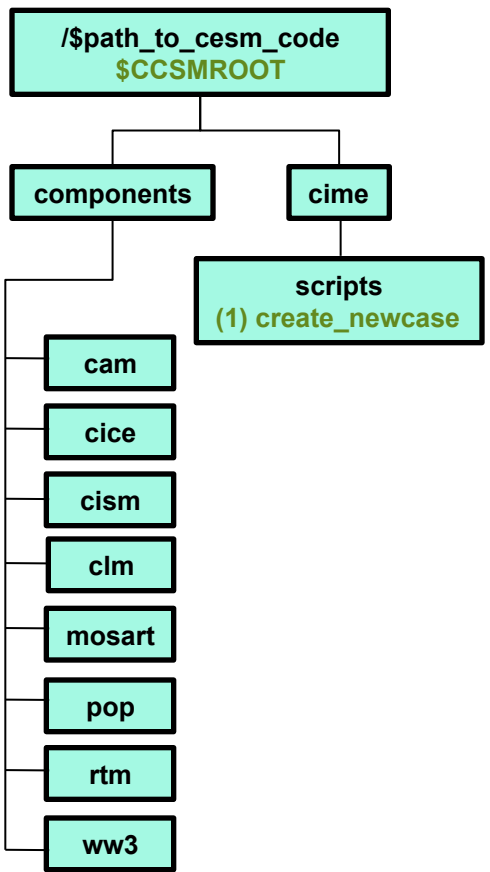
Overview of CESM directories + 4 CESM commands

INPUTDATA Directory

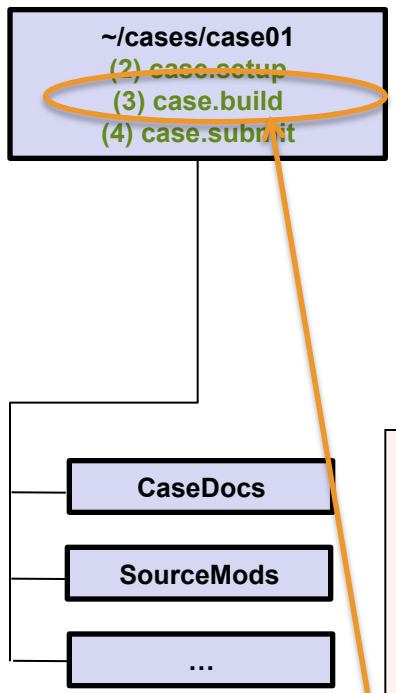
/glade/p/cesm/cseg/inputdata
\$DIN_LOC_ROOT



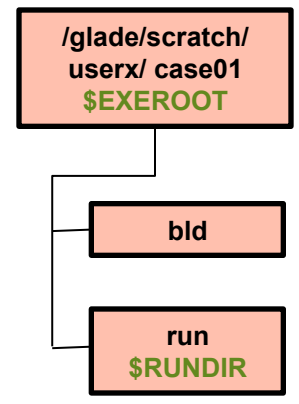
CESM Code



CASE Directory



Build/Run Directory



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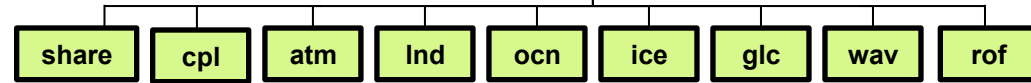
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Overview of CESM directories + 4 CESM commands

INPUTDATA Directory

/glade/p/cesm/cseg/inputdata
\$DIN_LOC_ROOT



CESM Code

/\$path_to_cesm_code
\$CCSMROOT

components

cime

scripts

(1) create_newcase

cam

cice

cism

clm

mosart

pop

rtm

ww3

CASE Directory

~/cases/case01
(2) case.setup
(3) case.build
(4) case.submit

CaseDocs

SourceMods

...

Build/Run Directory

/glade/scratch/
userx/ case01
\$EXERROOT

bld

run

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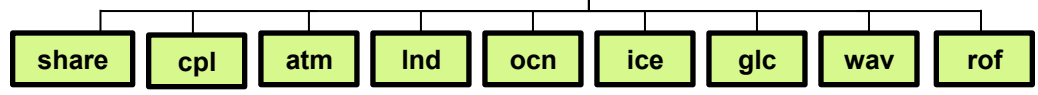
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```

Overview of CESM directories + 4 CESM commands

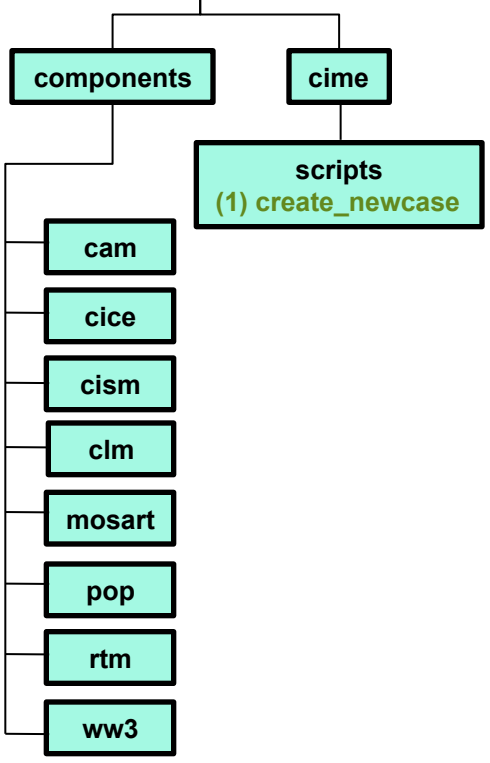
INPUTDATA Directory

`/glade/p/cesm/cseg/inputdata`
`$DIN_LOC_ROOT`



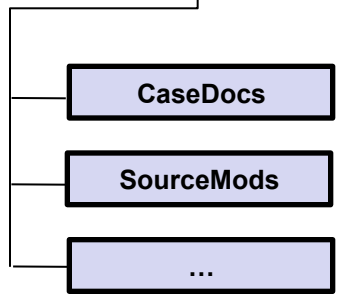
CESM Code

`/$path_to_cesm_code`
`$CCSMROOT`



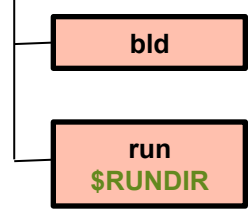
CASE Directory

`~/cases/case01`
(2) `case.setup`
(3) `case.build`
(4) `case.submit`



Build/Run Directory

`/glade/scratch/`
`userx/ case01`
`$EXERROOT`



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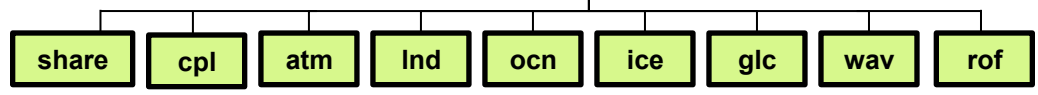
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```

This is when you can modify the namelists

Overview of CESM directories + namelist files

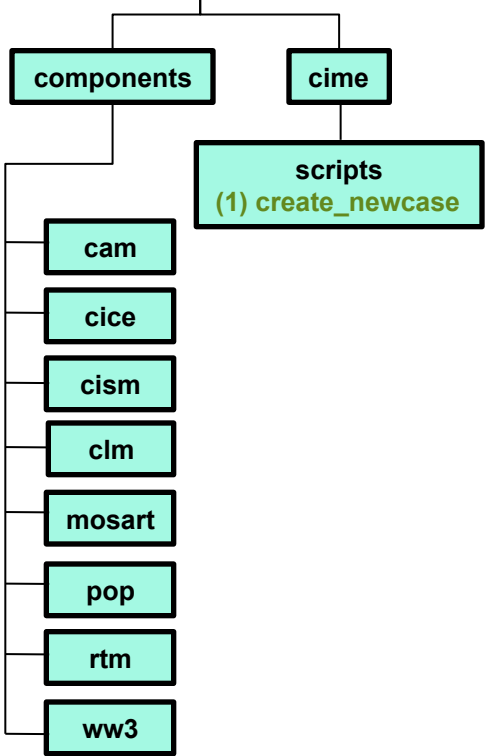
INPUTDATA Directory

/glade/p/cesm/cseg/inputdata
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CESM Code

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\$CCSMROOT



CASE Directory

~/cases/case01
(2) case.setup
(3) case.build
(4) case.submit
user_nl_cam
user_nl_cice
user_nl_cism
user_nl_clm
user_nl_cpl
user_nl_mosart
user_nl_pop
user_nl_wv

case.setup creates namelist modification files **user_nl_XXX** this is **where you modify your namelists**



Build/Run Directory

/glade/scratch/
userx/ case01
\$EXERROOT

bld

run
\$RUNDIR
atm_in
cism_in
drv_fds_in
drv_in
ice_in
lnd_in
mosart_in
pop_in
wav_in

The build script creates **namelists** in the run directory

This is used by the model at runtime

(should not be edited)



CaseDocs
atm_in
cism_in
drv_fds_in
drv_in
ice_in
lnd_in
mosart_in
pop_in
wav_in

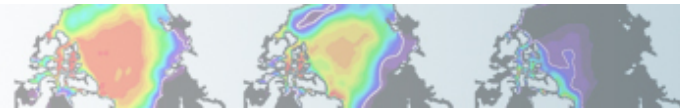
CaseDocs contains **copy of the namelists** for reference only

(should not be edited)



SourceMods

...



Part 1: Namelist Modifications

In this section, we will:

- review the “CESM flow” and how to make namelist changes,
- **see where to find documentation for namelist variables**
- as an illustration, we will customize the output history files to get high frequency output



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Where to find info about namelists ?

<http://www.cesm.ucar.edu/models/cesm2.0/>

Home / CESM Models / CESM2 Series Public Release

In Development - CESM2

About CESM2

TO DO Brief Description of CESM2

- What's New in CESM2
- CESM2 Supported Release Tags and Notes

Scientific Validation

Scientific validation consists of a multi-decadal model run of the given component set at the target resolution, followed by scientific review of the model output diagnostics. All scientifically supported component sets are also accompanied by diagnostic and model output data.

- Experiment Diagnostics
- Experiment Output Datasets on the Earth Systems Grid
- Experiment Case Naming Conventions
- Experiment Output File Naming Conventions

Quick Start Documentation

- CESM2 Quick Start Guide
- TO DO - move these into quick start guide [User Workflows and Examples](#)
- Register and Download
- Getting Help - DiscussCESM Forums

CIME - Documentation

Common Infrastructure for Modeling the Earth (CIME) contains the support scripts (configure, build, run, test), data models, essential utility libraries, a "main" and other tools that are needed to build a single-executable coupled Earth System Model. CIME is available in a stand-alone package that can be compiled and tested without active prognostic components but is typically included in the source of a climate model. CIME does not contain: any active components, any intra-component coupling capability (such as atmosphere physics-dynamics coupling).

- Common Infrastructure for Modeling the Earth (CIME) User's Guides
Includes CIME, Driver-Coupler and Data Models Documentation

Active or Prognostic Components

Each model component page contains descriptions and documentation for active or prognostic models.

- Atmosphere
- Land
- Land Ice
- Ocean
- Sea Ice
- River Runoff
- Wave

All CESM2.0 Component Configurations

TO DO - update just prior to release

Component configurations includes settings required for CIME enabled models; both prognostic and data model components. These configuration setting include:

- Component sets (compsets) defined by prognostic components
- Component Fortran Namelist settings
- Component XML variable definitions

CESM Project

CESM is a fully-coupled, community, global climate model that provides state-of-the-art comprehensive simulations of the Earth's past, present, and future climate states.

CESM is sponsored by the National Science Foundation (NSF) and the U.S. Department of Energy (DOE). Administration of the CESM is maintained by the Climate and Global Dynamics Laboratory (CGD) at the National Center for Atmospheric Research (NCAR).

Related Information

- Downloading the CESM Code
- CESM Data Management & Distribution Plan
- CESM Development Project Policies & Terms of Use
- CESM Support Policy
- DiscussCESM Forums Bulletin Board

Still in development

Information about namelist variables in:
"Component Fortran Namelist settings"

Where to find info about namelists ?

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- Component XML variable definitions

Home / ABOUT / ADMINISTRATION / WORKING GROUPS / MODELS / EVENTS

Home / CESM Models / CESM2 Series Public Release / CESM2 Component Namelists and XML Variables

CESM2 Component Namelists and XML Variable Definitions

Atmosphere Models - includes Aqua planet

Active / Prognostic Atmosphere - CAM

- CAM Namelist Definitions
- CAM XML Variable Definitions

Climatological Data Atmosphere - DATM

- DATM Namelist Definitions
- DATM XML Variable Definitions

Driver / Coupler

- Driver / Coupler

Land Models

- Active / Prognostic Land - CLM
- Climatological Data Land - DLND

Land Ice Model

- Active / Prognostic Land Ice - CISM

Ocean Models

- Active / Prognostic Ocean - POP2
- Climatological Data Ocean - DOCN

Sea Ice Models

- Active / Prognostic Sea Ice - CICE
- Climatological Data Sea Ice - DICE

River Models

- Active / Prognostic River Runoff Model - Mosart
- Active / Prognostic River Transport Model - RTM
- Climatological Data River Runoff - DROF

Wave Model

- Active / Prognostic Wave - WW3
- Climatological Data Wave - DWAV

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Related Information

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CAM namelist definitions

Other components



Where to find info about namelists ?

<http://www.cesm.ucar.edu/models/cesm2.0/>

The image shows a composite of three screenshots from the CESM2.0 website. The leftmost screenshot displays the main navigation menu with categories like 'In Development - CESM2', 'About CESM2', 'Scientific Validation', 'Quick Start Documentation', 'CIME - Documentation', 'Active or Prognostic Components', and 'All CESM2.0 Component Configuration'. A blue arrow points from the 'All CESM2.0 Component Configuration' link to the middle screenshot. The middle screenshot shows the 'CESM2 Component Namelists and Variable Definitions' page, listing various model components such as 'Atmosphere Models - includes Aqua pla...', 'Driver / Coupler', 'Land Models', 'Land Ice Model', 'Ocean Models', 'Sea Ice Models', 'River Models', and 'Wave Model'. A blue arrow points from the 'Atmosphere Models' link to the rightmost screenshot. The rightmost screenshot shows the 'Component Model Namelist Definitions for CAM' page, which lists variables like 'bndtvaer', 'cam3_aero_data_on', 'prescribed_strataero_use_chemtrop', etc. A yellow callout box with a black border is overlaid on this page, containing the text 'Browse variables names Show details about variables'. The callout box has a blue arrow pointing to the 'Show Details' button on the page.

Component Model Namelist Definitions for CAM

SVN component tag:
CESM Version: CESM2.0
HTML created on: 2017-05-03

This page contains the complete list of CAM namelist variables available. They are grouped by categories designed to aid browsing. Clicking on the name of a variable will display additional descriptive information. Click on the "Show Details" button and then ctrl+F key to search for specific strings.

[Show Details](#) [Hide Details](#)

Category: aero_data_cam

bndtvaer Group: cam3_aero_data_nl	Full pathname of time-variant boundary dataset for aerosol masses. Default:...
cam3_aero_data_on Group: cam3_aero_data_nl	Add CAM3 prescribed aerosols to the physics buffer. Default: FALSE

Category: aerosol

prescribed_strataero_use_chemtrop Group: prescribed_strataero_nl	Indicates whether to use the unified chemistry tropopause method to set pre...
--	--

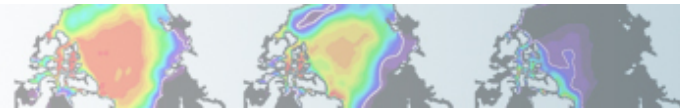
Category: build

cam_chempkg Group: phys_ctl_nl	Name of the CAM chemistry package. N.B. this variable may not be set by the...
cam_physpkg Group: phys_ctl_nl	Name of the CAM physics package. N.B. this variable may not be set by the u...

Category: cam_chem

aer_drydep_list Group: aerosol_nl	List of aerosol species that undergo sediment (dry deposition). Default: se...
aer_scav_coef Group: aerosol_nl	Scavenging coefficient used in BULK aerosol wet removal Default: set by bul...
aer_sol_factb Group: aerosol_nl	Below-cloud solubility factor used in BULK aerosol wet removal Default: set...
aer_sol_facti Group: aerosol_nl	In-cloud solubility factor used in BULK aerosol wet removal Default: set by...
aer_wetdep_list Group: aerosol_nl	List of aerosol species that undergo wet deposition. Default: set by build-...
aerodep_fix_cycle_yr Group: aerodep_fix_nl	The cycle year of the prescribed aerosol flux data if
aerodep_fix_datapath Group: aerodep_fix_nl	Full pathname of the directory that contains the files specified in
aerodep_fix_file Group: aerodep_fix_nl	Filename of dataset for prescribed aerosols. Default: set by build-namelist...
aerodep_fix_filelist Group: aerodep_fix_nl	Filename of file that contains a sequence of filenames for prescribed aeros...
aerodep_fix_fixed_tod Group: aerodep_fix_nl	The time of day (seconds) corresponding to
aerodep_fix_fixed_ymd Group: aerodep_fix_nl	The date at which the prescribed aerosol flux data is fixed if
aerodep_fix_rmfile Group: aerodep_fix_nl	Remove the file containing prescribed aerosol deposition fluxes from local ...
aerodep_fix_specifier	Names of variables containing aerosol data in the prescribed aerosol datase...

**Browse variables names
Show details about variables**



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Let's change the output frequency in CAM**

By default, CESM outputs **monthly average** history files.

To change the output frequency of a CAM history file from **monthly average** to **daily average**, we use the namelist variable: ***nhtfrq=-24***

***** In this tutorial, most examples will be coming from the atmospheric and land model. Concepts are transferable to other model components.***

Customizing CAM history files

In this section, we will cover:

- how to change the **output frequency**
- how to output **extra variables**
- how to output **extra history files**
- how to control the **number of time samples** written to a history file

This can be achieved with 3 namelist variables:

- ***nhtfrq***: sets the output frequency
- ***fincl***: add variables to the history file
- ***mfilt***: maximum number of time samples written to a history file

Customizing CAM history files: *nhtfrq*, *mfilt*

The **default** history file from CAM is a **monthly average**.

We can change the output frequency with the namelist variable *nhtfrq*

If *nhtfrq*=0, the file will be a **monthly average**

If *nhtfrq*>0, frequency is input as number of **timesteps**.

If *nhtfrq*<0, frequency is input as number of **hours**.

For instance to change the history file from **monthly average** to **daily average**, we set the namelist variable:

nhtfrq = -24

To control the **number of timesteps** in the history file, we can use the variable *mfilt*

For instance, to specify that we want one time sample on each history file, we set the namelist variable:

mfilt = 1

Customizing CAM history files: fincl

You can output up to 6 history files: “h0”, “h1”, ..., “h5”.

The file “h0” contains the default variables (in the code: “call add_default”). This includes the variables necessary for the *AMWG package*.

For the files “h1” to “h5”, the user has to specify the variables to output.

To control the list of fields in the history files we can use the namelist variables

h0 *h1* ... *h5*
fincl1 *fincl2* ... *fincl6*

For instance, the line:

fincl1 = ‘*PRECT*’

is used to add the field ‘*PRECT*’ to the file “h0”

Customizing CAM history files: fincl

Using a ":" following a field gives the **averaging flag** for the output field.

Valid flags are:

I for instantaneous,

A for average,

M for minimum,

X for maximum.

For instance, the line:

fincl1 = 'PREC:M'

is used to add the minimum of 'PREC' to the file "h0"

Example of customizing history files

For instance, in addition to the monthly history file “h0”, we want to output a file “h1” with instantaneous values of T, Q, U, V and OMEGA every 3 hour. We can use:

```
fincl2 = 'T:I','Q:I','U:I','V:I', 'OMEGA:I'  
nhtrfq = 0, -3
```

Notice that it is equivalent to:

```
fincl2 = 'T:I','Q:I','U:I','V:I', 'OMEGA:I'  
nhtrfq(1) = 0  
nhtrfq(2) = -3
```

NB: If you plan to run the AMWG diagnostic package, it is recommended to leave the “h0” file untouched and to add extra history files.

Outputting high frequency data in other components

Here is a few variables to control output frequency of **land**, **ice** and **ocean**

CLM

hist_nhtfrq: output frequency of the history file

hist_mfilt: number of samples on each history file

hist_fincl: adding variables and auxiliary history files

Example

user_nl_clm to output 4 extra history files with daily, six-hourly, hourly, and every time-step values of TG and TV (leaving the primary history files as monthly):

hist_fincl2 = 'TG', 'TV'

hist_fincl3 = 'TG', 'TV'

hist_fincl4 = 'TG', 'TV'

hist_fincl5 = 'TG', 'TV'

hist_nhtfrq = 0, -24, -6, -1, 1

http://www.cesm.ucar.edu/models/cesm2.0/namelist/clm_nml.html

Outputting high frequency data in other components

CICE

histfreq: Frequency of output written to history files ('1', 'm', 'd', 'y', ...)

histfreq_n: Frequency history data is written to history files

hist_avg: if false => instantaneous values
if true => time-averages

Example

user_nl_cice to output an extra history file with daily values (leaving the primary history file as monthly):

histfreq = 'm','d','x','x','x'

histfreq_n = 1,1,1,1,1

See: http://www.cesm.ucar.edu/models/cesm2.0/namelists/cice_nml.html

Outputting high frequency data in other components

POP2

tavg_freq = frequency at which the model fields are written

tavg_freq_opt = units of time for 'tavg_freq' ('nmonth', 'nhour', 'once', ...)

tavg_file_freq = frequency at which the model files are written

tavg_file_freq_opt = units of time for 'tavg_file_freq' ('nmonth', 'nhour', ...)

http://www.cesm.ucar.edu/models/cesm2.0/namelist/pop2_nml.html

For instance, to output a timeseries of daily averages bundled into a monthly file:

tavg_freq_opt = 'nday'

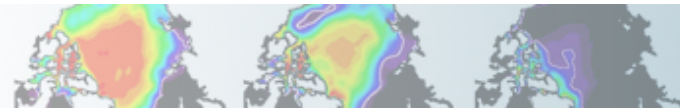
tavg_freq = 1

tavg_file_freq_opt = 'nmonth'

tavg_file_freq = 1



Changing tavg_nml variables is non standard
Do not modify these variables directly in user_nl_pop2
Use the workaround explained in user_nl_pop2



Part 2: Code Modification

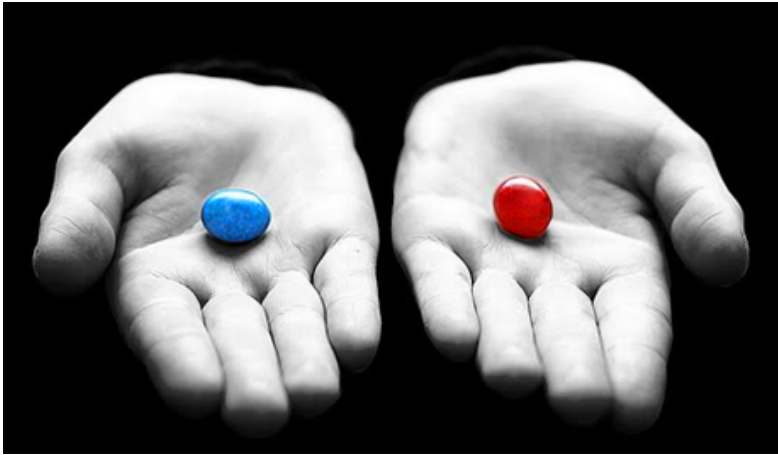
In this section, we will learn how to do simple code modifications such changing a parameter in the code or adding a new variable



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Your choice: The Red Pill or the Blue Pill



The Matrix (1999): Neo, the main character is offered the choice between a red pill and a blue pill.

-The **blue pill** would allow him to remain in the Matrix (a fictional computer-generated world)



-The **red pill** would lead to his "escape" from the Matrix into the real world and embracing the sometimes painful truth of reality.

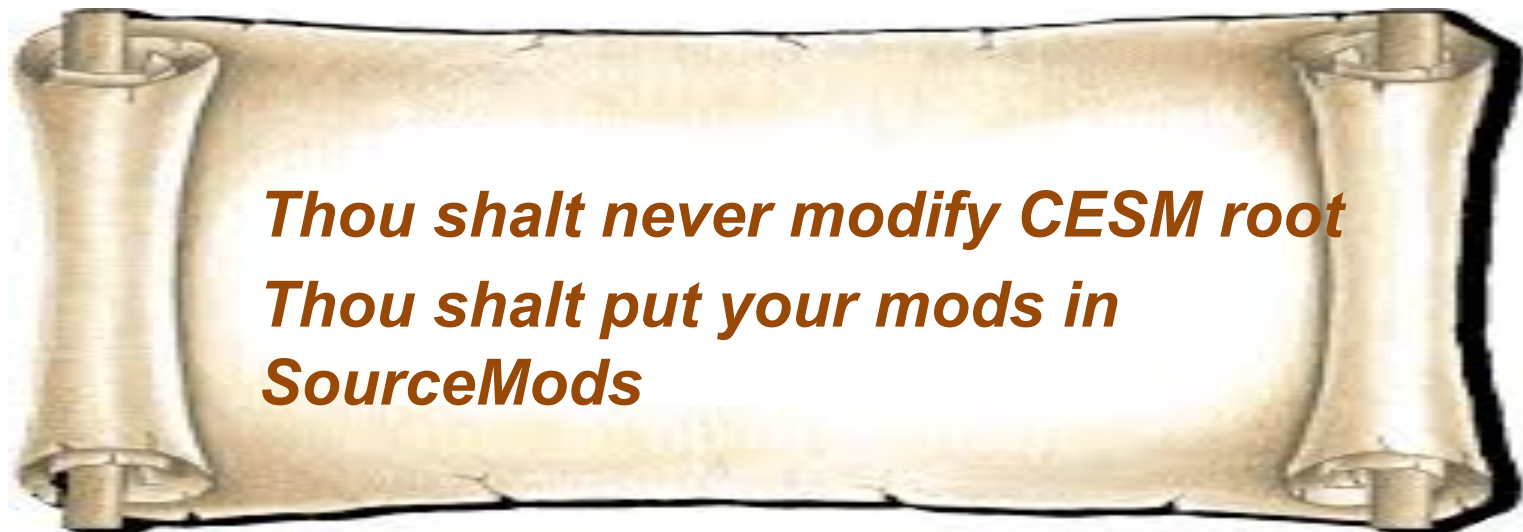


Courtesy: Andrew Gettelman

Principles for modifying the code

Never modify the CESM root itself.

Your modifications to the code should go into: *SourceMods*

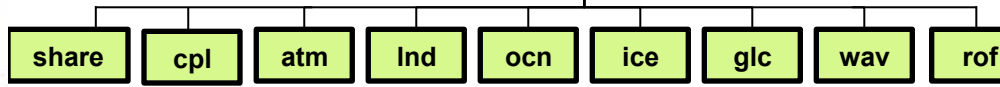


Principles for modifying the code



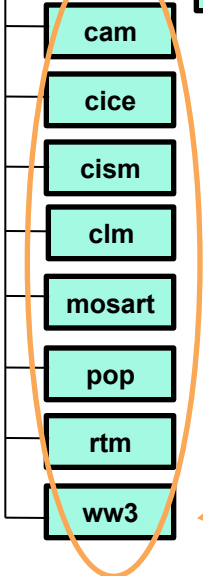
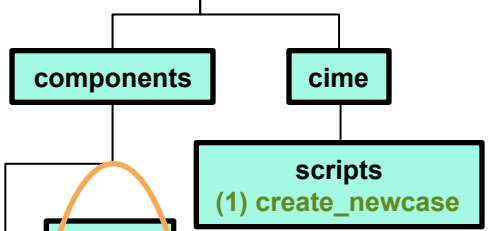
INPUTDATA Directory

/glade/p/cesm/cseg/inputdata
\$DIN_LOC_ROOT



CESM Code

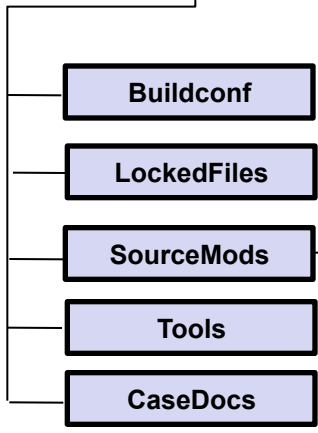
/\$path_to_cesm_code
\$CCSMROOT



Not here
These modifications affect all the cases

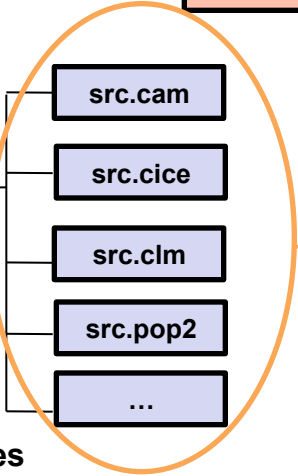
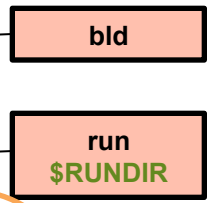
CASE Directory

~/cases/case01
(2) case.setup
(3) case.build
(4) case.submit

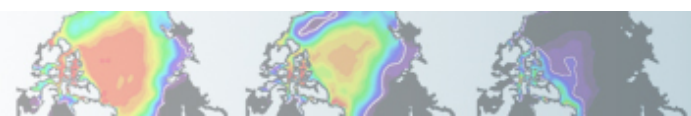


Build/Run Directory

/glade/scratch/
userx/ case01
\$EXERROOT



This is where you put your modifications
These modifications only affect the current case

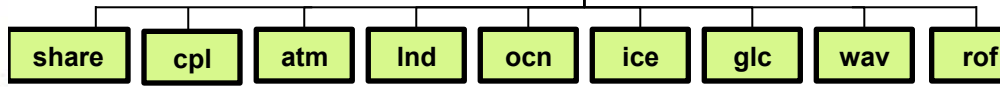


Principles for modifying the code

*Thou shalt never modify CESM root
Thou shalt put your mods in SourceMods*

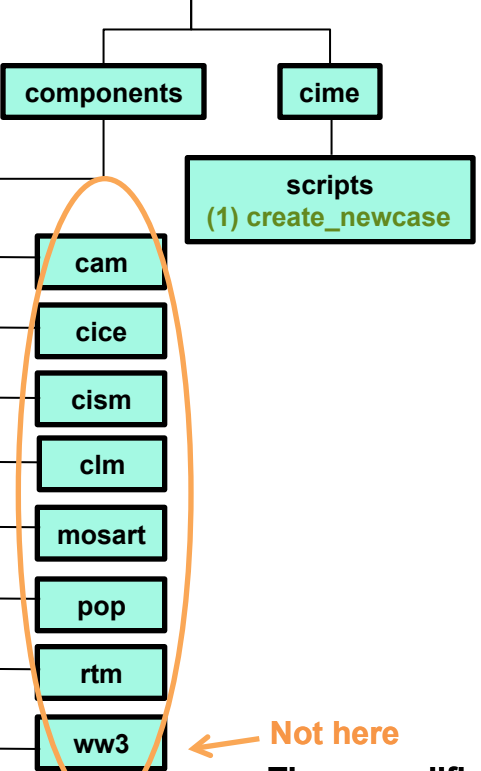
INPUTDATA Directory

/glade/p/cesm/cseg/inputdata
\$DIN_LOC_ROOT



CESM Code

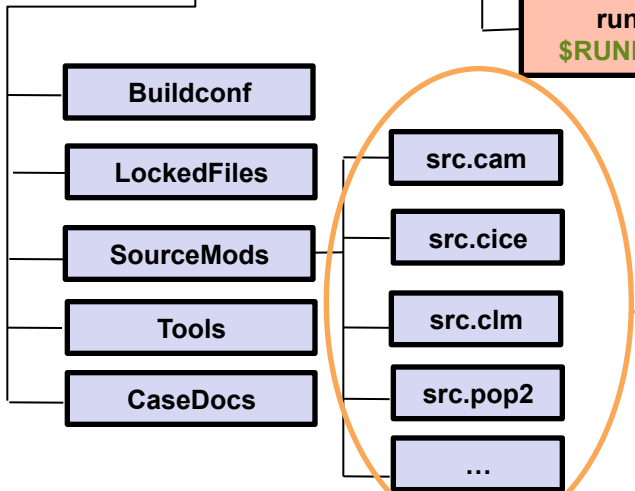
/\$path_to_cesm_code
\$CCSMROOT



← Not here
These modifications affect all the cases

CASE Directory

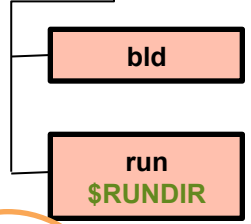
~/cases/case01
(2) case.setup
(3) case.build
(4) case.submit



← This is where you put your modifications
These modifications only affect the current case

Build/Run Directory

/glade/scratch/
userx/ case01
\$EXERROOT



```
# go into scripts directory
cd /glade/p/cesm/tutorial/cesm2_0_alpha07c/cime/
scripts

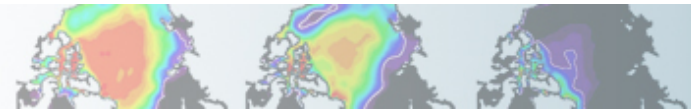
# (1) create a new case
./create_newcase --case ~/cases/case01 --compset
B1850 --res f19_g17

# go into the case you just created in the last step
cd ~/cases/case01/

# (2) invoke case.setup
./case.setup
← Make your source mods

# (3) build the executable
./case.build

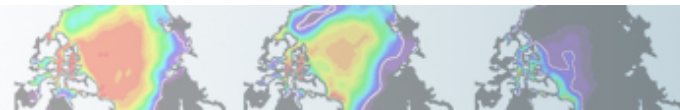
# (4) submit your run to the batch queue
./case.submit
```



Modifying a subroutine

Steps to modify the code:

- Find the subroutine you want to modify
- Copy this subroutine in SourceMods
- Make your mods
- Compile and run the model



Example: Modify a parameter, zlnd

Let's modify a **tuning parameter** in the CLM code
zlnd = roughness length for soil (m)

“tuning parameter”

- *parameter weakly constrained by observation*
- *can be adjusted to achieve agreement with observations*

1. Find the subroutine you want.

Go in the CESM code and look for zlnd (for instance, you can use: `grep -r zlnd *`)

zlnd is in the subroutine `clm_varcon.F90`

2. Copy this subroutine in SourceMods

Go your case directory and copy `clm_varcon.F90` into `SourceMods/src.clm`

3. Make your modifications

Edit the value of zlnd in `SourceMods/src.clm/clm_varcon.F90`

4. Compile and run the model

Output an extra variable

- One common thing you may want to do is to **add code to output a new variable**
- For instance, CAM has a field to output the temperature at 500 mbar (T500) but not at 750mb.
Let's add a field to output the temperature at 750 mbar (T750)

This can be done by a succession of calls:

call addfld (' T750', ...)

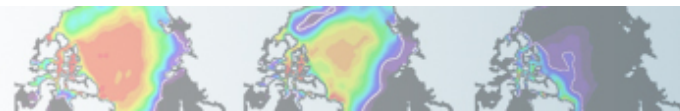
→ Add a field to master field list

call add_default (' T750',...)

→ Add this field to "h0" by default (optional)

call outfld(' T750', ...)

→ Collect values for this field and write to history file



Syntax: addfld

addfld = Add a field to master field list

Field name

Units

Number of vertical levels:
single level :1
multi-level: pver or pverp

Averaging flag:
A = average
I = instantaneous

**subroutine addfld (fname, units, numlev, avgflag, &
long_name, decomp_type, [Optional arguments])**

Field full name

Decomposition type
(phys_decomp or
dyn_decomp)

There are several optional arguments (not covered here. See documentation for more information about optional arguments)

Example:

call addfld ('T500', 'K', 1, 'A', 'Temperature at 500 mbar pressure surface', phys_decomp)

Syntax: add_default

add_default = Add a field to the list of default fields on history file

Field name

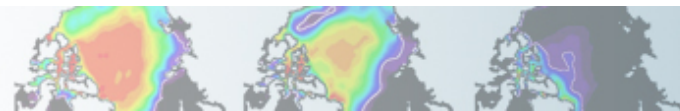
Averaging flag:
A = average (default)
I = instantaneous

```
subroutine add_default (name, tindex, flag)
```

history tape index

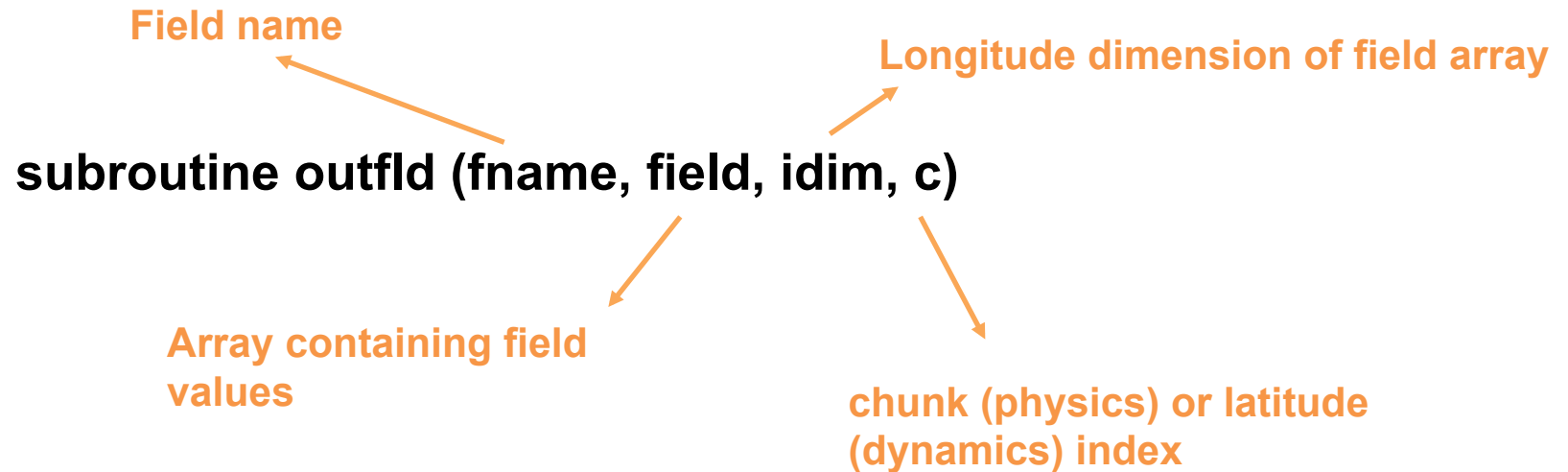
Example:

```
call add_default ('CLOUD ', 1, '')
```



Syntax: outfld

outfld = accumulate (or take min, max, etc. as appropriate) input field into its history buffer for appropriate tapes



Example:

call outfld('CLOUD', cld, pcols, lchnk)

Where to find help ?

<http://www.cesm.ucar.edu/models/cesm2.0/>

☰ / CESM Models / CESM2 Series Public Release

In Development - CESM2

About CESM2

TO DO Brief Description of CESM2

- [What's New in CESM2](#)
- [CESM2 Supported Release Tags and Notes](#)

Scientific Validation

Scientific validation consists of a multi-decadal model run of the given component set at the target resolution, followed by scientific review of the model output diagnostics. All scientifically supported component sets are also accompanied by diagnostic and model output data.

- [Experiment Diagnostics](#)
- [Experiment Output Datasets on the Earth Systems Grid](#)
- [Experiment Case Naming Conventions](#)
- [Experiment Output File Naming Conventions](#)

Quick Start Documentation

- [CESM2 Quick Start Guide](#)
- TO DO - move these into quick start guide [User Workflows and Examples](#)
- [Register and Download](#)
- [Getting Help - DiscussCESM Forums](#)

CIME - Documentation

Common Infrastructure for Modeling the Earth (CIME) contains the support scripts (configure, build, run, test), data models, essential utility libraries, a "main" and other tools that are needed to build a single-executable coupled Earth System Model. CIME is available in a stand-alone package that can be compiled and tested without active prognostic components but is typically included in the source of a climate model. CIME does not contain: any active components, any intra-component coupling capability (such as atmosphere physics-dynamics coupling).

- [Common Infrastructure for Modeling the Earth \(CIME\) User's Guides](#)
Includes CIME, Driver-Coupler and Data Models Documentation

Active or Prognostic Components

Each model component page contains descriptions and documentation for active or prognostic models.

- [Atmosphere](#)
- [Land](#)
- [Land Ice](#)
- [Ocean](#)
- [Sea Ice](#)
- [River Runoff](#)
- [Wave](#)

CESM Project

CESM is a fully-coupled, community, global climate model that provides state-of-the-art computer simulations of the Earth's past, present, and future climate states.

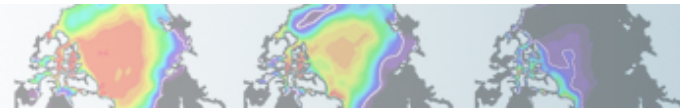
CESM is sponsored by the National Science Foundation (NSF) and the U.S. Department of Energy (DOE). Administration of the CESM is maintained by the Climate and Global Dynamics Laboratory (CGD) at the National Center for Atmospheric Research (NCAR).

Related Information

- [Downloading the CESM Code](#)
- [CESM Data Management & Distribution Plan](#)
- [CESM Development Project Policies & Terms of Use](#)
- [CESM Support Policy](#)
- [DiscussCESM Forums Bulletin Board](#)

CESM webpage is a gold mine for model documentation

If you cannot find an answer in the model documentation, post your question on the CESM Bulletin Board



Part 3: Exercises and Quiz

Today lab consists of 3 **exercises** that cover namelist and code modifications.

The **quiz** covers what you have learned during the practicals this week.

- Don't forget to write your name, email and institution.
- To answer the questions, you can use documentation, ask questions to others or to the helper. This is the way you will use CESM in the future.
- If you cannot complete the quiz by the end of the practical session, please finish it before Friday morning, so I have enough time to grade it.
- “Special certificate” for those who get everything right !!!



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Reminder: Rules for compiling



During the tutorial (this week only)

Cheyenne can only handle a certain number compilations at the same time. If too many students compile at the same time, the machine will hang. Compilation time will increase from 10 minutes to 2+ hours.

We have determined how many compilations the machine can handle. This is the reason of the “compile cards”.

Please compile on the assigned node.

Please don't compile several jobs at the same time.

Please only 1 person per group can compile at a time.

Please respect the rule (if you don't, you penalize not only yourself but everybody in the room and all the cheyenne users over the country)