

# Introduction to Wednesday practicals

Cécile Hannay



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# What are we going to do today?

- **Namelist Modifications**
- **Troubleshooting model errors**
- **Code Modifications**

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

*(The Matrix, 1999)*



# What are we going to do today?

- **Namelist Modifications**
- **Troubleshooting model errors**
- **Code Modifications**



The screenshot shows the NCAR CESM Tutorial page. On the left, a sidebar contains a table of contents with the following items: Introduction, Prerequisites for Success, Basics, Simple XML Modifications, **Namelist Modifications** (highlighted), Troubleshooting runtime errors, Source Modifications, Diagnostics, Challenge Exercises, and Resources. The main content area features the heading 'Welcome to the CESM Tutorial' and a paragraph explaining the model's history: 'In 1983 NCAR created the *Community Climate Model* (CCM) as a freely available global atmosphere model for use by the climate research community. The scope of CCM development continued to expand and in 1994 NCAR scientists released the *Climate System Model* (CSM), a global model that included component models for the atmosphere, land surface, ocean, and sea-ice, communicating through a central coupler component. To recognize the broad community of users and sponsors contributing to this effort, the CSM was renamed the *Community Climate System Model* (CCSM). The CCSM model evolved to include ice sheet and biogeochemical modeling and was renamed the *Community Earth System Model* (CESM) in 2013.' Below this, it states: 'This repository includes materials designed to be an introduction to running the CESM. The materials were developed to support the CESM tutorial and serve as reference documentation for all CESM users.'

<https://ncar.github.io/CESM-Tutorial/README.html>

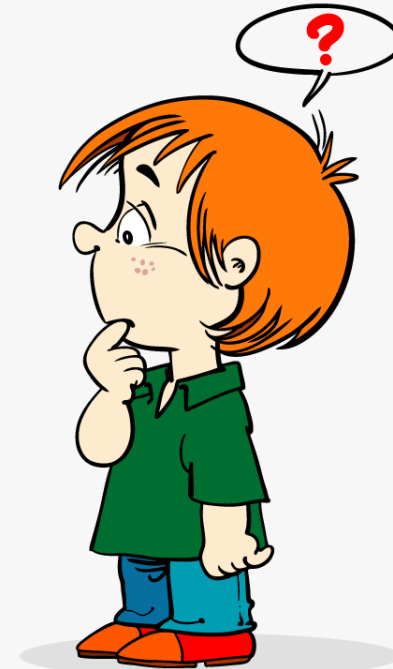
# Namelist Modifications

- **What are namelists? How to modify them?**
- **For instance, let's change the output frequency of the model.**

# Namelist Modifications

- What are namelists? How to modify them?
- For instance, let's change the output frequency of the model.

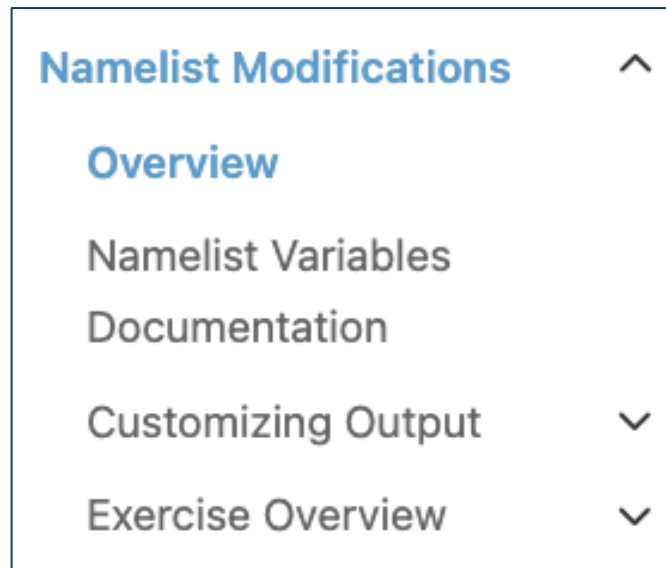
Question: By default, the model outputs **monthly** data and I need to look at the **daily** cycle...



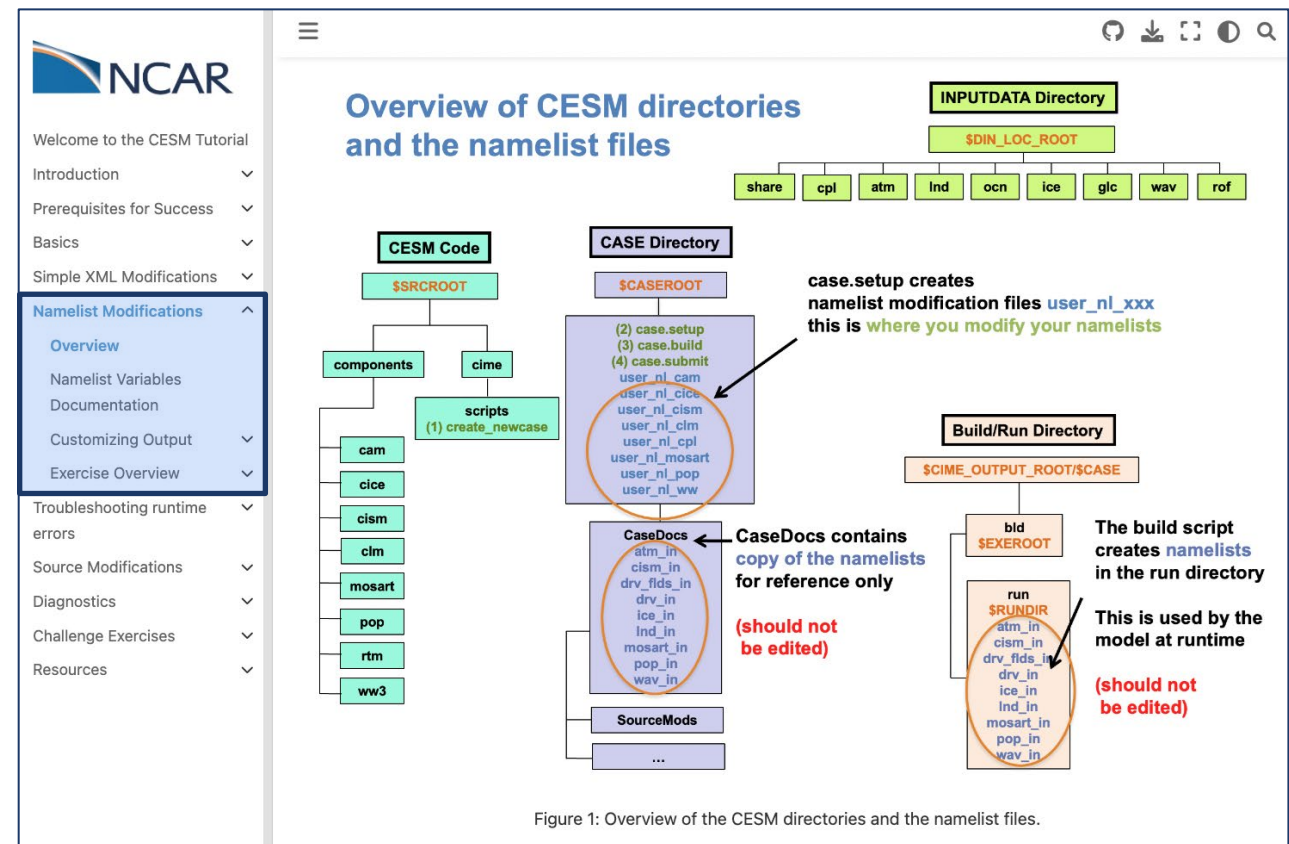


# Namelist Modifications

- What are namelists? How to modify them?
- For instance, let's change the output frequency of the model.



Go step by step into the chapter:  
**Namelist Modifications**



# Troubleshooting runtime errors

- **“Help! My run crashed”**
- **Where/how can I find information about the crash?**



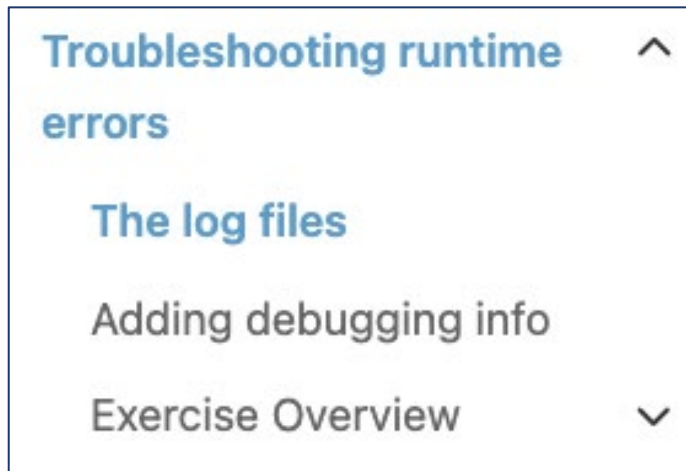
# Troubleshooting runtime errors

- **“Help! My run crashed”**
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# Troubleshooting runtime errors

- “Help! My run crashed”
- Where/how can I find information about the crash?



Go step by step into the chapter:  
**Troubleshooting runtime errors**

**NCAR**

Welcome to the CESM Tutorial

- Introduction
- Prerequisites for Success
- Basics
- Simple XML Modifications
- Namelist Modifications
- Troubleshooting runtime errors**
  - The log files**
  - Adding debugging info
  - Exercise Overview
- Source Modifications
- Diagnostics
- Challenge Exercises
- Resources

## The log files

The log files are files in the format `$model.log.*`

- When the model is running, it produces the log files in the **run directory**: `RUNDIR`.
- When the run completes successfully, the model moves the log files into the **archive** directory: `DOOUT_S_ROOT`.
- When the model fails, the log files remain in the run directory `RUNDIR`.

### Overview of CESM directories and Log files

Logs files:

- in `RUNDIR` while it is running
- moved to `CASE/logs` when run completes

**QUICK TIPS**

If the model crashes the log files will stay in the run directory `RUNDIR`

# Source Modifications

- **I am bored and I want to go to the next level and modify CESM.**
- **For instance, let's add a variable into CAM**

# Source Modifications

- I am bored and I want to go to the next level and modify CESM.
- For instance, let's add a variable into CAM



Your choice: The **Red** Pill or the **Blue** Pill

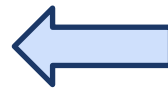
*The Matrix (1999): Neo, the main character is offered the choice between a red pill and a blue pill.*

- 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.

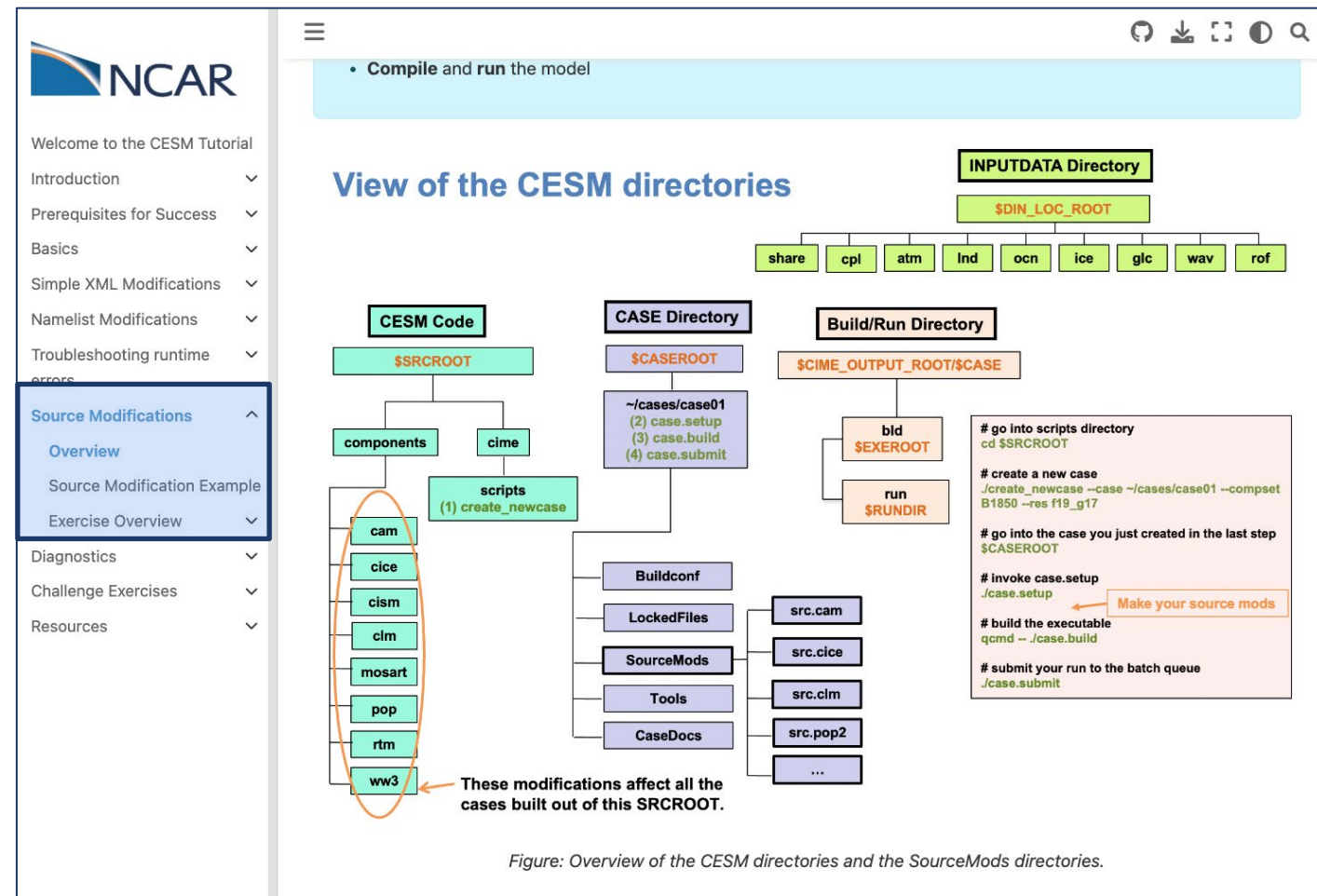
# Source Modifications

- I am bored and I want to go to the next level and modify CESM.
- For instance, let's add a variable into CAM

Source Modifications	^
Overview	
Source Modification Example	
Exercise Overview	▼

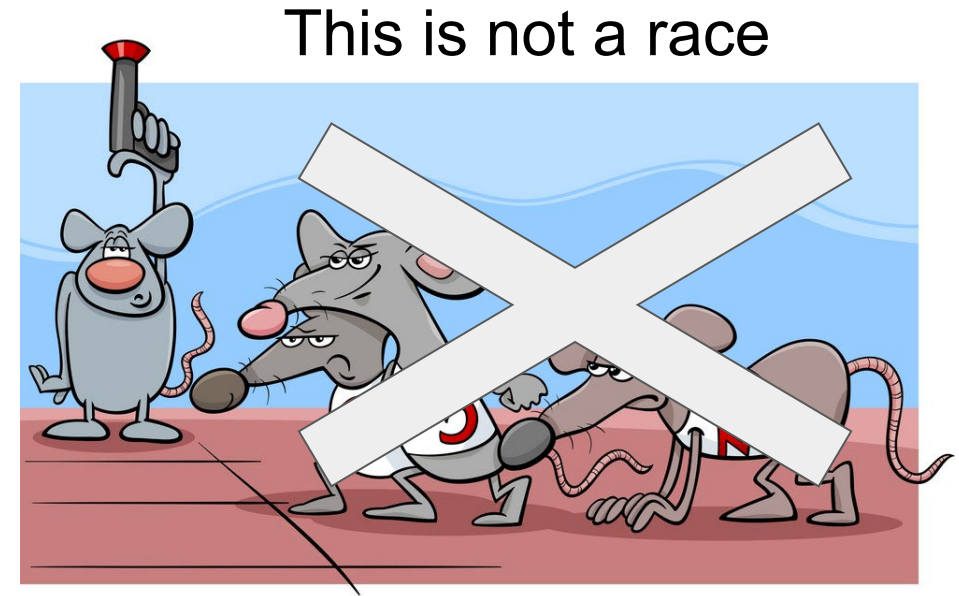


Go step by step into the chapter:  
**Source Modifications**



## FAQs

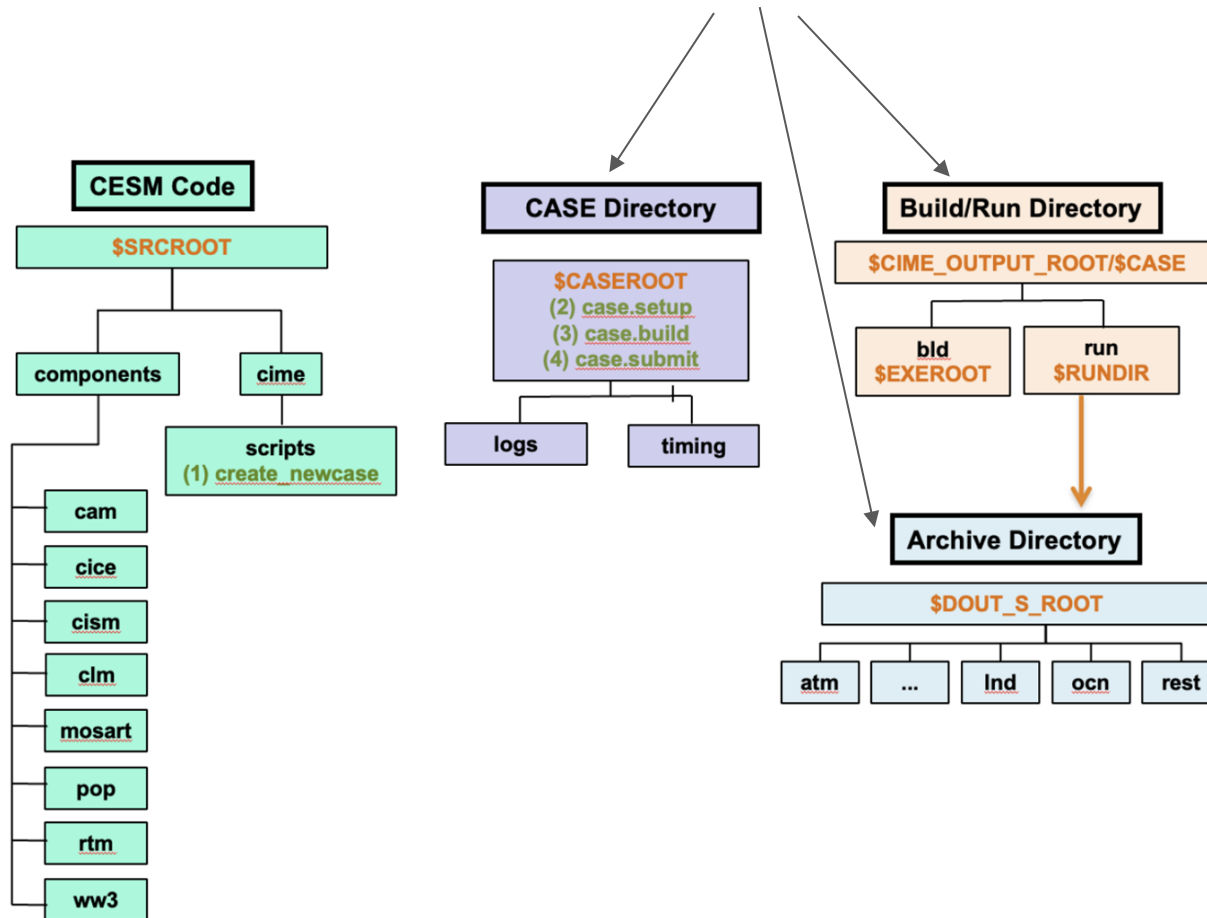
- I have not finish Monday's exercise.  
What should I do?
- I already completed all of these chapters.  
What should I do?





# FAQs

- Everything is called ‘**b1850.basics**’. I am a bit confused.



For the current tutorial on Derecho, the paths are:

- `$SRCROOT = /glade/u/home/$USER/code/my_cesm_code`
- `$CASEROOT = /glade/u/home/$USER/cases/$CASE`
- `$EXEROOT = /glade/derecho/scratch/$USER/$CASE/bld`
- `$RUNDIR = /glade/derecho/scratch/$USER/$CASE/run`
- `$DOUT_S_ROOT = /glade/derecho/scratch/$USER/archive/$CASE`

# FAQs

- I am completely confused about the tutorial special queue. What should I do?

The screenshot shows the NCAR CESM Tutorial website. The left sidebar contains a navigation menu with the following items: Resources, NCAR Supercomputer, Modules on NCAR HPC, Tutorial one time setup, and Tutorial queue and account. The 'Tutorial queue and account' item is highlighted with a blue box, and a blue arrow points from this box to the main content area. The main content area has a header with the NCAR logo and a search bar. Below the header, the page title is 'Tutorial queue and account'. The main content includes a section titled 'Tutorial Project Account' with a yellow box stating: 'You should have access to project account **UESM0013** and use this for your simulations.' Below this, it says 'You can change the account in your case directory using the following command:' followed by a code block: `./xmlchange PROJECT=UESM0013`. The next section is 'Special Queues' with a yellow box titled 'Schedule for Tutorial Reservation Queues' containing two bullet points: 'We have a special queue **tutorial** during the lab sessions to ensure you get through the derecho queues quickly and get your jobs run. This queue are only active during our lab sessions.' and 'Outside the lab sessions, you should use the queue **main** to run cesm.'

NCAR

Q Search

Welcome to the CESM Tutorial

Introduction

Prerequisites for Success

Basics

Simple XML Modifications

Namelist Modifications

Troubleshooting runtime errors

Source Modifications

Challenge Exercises

Diagnostics

Resources

NCAR Supercomputer

Modules on NCAR HPC

Tutorial one time setup

Tutorial queue and account

terminal windows

## Tutorial queue and account

### Tutorial Project Account

You should have access to project account **UESM0013** and use this for your simulations.

You can change the account in your case directory using the following command:

```
./xmlchange PROJECT=UESM0013
```

### Special Queues

#### Schedule for Tutorial Reservation Queues

- We have a special queue **tutorial** during the lab sessions to ensure you get through the derecho queues quickly and get your jobs run. This queue are only active during our lab sessions.
- Outside the lab sessions, you should use the queue **main** to run cesm.

# Questions ?



Courtesy: Kolya Dols