

Namelist and Code Modifications

Part 1: Namelist Modifications

Part 2: Code Modifications

Part 3: Exercises Overview

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Atmospheric Modeling and Predictability Section
Climate and Global Dynamics Division

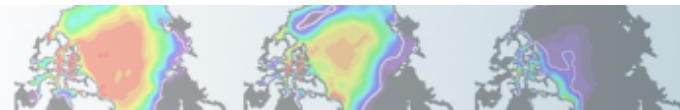


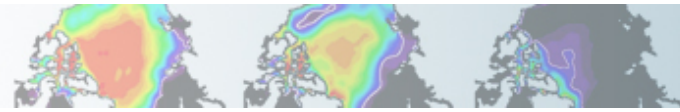
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**“I can only show you the door.
You're the one that has to walk through it”**

(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 "cheyenne"

```
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# (2) invoke case.setup
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qcmd -- ./case.build

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Review: The 4 commands to run CESM

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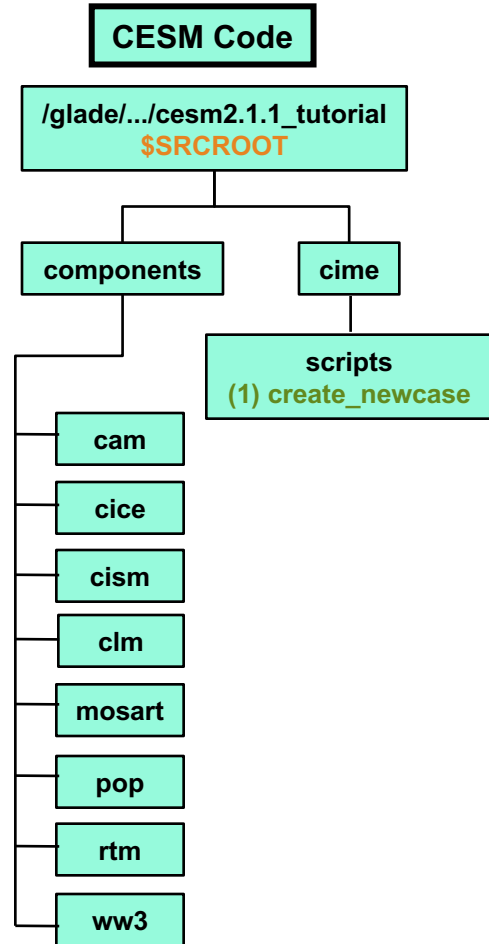
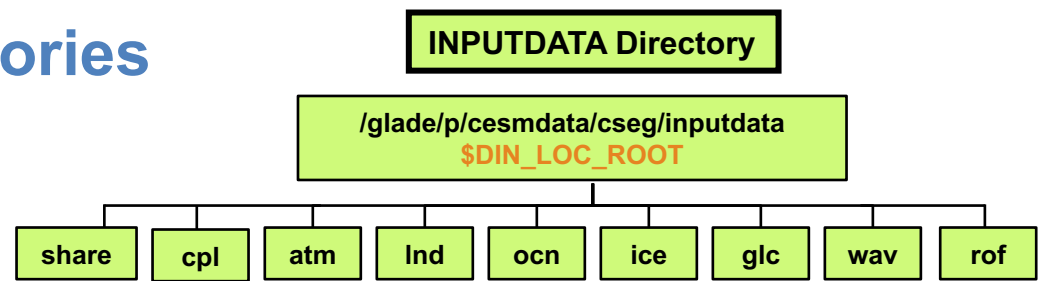
```
qcmd -- ./case.build
```

← "qcmd" is for Cheyenne only

(4) submit your run to the batch queue

```
./case.submit
```

Overview of CESM directories before create_newcase



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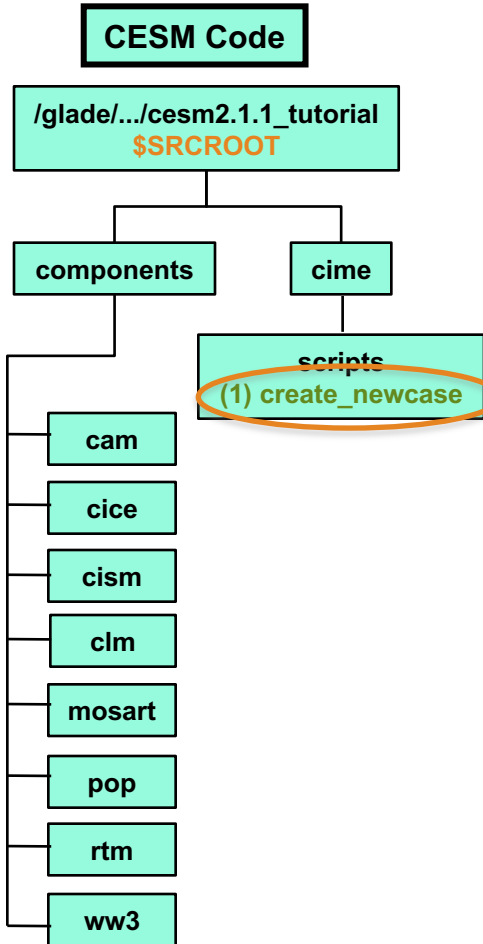
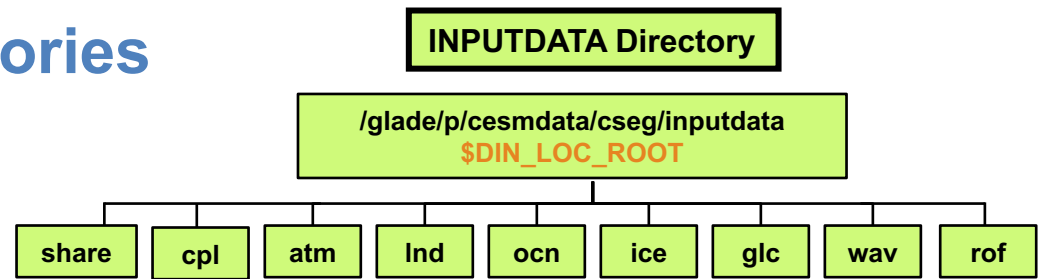
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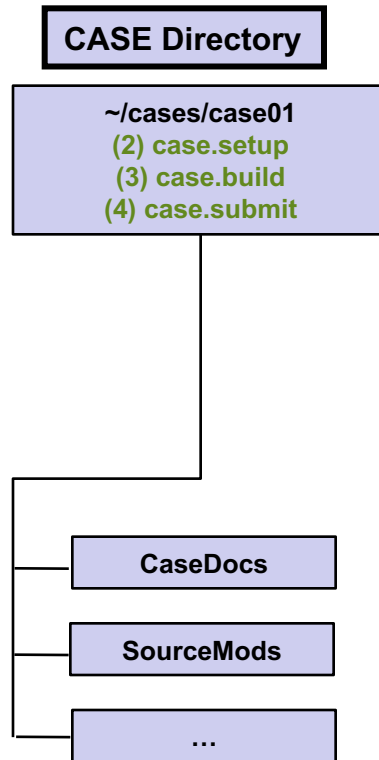
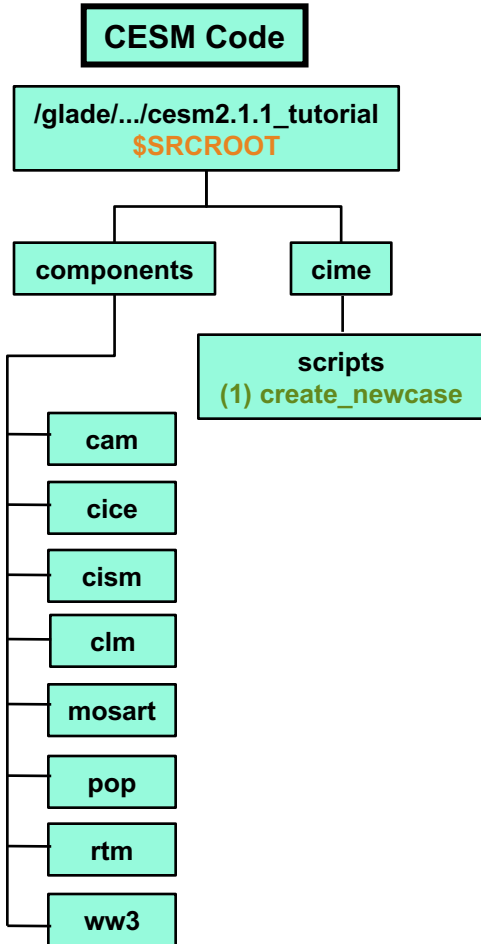
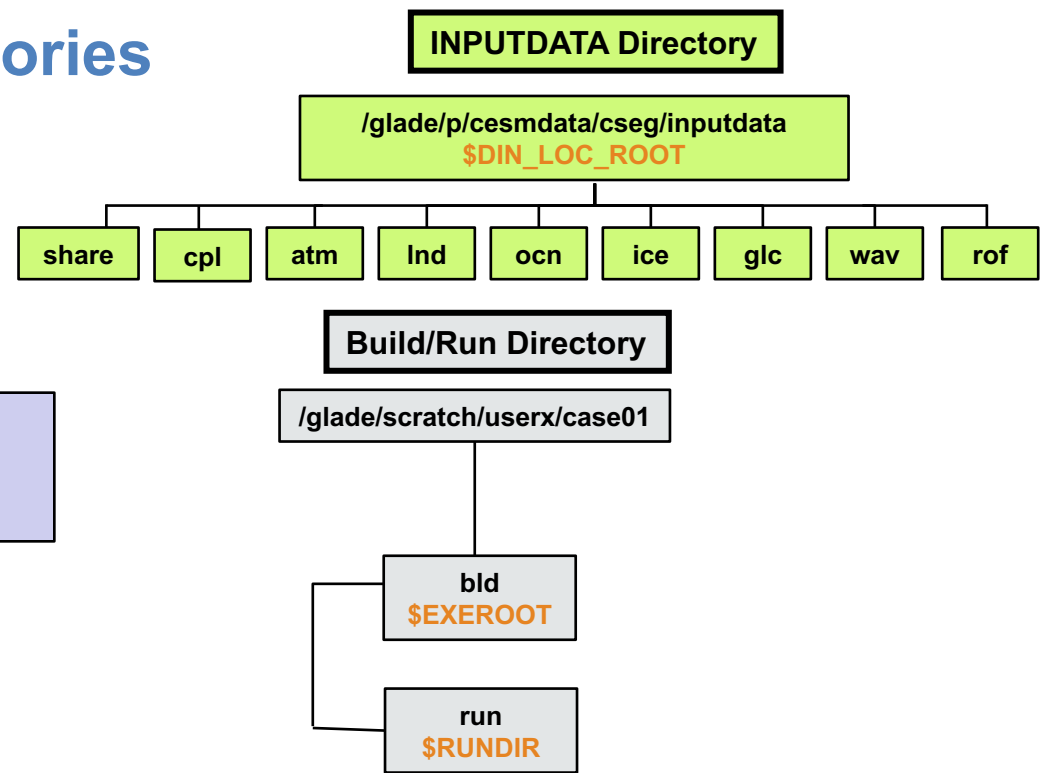
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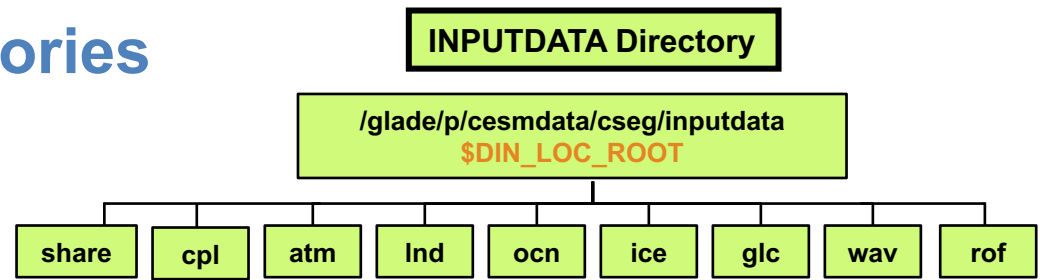
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Overview of CESM directories + 4 CESM commands



Build/Run Directory

```

    /glade/scratch/userx/case01
  
```

```

    bld
    $EXERROOT
  
```

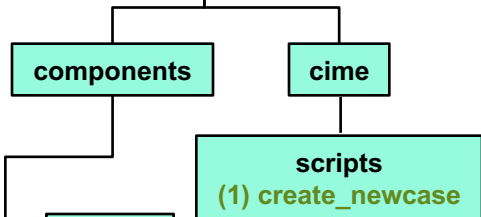
```

    run
    $RUNDIR
  
```

CESM Code

```

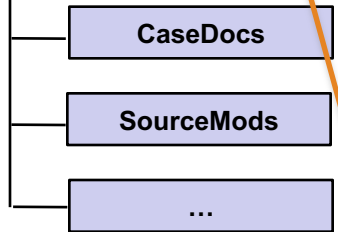
    /glade/.../cesm2.1.1_tutorial
    $SRCROOT
  
```



CASE Directory

```

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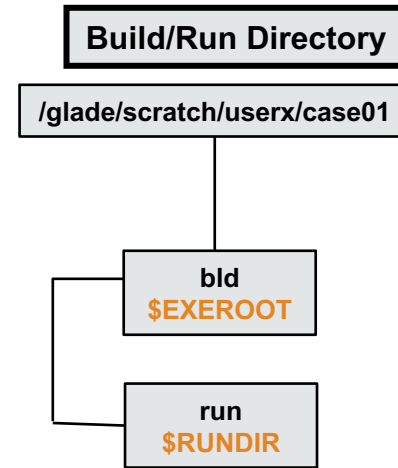
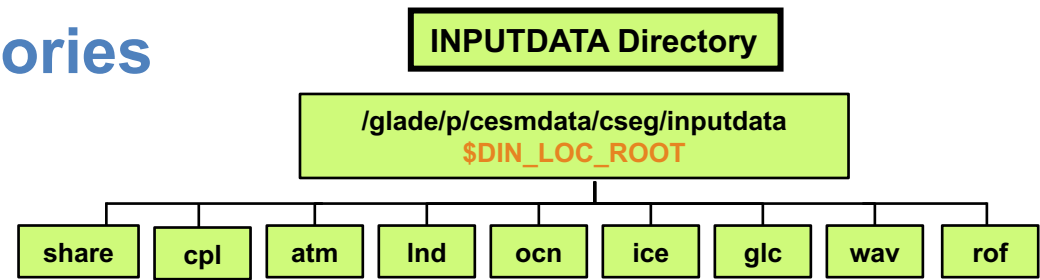
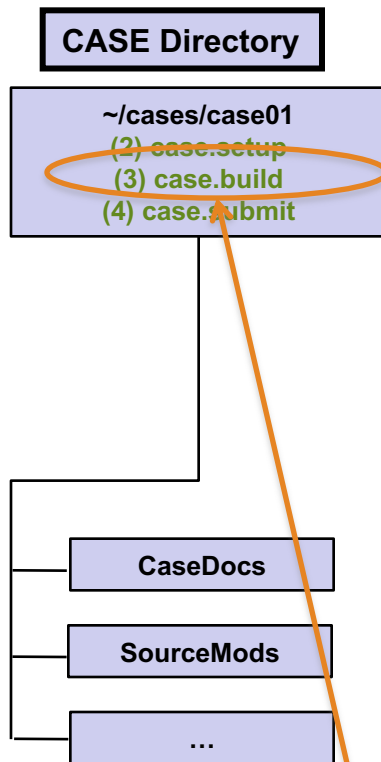
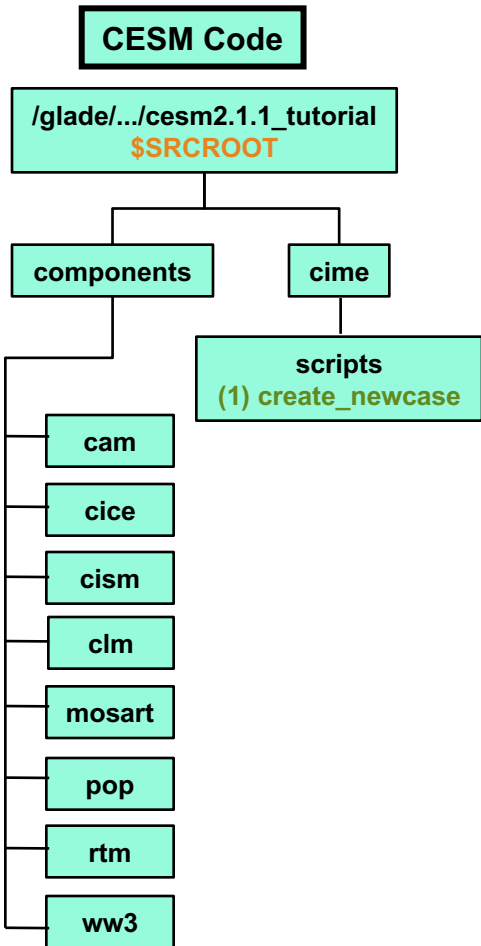
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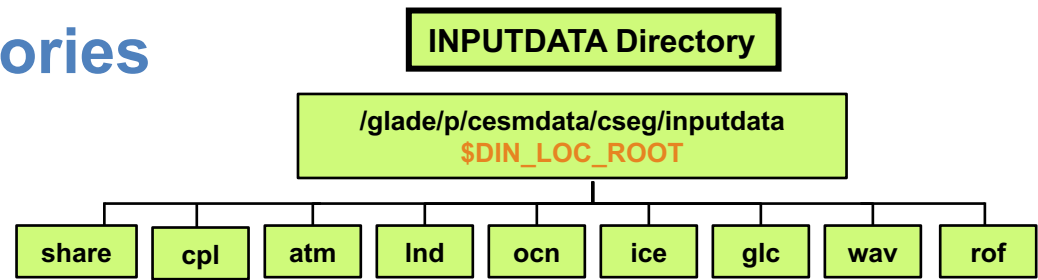
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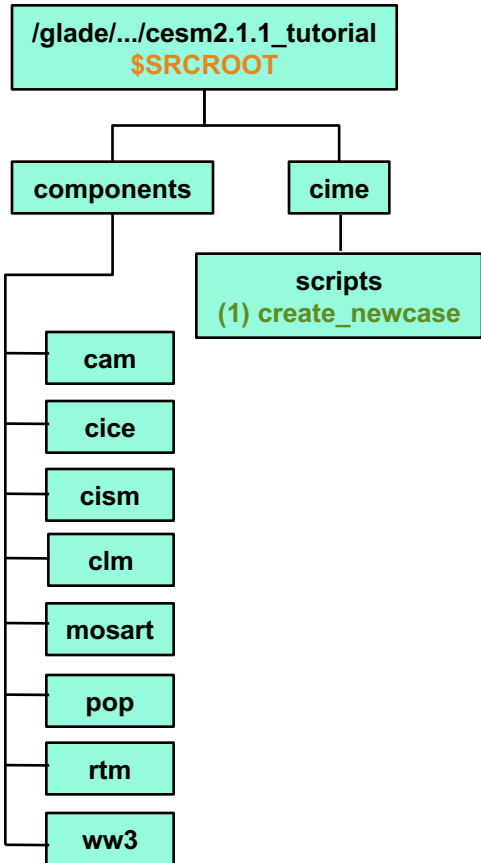
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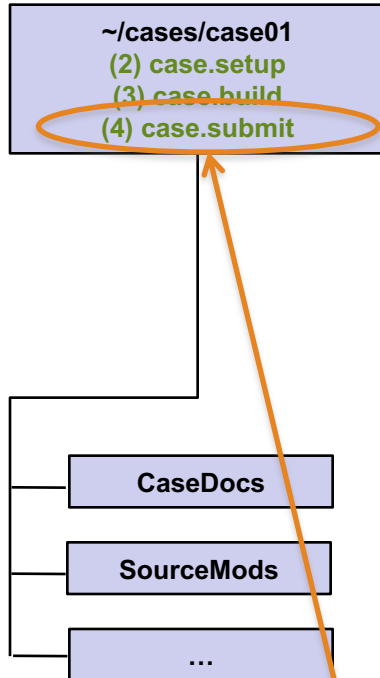
Overview of CESM directories + 4 CESM commands



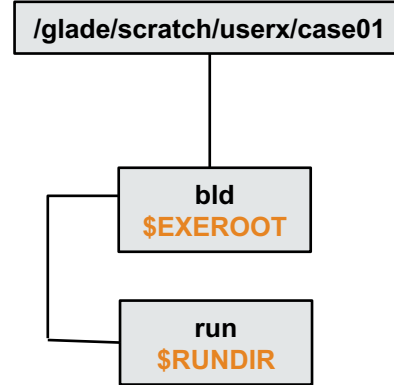
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CASE Directory



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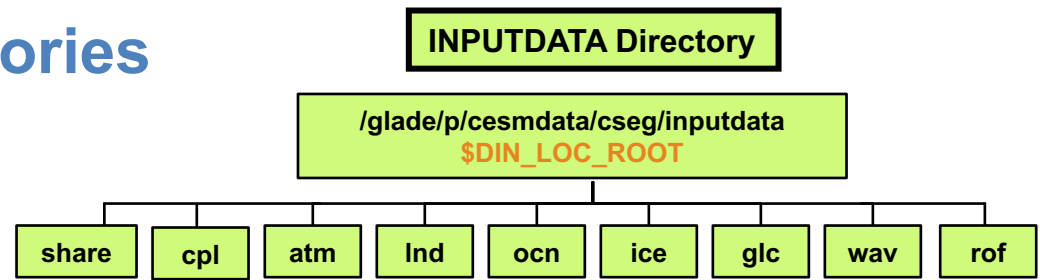
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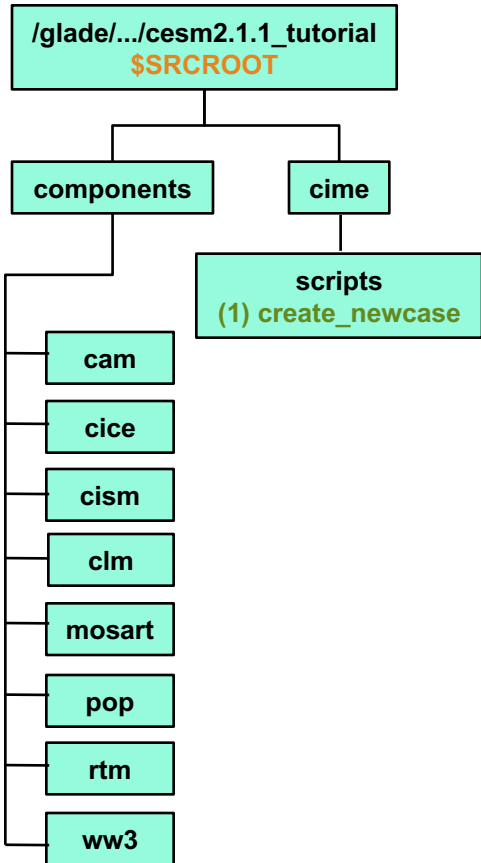
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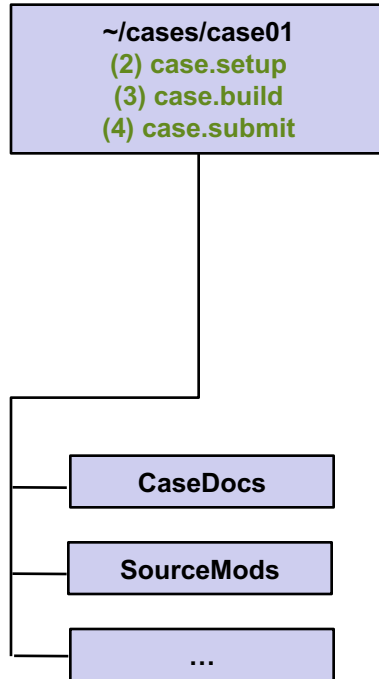
Overview of CESM directories + 4 CESM commands



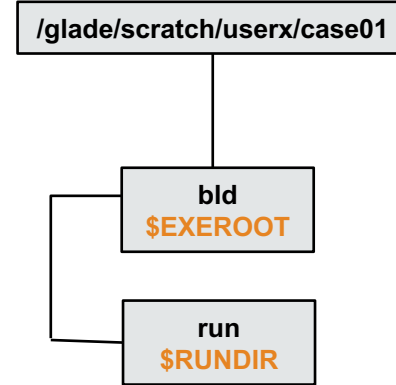
CESM Code



CASE Directory



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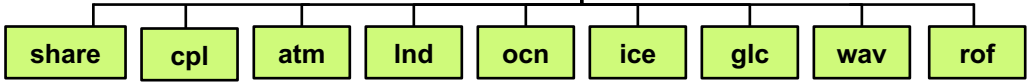
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```

This is when you can modify the namelists

Overview of CESM directories + 4 CESM commands

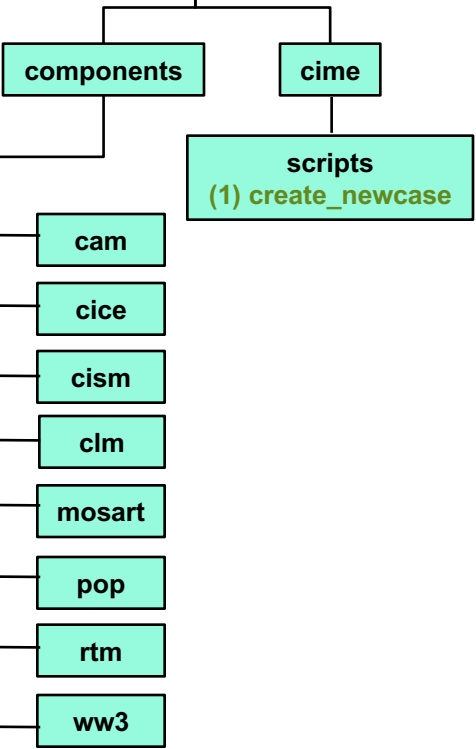
INPUTDATA Directory

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



CESM Code

/glade/.../cesm2.1.1_tutorial
\$SRCROOT



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_ww
  
```

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



Build/Run Directory

/glade/scratch/userx/case01

bld
\$EXEROOT

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

```

run
$RUNDIR
atm_in
cism_in
drv_flds_in
drv_in
ice_in
Ind_in
mosart_in
pop_in
wav_in
  
```

This is used by the model at runtime

(should not be edited)



```

CaseDocs
atm_in
cism_in
drv_flds_in
drv_in
ice_in
Ind_in
mosart_in
pop_in
wav_in
  
```

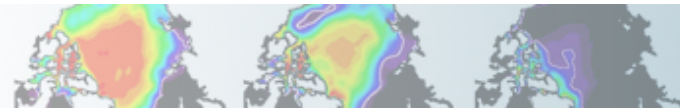
CaseDocs contains **copy of the namelists** for reference only

(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>

The screenshot shows the CESM2 website homepage. At the top left, there is a navigation bar with 'CESM Models / CESM Supported Releases / CESM2'. Below this is a large banner image of Earth from space with the text 'Current Release' and 'The current CESM supported release is CESM 2.11'. There are three buttons: 'Learn more', 'View Experiments', and 'Download current release'. To the right is a 'CESM2 QUICKLINKS' sidebar with sections for 'RELATED INFORMATION' and 'CESM PROJECT'. The main content area is divided into several sections: 'About CESM2', 'Scientific Validation', 'Quick Start', 'CIME Documentation', 'Configurations and Grids', 'Supported Machines & Performance Data', and 'External Library Documentation'. Two orange arrows originate from a text box on the right. One arrow points to the 'Prognostic Components' section, and the other points to the 'Component Configuration Settings' link in the 'Configurations and Grids' section.

CESM2

Current Release
The current CESM supported release is CESM 2.11

[Learn more](#) [View Experiments](#) [Download current release](#)

About CESM2

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.

- What's New in CESM2
- CESM Naming Conventions
- CESM2 Known Issues *

* Includes known issues associated with the CESM2 CIMP6 code base and output datasets.

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.

- CESM2 Scientifically Validated Configurations *
- CESM1 Experiment Diagnostics

* This page now contains links to datasets on ESGF, CDG, glade and NCAR HPSS as well as diagnostic plots and caseroad details.

Quick Start

See the selected links below to help you quickly get started with CESM2

- Getting Help
- CESM2 Use Cases
- CESM2 Quick Start Guide
- Download the CESM2 Code

Configurations and Grids

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

- Grid Resolutions
- Component Sets
- Component Configuration Settings

Supported Machines & Performance Data

- Supported Machines and Compilers
- Timing, Performance and Load Balancing Data
- Running on a Medium-Sized Linux Cluster
- Verify a Machine Port

External Library Documentation

- Parallel I/O Library (PIO)
- Model Coupling Toolkit (MCT)
- Earth System Modeling Framework (ESMF)
- External Python Based Tools*

* Support for these tools is currently limited to NCAR machines only

CESM2 QUICKLINKS

Quick Start Guide

Downloading The Code

Scientifically Validated Configurations

> Prognostic Components

CESM Software Engineering

RELATED INFORMATION

Data Management & Distribution Plan

Development Project Policies & Terms of Use

DiscussCESM Forums Bulletin Board

Publication / Acknowledgment Information

CESM2 Copyright

CESM Support Policy

CESM2 Included Packages Copyright

CESM PROJECT

The CESM project is supported primarily by the National Science Foundation (NSF). Administration of the CESM is maintained by the Climate and Global Dynamics Laboratory (CGD) at the National Center for Atmospheric Research (NCAR).

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.

Prognostic Components

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

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

In "Prognostic Components" or in "Components Configuration Settings", you can find information about namelist variables in:
"Component Fortran Namelist settings"

Where to find info about namelists ?

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

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Component Configuration Settings

CESM2 Version -
Model Version: 2.11
HTML created on: 2019-06-09

Please select a setting from the model options below

Atmosphere Models

Active / Prognostic Atmosphere - CAM

- CAM Namelist Definitions
- CAM CASEROOT Variable Definitions

Climatological Data Atmosphere - DATM (includes Aquaplanet)

- DATM Namelist Definitions
- DATM CASEROOT Variable Definitions

Land Models

Active / Prognostic Land - CLM

- CLM5.0 Namelist Definitions
- CLM5.0 CASEROOT Variable Definitions
- CLM4.0 Namelist Definitions
- CLM4.0 CASEROOT Variable Definitions (See CLM4.0 documentation)

Climatological Data Land - DLND

- DLND Namelist Definitions
- DLND CASEROOT Variable Definitions

River Models

Active / Prognostic River Runoff Model - MOSART

- MOSART Namelist Definitions
- MOSART CASEROOT Variable Definitions

Active / Prognostic River Runoff Model - RTM

- RTM Namelist Definitions
- RTM CASEROOT Variable Definitions

Climatological Data River - DROF

- DROF Namelist Definitions
- DROF CASEROOT Variable Definitions

Ocean Models

Active / Prognostic Ocean - POP2

- POP2 Namelist Definitions
- MARBL Namelist Definitions
- POP2 / MARBL CASEROOT Variable Definitions

Climatological Data Ocean - DOCN

- DOCN Namelist Definitions
- DOCN CASEROOT Variable Definitions

Sea Ice Models

Active / Prognostic Sea Ice - CICE

- CICE Namelist Definitions
- CICE CASEROOT Variable Definitions

Climatological Data Sea Ice - DICE

- DICE Namelist Definitions
- DICE CASEROOT Variable Definitions

Wave Models

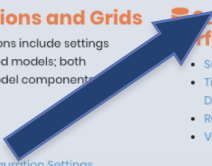
Active / Prognostic Wave - WW3

- WW3 Namelist Definitions
- WW3 CASEROOT Variable Definitions

Climatological Data Wave - DWAV

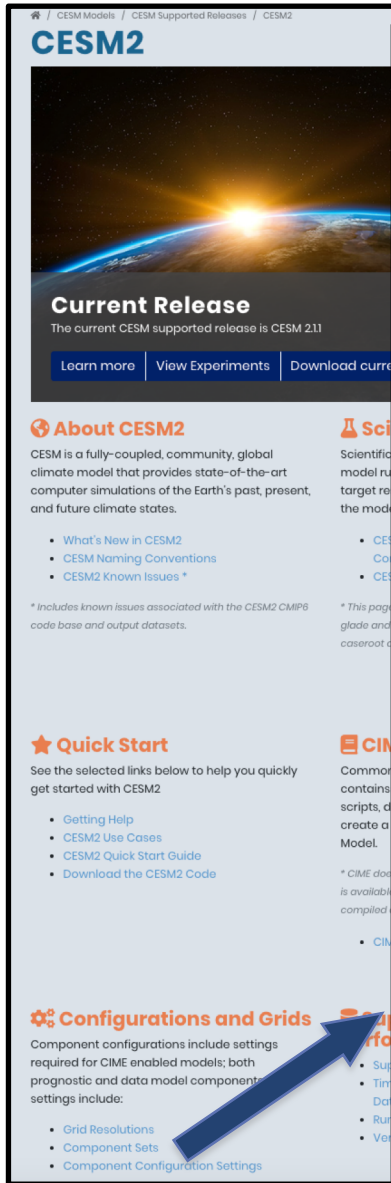
- DWAV Namelist Definitions
- DWAV CASEROOT Variable Definitions

Namelist definitions for every component



Where to find info about namelists ?

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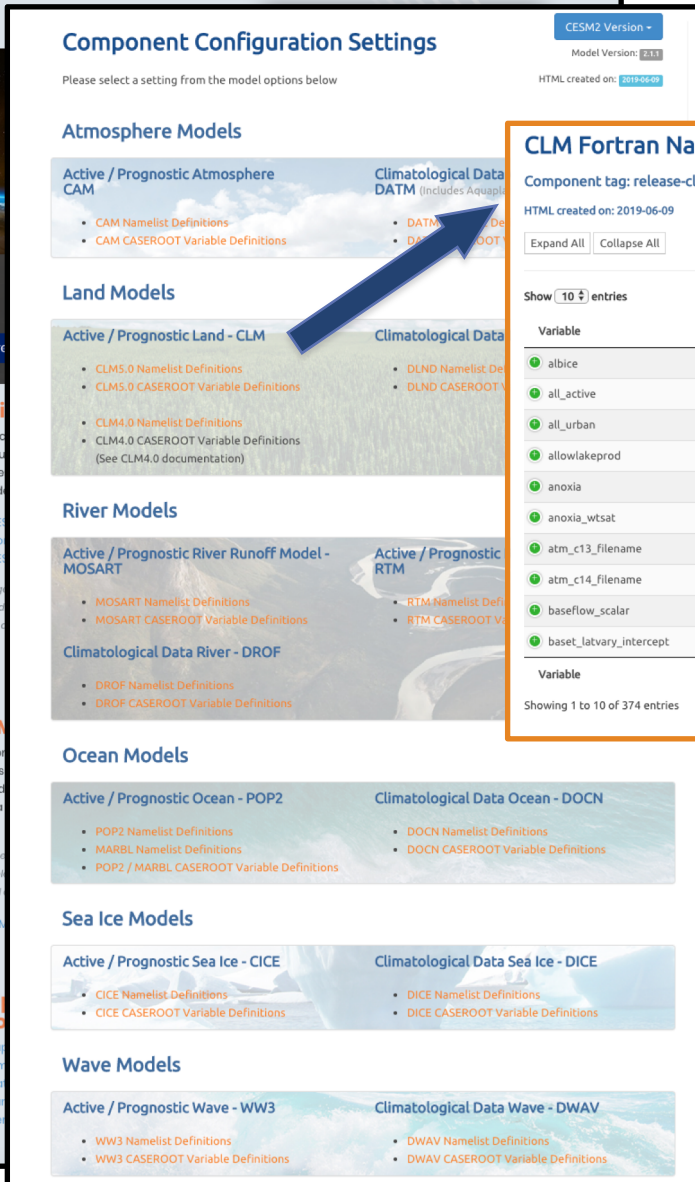
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- Grid Resolutions
- Component Sets
- Component Configuration Settings



Component Configuration Settings

Please select a setting from the model options below

CESM2 Version -
Model Version: 2.11
HTML created on: 2019-06-09

Atmosphere Models

Active / Prognostic Atmosphere CAM | Climatological Data DATM (Includes Aquap)

- CAM Namelist Definitions
- CAM CASEROOT Variable Definitions
- DATM Namelist Definitions
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Land Models

Active / Prognostic Land - CLM | Climatological Data DLND (Includes Aquap)

- CLM5.0 Namelist Definitions
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River Models

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Sea Ice Models

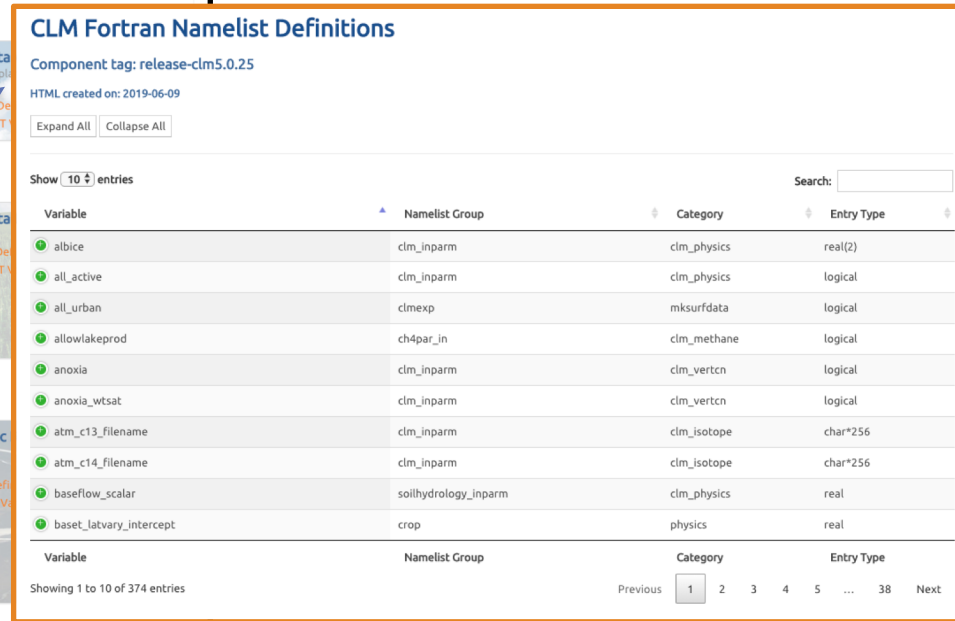
Active / Prognostic Sea Ice - CICE | Climatological Data Sea Ice - DICE

- CICE Namelist Definitions
- CICE CASEROOT Variable Definitions
- DICE Namelist Definitions
- DICE CASEROOT Variable Definitions

Wave Models

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

- WW3 Namelist Definitions
- WW3 CASEROOT Variable Definitions
- DWAV Namelist Definitions
- DWAV CASEROOT Variable Definitions



CLM Fortran Namelist Definitions

Component tag: release-clm5.0.25

HTML created on: 2019-06-09

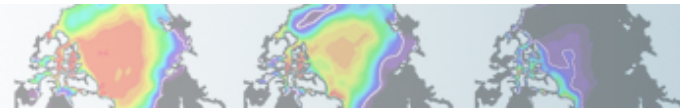
[Expand All](#) | [Collapse All](#)

Show 10 entries

| Variable | Namelist Group | Category | Entry Type |
|-------------------------|----------------------|-------------|------------|
| albice | clm_inparm | clm_physics | real(2) |
| all_active | clm_inparm | clm_physics | logical |
| all_urban | clmexp | mksurldata | logical |
| allowlakeprod | ch4par_in | clm_methane | logical |
| anoxia | clm_inparm | clm_vertcn | logical |
| anoxia_wtsat | clm_inparm | clm_vertcn | logical |
| atm_c13_filename | clm_inparm | clm_isotope | char*256 |
| atm_c14_filename | clm_inparm | clm_isotope | char*256 |
| baseflow_scalar | soilhydrology_inparm | clm_physics | real |
| basel_latvary_intercept | crop | physics | real |

Showing 1 to 10 of 374 entries

Previous 1 2 3 4 5 ... 38 Next



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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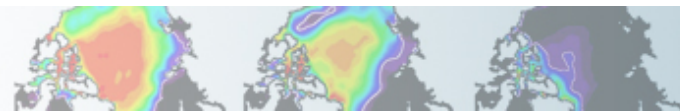
Office of
Science

Let's change the output frequency in CAM**

By default, CESM outputs **monthly average** history files but you can output at other frequency.

For instance: 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, examples will be coming from the atmospheric 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*

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

Customizing CAM history files: mfilt

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

For instance, to specify that we want 10 time samples on each history file, we set the namelist variable:

mfilt = 10

For instance, if we output daily data for a 1 year run:

nhfrq = -24

mfilt = 365

=> *1 history file with 365 time samples*

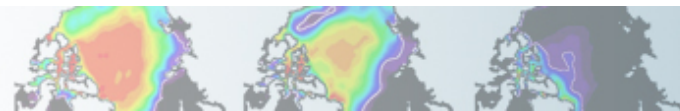
nhfrq = -24

mfilt = 1

=> *365 history files with 1 time sample*

NB: we cannot change *mfilt* for monthly frequency.

For monthly frequency, we always have: *mfilt = 1*



Customizing CAM history files: fincl

You can output up to 10 history files: “h0”, “h1”, ..., “h9”.

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 “h9”, the user has to specify the variables to output.

To control the list of fields in the history files *h0* *h1* ... *h9*
we can use the namelist variables *fincl1* *fincl2* ... *fincl10*

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:

A ==> Average

B ==> GMT 00:00:00 average

I ==> Instantaneous

M ==> Minimum

X ==> Maximum

L ==> Local-time

S ==> Standard deviation

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, what happens if we set:

```
fincl2 = 'T:I','Q:I','U:I','V:I'
```

```
nhtfrq = 0, -3
```

```
mfilt = 1, 8
```

In addition to the monthly history file “h0”,
we output the file “h1” with **instantaneous values of T, Q, U, V**
we output these variables every **3 hour**
We have **8 time samples** in each h1 file (we create a new file every
day)

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/settings/current/clm5_0_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

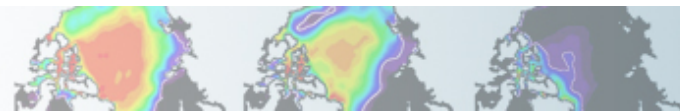
Example

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/settings/current/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/namelist/pop2_nml.html

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

tavg_freq_opt = 'nday'

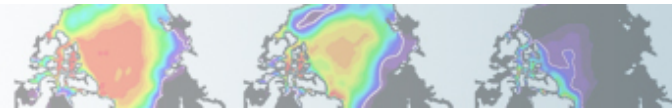
tavg_freq = 1

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

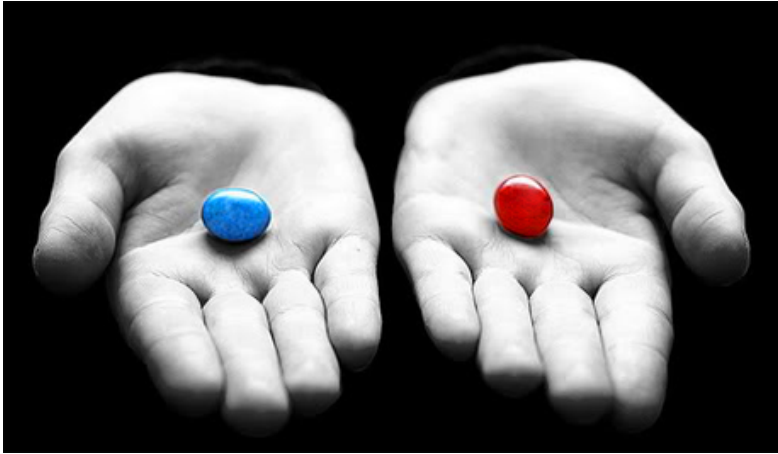
In this section, we will learn how to do simple code modifications such adding a new variable



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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.

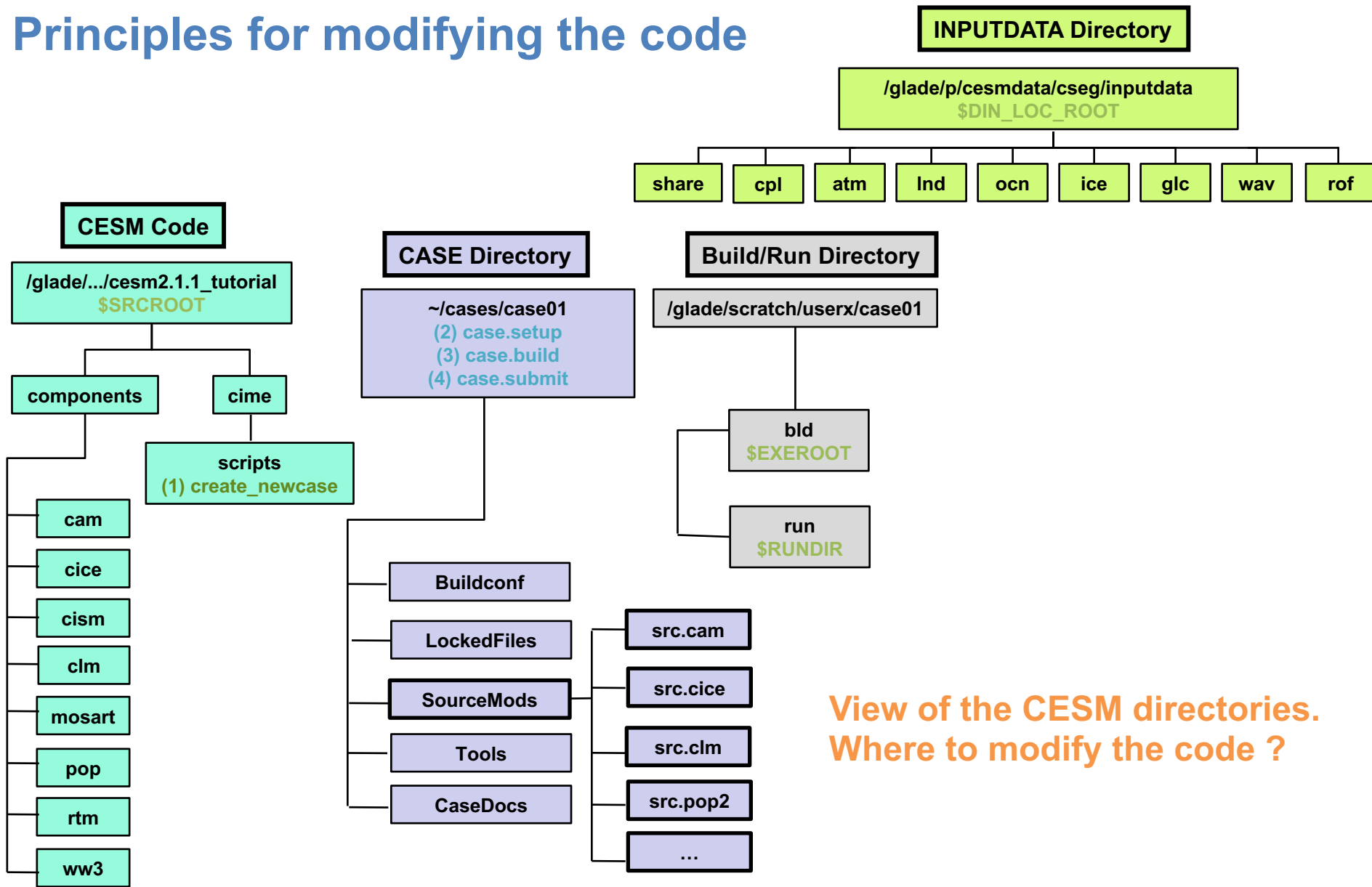
-The **blue pill** would allow him to remain in the Matrix (a fictional computer-generated world)

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



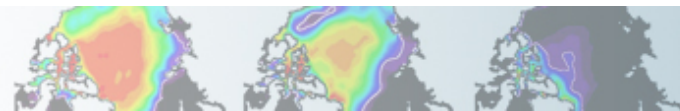
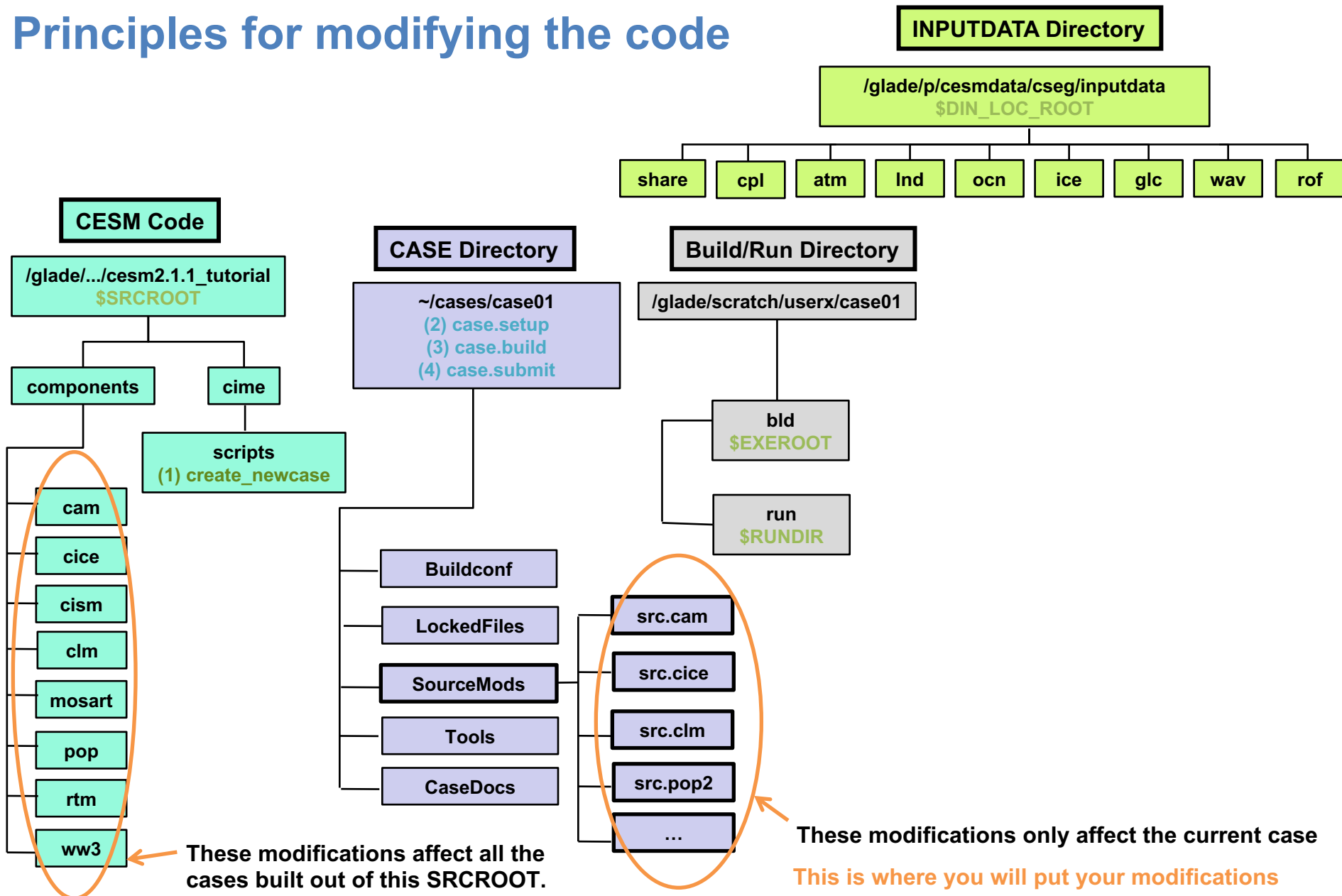
Courtesy: Andrew Gettelman

Principles for modifying the code

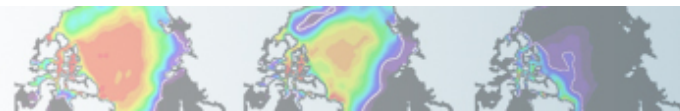
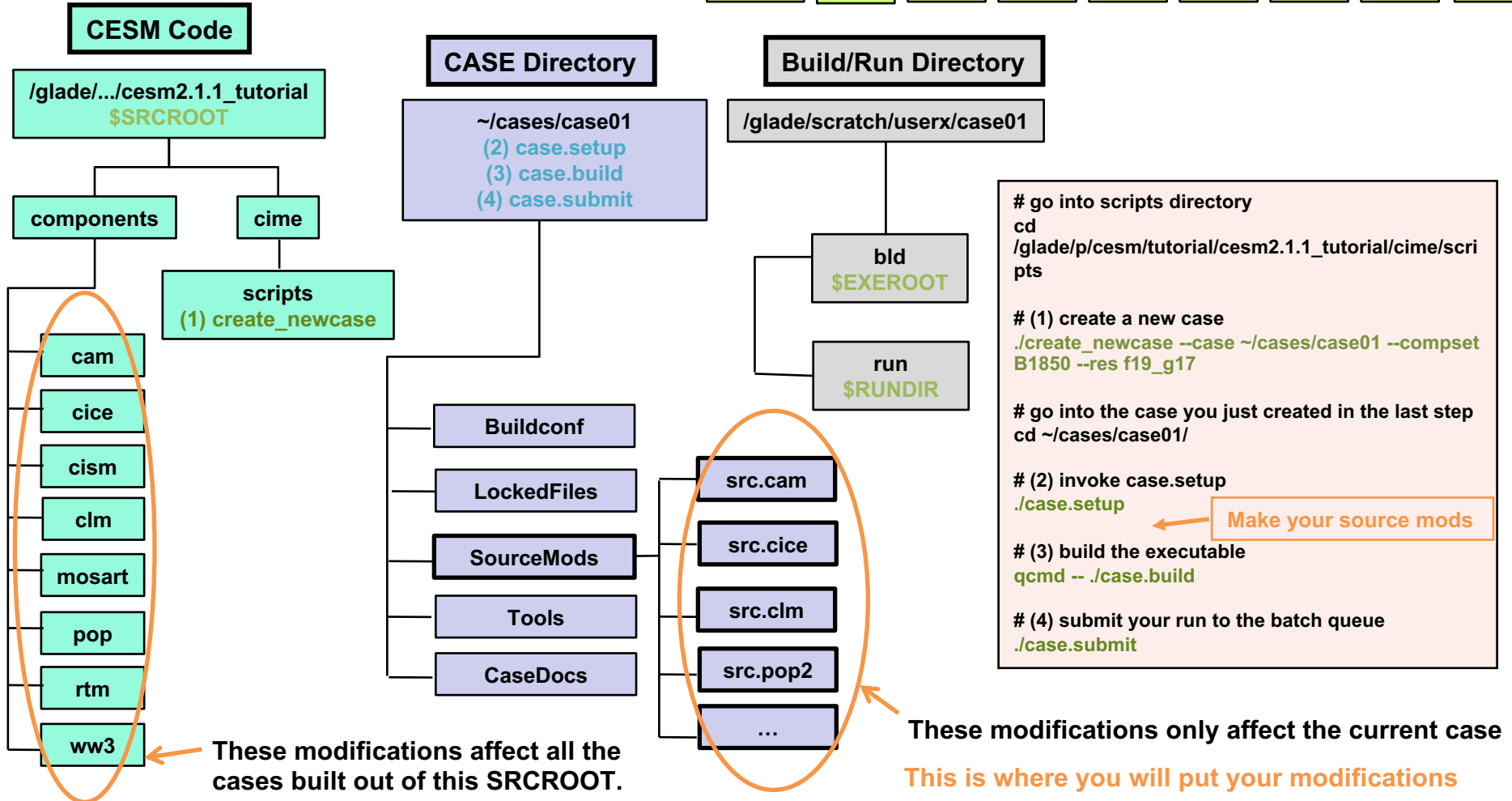


View of the CESM directories.
Where to modify the code ?

Principles for modifying the code



Principles for modifying the code



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

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', ...)

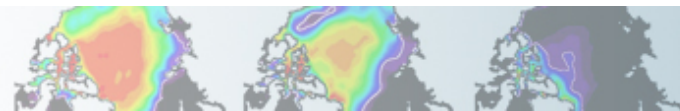
→ Add a field to master field list

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

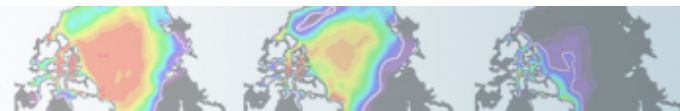
Averaging flag:
A = average (default)
I = instantaneous

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

history tape index

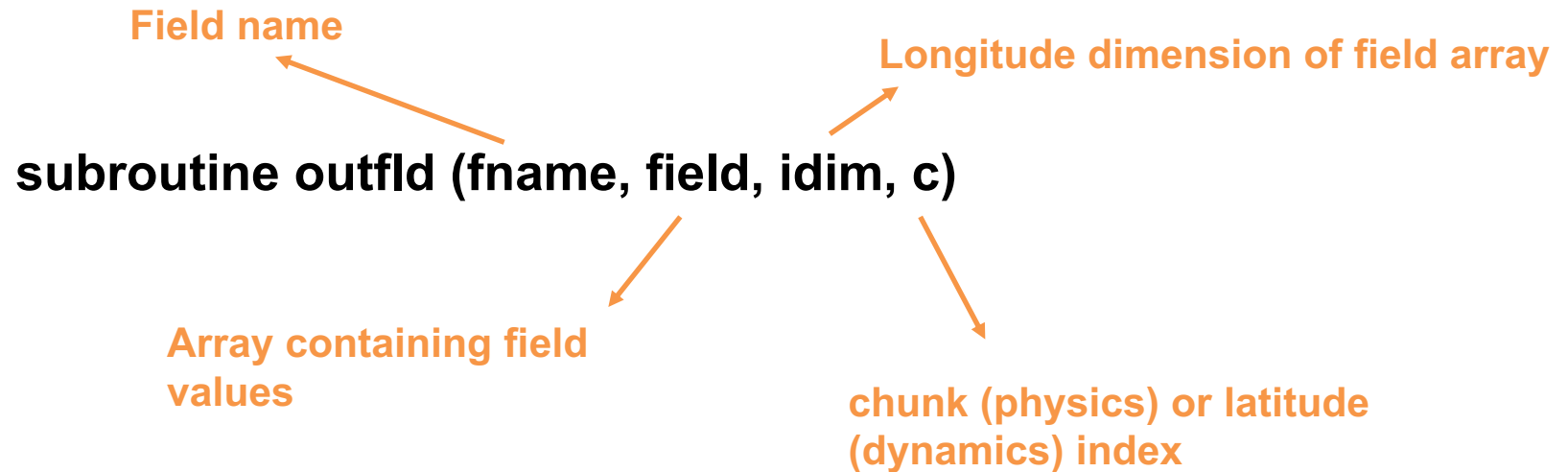
Example:

call add_default ('T500', 1, '')



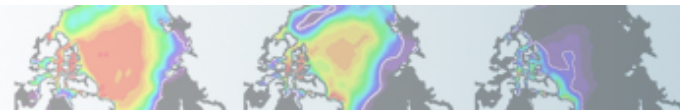
Syntax: outfld

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



Example:

call outfld('T500', cld, pcols, lchnk)



Where to find help ?

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

CESM Models | CESM2



About CESM2

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.

- [What's New in CESM2](#)
- [CESM Naming Conventions](#)
- [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.

- [CESM2 Scientifically Validated Configurations](#)
- [Experiment Diagnostics](#)
- [Experiment Output Datasets](#) * [↗](#)

* Please see [CESM2 Scientifically Validated Configurations](#) for data download details.

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).

CESM2 Quicklinks

- Quick Start Guide
- Downloading The Code
- Scientifically Validated Configurations
- [Prognostic Components](#)

Related Information

- [Data Management & Distribution Plan](#)
- [Development Project Policies & Terms of Use](#)
- [DiscussCESM Forums Bulletin Board](#)
- [CESM2 Copyright](#)
- [CESM Support Policy](#)
- [CESM2 Included Packages Copyright](#)

CESM webpage is a gold mine for **model documentation**

★ Quick Start

See the selected links below to help you quickly get started with CESM2

- [Getting Help](#)
- [CESM2 Use Cases](#)
- [CESM2 Quick Start Guide](#)
- [Download the CESM2 Code](#)

📄 CIME Documentation

Common Infrastructure for Modeling the Earth contains the coupling infrastructure, support scripts, data models and utility libraries needed to create a single-executable coupled Earth System Model.

* CIME does not contain any prognostics components and is available in a stand-alone package that can be compiled and tested with just its data components.

- [CIME User Guide](#) [↗](#)

≡ Prognostic Components

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

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

⚙️ Configurations and Grids

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

🖨️ Supported Machines & Performance Data

- [Supported Machines and Compilers](#)
- [Performance and Load Balancing Data](#)
- [Running on a Medium-Sized Linux Cluster](#)
- [Verify a Machine Port](#)

📖 External Library Documentation

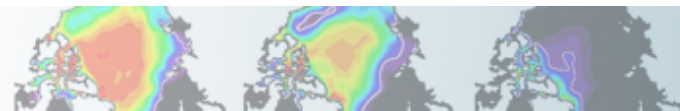
- [Parallel I/O Library \(PIO\)](#)
- [Model Coupling Toolkit \(MCT\)](#)
- [Earth System Modeling Framework \(ESMF\)](#)
- [External Python Based Tools *](#)

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

Exercise Overview



- **Exercise 1: Namelist modification**
Customize your history output
- **Exercise 2: Namelist + Code modification**
Add a new output field to the code
- **Exercise 3: Change a tuning parameter**



Exercise Overview



Find the exercises on the CESM tutorial webpage:

<http://www.cesm.ucar.edu/events/tutorials/2020/files/Practical4-exercise-hannay.pdf>

Location of these
afternoon exercises

Exercise

Hints

And ... solutions

Exercise 2: Add an output field

Create a case called "b1850_T750" using the `compset B1850` at `f19_g17` resolution.

- Add an output field for the temperature at 750 mbar.
- Output daily values of T750 and T500 in the "h1" history file.
- Set the `namelist` to output a single h1 for the run.
- Make a 1-month run.

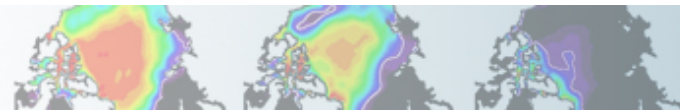
Hints for exercise 2

Use T500 as a template for your changes.

Find the subroutine containing T500 using `grep -r T500 *`

When the run is completed, go to your archive directory:

- check the fields T750 and T500 are in the file h1
- create a file with the difference between T750-T500
- For instance, you can use `ncap2`
`ncap2 -s 'T750_minus_T500=T750-T500' b1850_T750.cam.h1.0001-01-01-00000.nc T750-T500.nc`
- Look at the difference with `ncview`.



Solutions to the exercises



At the request of previous year students, I am providing the solution.

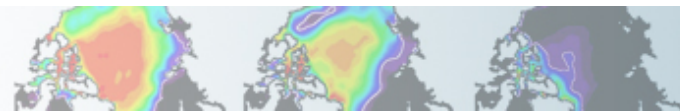
My own recommendation:

DON'T LOOK AT THE SOLUTIONS DURING THE LAB !!!

I believe:

- You will only learn if you try the exercises by yourself.
- You will only learn if you do mistakes.
- Copy/paste will teach you little, indeed.
- Your best bet is to try, do mistakes, ask your helper, interact with each others, look at the documentation, try to understand what is wrong...

But this is my own opinion, and I am too old to believe I know the Truth.
So do what is best for you 😊



Where to find stuff ?

<http://www.cesm.ucar.edu/events/tutorials/2020/>

Thursday, August 6 2020

Lectures

Topic: Ocean Modeling II
Speaker: Peter Gent [Slides](#) [Videos](#)

Topic: Ocean Biogeochemistry
Speaker: Keith Lindsay [Slides](#) [Videos](#)

Topic: Sea Ice Modeling
Speaker: Alice DuVivier [Slides](#) [Videos](#)

Specialized Talk

Topic: Porting CESM
Speaker: Jim Edwards [Slides](#) [Videos](#)

Meet a Scientist

Topic: Sign up to meet one of our CESM Scientists [Scientist Bios](#)

Practical

Topic: Namelist and Code Modifications
Speaker: Cecile Hannay [Overview](#) [Exercises](#) [Videos](#)

Lab overview
(these slides)

Exercises/Solutions

Tutorial Details

- **Dates:** 03 - 07 August 2020
- **Location:** Zoom <https://zoom.us/download>
- **Registration:** [Registration Closed](#)

Tutorial participants are also welcome to join the [2020 CESM Tutorial Facebook group](#) and are welcome to post pictures, questions/replies, and tips as well as get to know the other participants.

Tutorial Links

- **Agenda:** View the agenda in pdf format
- **Announcement:** Information about the event and how to apply to the tutorial
- **Prerequisites:** Please complete the following activities to ensure you are prepared for the tutorial
- **Coursework:** View the sciences presentations and the labs exercises.
- **Visitor Wireless:** How to access the UCAR Visitor Wireless

