

How to Run CLM on Lonestar

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References

CESM1_0_3 Users' Guide

http://www.cesm.ucar.edu/models/cesm1.0/cesm/cesm_doc/ug.pdf

CLM4 User's Guide

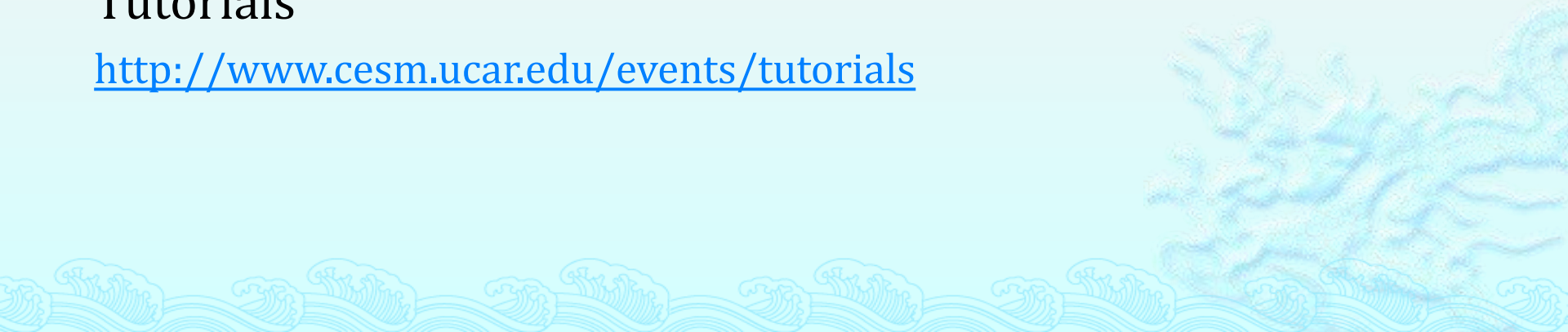
http://www.cesm.ucar.edu/models/cesm1.0/clm/models/lnd/clm/doc/UsersGuide/clm_ug.pdf

Technical Notes of CLM4

http://www.cesm.ucar.edu/models/ccsm4.0/clm/CLM4_Tech_Note.pdf

Tutorials

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



TACC Lonestar Machine

- ◆ Your Space

- ◆ /home Small space – 1GB

- ◆ /work Larger –250 GB

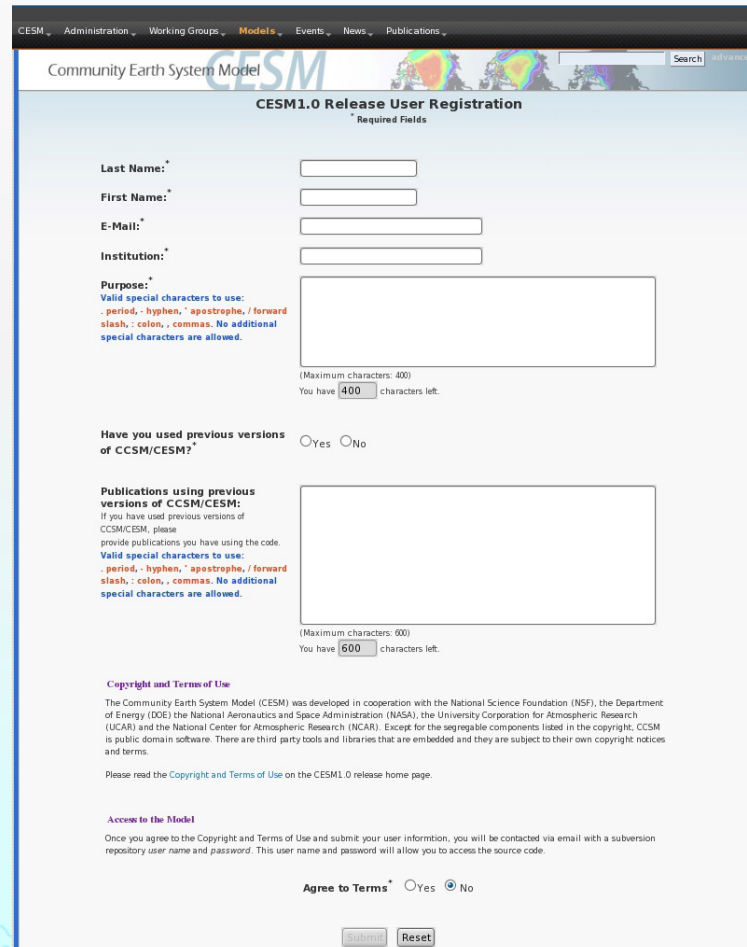
- ◆ /scratch Will be scratched if not used for a long time

- ◆ <http://www.tacc.utexas.edu/user-services/user-guides/lonestar-user-guide>

- ◆ Since Lonestar has not been tested and supported by NCAR to run CESM. Zhong-Feng Xu in Dr. Liang Yang's group has made efforts to modify relevant scripts in CESM to get it work. I'll send the package to you later.

Downloading the Code

- ◆ First you need to register as a user
- ◆ http://www.cesm.ucar.edu/models/cesm1.0/register/register_cesm1.0.cgi



The screenshot shows the 'CESM1.0 Release User Registration' page. At the top, there is a navigation bar with links for 'CESM', 'Administration', 'Working Groups', 'Models', 'Events', 'News', and 'Publications'. Below this is a header section with the 'Community Earth System Model' logo and a search bar. The main content area is titled 'CESM1.0 Release User Registration' and 'Required Fields'. It contains several form fields: 'Last Name', 'First Name', 'E-Mail', and 'Institution', each with a text input box. Below these is a 'Purpose' field with a large text area and a character count '(Maximum characters: 400) You have 400 characters left.' There is a section for 'Have you used previous versions of CCSM/CESM?' with radio buttons for 'Yes' and 'No'. Below that is a 'Publications using previous versions of CCSM/CESM:' section with another large text area and a character count '(Maximum characters: 600) You have 600 characters left.' At the bottom, there is a 'Copyright and Terms of Use' section with a paragraph of text and a link to the 'Copyright and Terms of Use' page. Below this is an 'Agree to Terms' section with radio buttons for 'Yes' and 'No'. At the very bottom, there are 'Submit' and 'Reset' buttons.

CESM Administration Working Groups Models Events News Publications

Community Earth System Model

CESM1.0 Release User Registration
Required Fields

Last Name:

First Name:

E-Mail:

Institution:

Purpose:
Valid special characters to use: period, hyphen, apostrophe, forward slash, colon, comma. No additional special characters are allowed.
(Maximum characters: 400)
You have 400 characters left.

Have you used previous versions of CCSM/CESM? ☐ Yes ☐ No

Publications using previous versions of CCSM/CESM:
If you have used previous versions of CCSM/CESM, please provide publications you have using the code.
Valid special characters to use: period, hyphen, apostrophe, forward slash, colon, comma. No additional special characters are allowed.

(Maximum characters: 600)
You have 600 characters left.

Copyright and Terms of Use
The Community Earth System Model (CESM) was developed in cooperation with the National Science Foundation (NSF), the Department of Energy (DOE) the National Aeronautics and Space Administration (NASA), the University Corporation for Atmospheric Research (UCAR) and the National Center for Atmospheric Research (NCAR). Except for the segregable components listed in the copyright, CCSM is public domain software. There are third party tools and libraries that are embedded and they are subject to their own copyright notices and terms.
Please read the Copyright and Terms of Use on the CESM1.0 release home page.

Access to the Model
Once you agree to the Copyright and Terms of Use and submit your user information, you will be contacted via email with a subversion repository user name and password. This user name and password will allow you to access the source code.

Agree to Terms ☐ Yes ☒ No

- ◆ Log on Lonestar
- ◆ Subversion has been installed on Lonestar
- ◆ **svn list** https://svn-ccsm-release.cgd.ucar.edu/model_versions
- ◆ **svn co** https://svn-ccsm-release.cgd.ucar.edu/model_versions/cesm1_0_3 ./cesm1_0_3

Creating an Input Directory

- ◆ The inputdata area contains all input data required to run the model
 - Location specified in the scripts by the \$DIN_LOC_ROOT_CSMDATA variable in file env_run.xml
 - On supported machines - inputdata directory already exists with all necessary data
 - On non-supported machines - need to create an inputdata root directory and add the data
 - Ideally this directory is shared by a group of users to save disc space
 - Initially inputdata directory contains no data – data is added on an asneeded Basis
- Do NOT download input data manually (ie. by using svn co)
- The script check_input_data is used to download input data
- Checks if the necessary data is already available in the inputdata directory
- Downloads only the data needed for a particular run (more later)
- Puts the data in the proper subdirectories of the input data directory tree and creates the proper subdirectories if necessary

4 Steps of Running a Case

◆ 1. Create a New Case

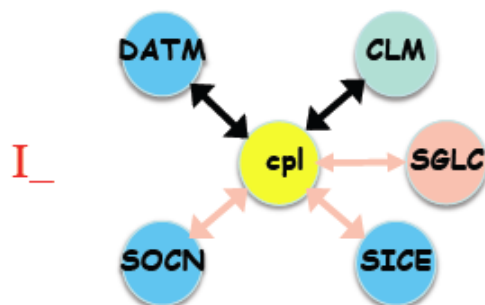
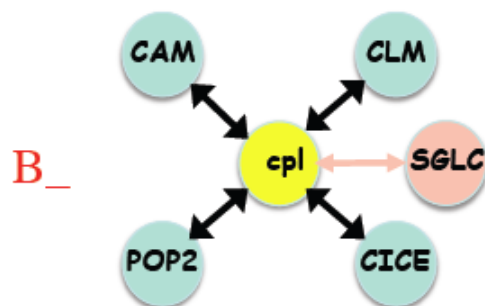
- ◆ Go to the script directory `/cesm1_0_3/scripts`
- ◆ `./create_newcase -case ${casename}`
- ◆ `-mach generic_linux_intel`
- ◆ `-res 1.9x2.5_1.9x2.5`
- ◆ `-din_loc_root_csmdata` your input directory
- ◆ `-scratch` where do you want to execute your case?
- ◆ `-Compset I`

To see all options, type

`./create_newcase -list`

More on CESM component sets

- The component and component models are basic element throughout CESM
- Plug and play of components (ie atm) with different component models (ie cam, datm, etc)
 - Done at case configuration time
 - Each component model has its own sub-directory tree under the model root



◆ Case directory after you run create_newcase

- **SourceMods** is a directory where case specific code modification can be placed
- **configure** is the script used in the next step, step (2)
- **env_*.xml** contain environment variables associate with the case (more on this later)
- **xmlchange** is a script that changes env variable values through a command line interface

```
CESM1_0/scripts> cd ~/cases/mycase1
```

```
cases/mycase1>ls -l
```

```
total 64
```

drwxr-xr-x	2	userx	ncar	8192	May 13 14:32	LockedFiles
-rw-r--r--	1	userx	ncar	10687	May 13 14:32	Macros.bluefire
drwxr-xr-x	2	userx	ncar	8192	May 13 14:32	README
-rw-r--r--	1	userx	ncar	66	May 13 14:32	README.case
drwxr-xr-x	9	userx	ncar	8192	May 13 14:32	SourceMods
drwxr-xr-x	4	userx	ncar	8192	May 13 14:32	Tools
-rwxr-xr-x	1	userx	ncar	9330	May 12 11:33	check_input_data
-rwxr-xr-x	1	userx	ncar	10092	May 12 11:33	configure
-rwxr-xr-x	1	userx	ncar	3085	May 12 11:33	create_production_test
-rw-r--r--	1	userx	ncar	4433	May 13 14:32	env_build.xml
-rw-r--r--	1	userx	ncar	5635	May 13 14:32	env_case.xml
-rw-r--r--	1	userx	ncar	7029	May 13 14:32	env_conf.xml
-rw-r--r--	1	userx	ncar	5915	May 13 14:32	env_mach_pes.xml
-rwxr-xr-x	1	userx	ncar	2199	May 13 14:32	env_mach_specifi
-rw-r--r--	1	userx	ncar	10466	May 13 14:32	env_run.xml
-rwxr-xr-x	1	userx	ncar	10388	May 12 11:33	xmlchange

SourceMods

configure

env files

xmlchange

❖ 2. Configure the Case

In the same directory

`./configure -case`

case directory after you run `configure -case`

- **configure** adds the **Buildconf/** directory and populates it
- **configure** generates **build, clean_build, run, and archive scripts**

```
cases/mycase1>ls -l
total 432
drwxr-xr-x  6 userx  ncar      8192 May 13 17:12 Buildconf
drwxr-xr-x  2 userx  ncar      8192 May 13 17:12 LockedFiles
-rw-r--r--  1 userx  ncar    10687 May 13 14:32 Macros.bluefire
drwxr-xr-x  2 userx  ncar      8192 May 13 14:32 README
-rw-r--r--  1 userx  ncar       66 May 13 14:32 README.case
drwxr-xr-x  9 userx  ncar      8192 May 13 14:32 SourceMods
drwxr-xr-x  4 userx  ncar      8192 May 13 14:32 Tools
-rwxr-xr-x  1 userx  ncar     9330 May 12 11:33 check_input_data
-rwxr-xr-x  1 userx  ncar    10092 May 12 11:33 configure
-rwxr-xr-x  1 userx  ncar     3085 May 12 11:33 create_production_test
-rw-r--r--  1 userx  ncar     4454 May 13 17:12 env_build.xml
-rw-r--r--  1 userx  ncar     5635 May 13 14:32 env_case.xml
-rw-r--r--  1 userx  ncar     7029 May 13 14:32 env_conf.xml
-rw-r--r--  1 userx  ncar       614 May 13 17:12 env_derived
-rw-r--r--  1 userx  ncar     5916 May 13 17:12 env_mach_pes.xml
-rwxr-xr-x  1 userx  ncar     2199 May 13 14:32 env_mach_specific
-rw-r--r--  1 userx  ncar    10466 May 13 14:32 env_run.xml
-rwxrwxr-x  1 userx  ncar       574 May 13 17:12 mycase1.bluefire.build
-rwxrwxr-x  1 userx  ncar       836 May 13 17:12 mycase1.bluefire.clean_build
-rwxrwxr-x  1 userx  ncar       802 May 13 17:12 mycase1.bluefire.l_archive
-rwxrwxr-x  1 userx  ncar     3938 May 13 17:12 mycase1.bluefire.run
-rwxr-xr-x  1 userx  ncar    10388 May 12 11:33 xmlchange
```

Buildconf

new scripts

◆ 3. Build the Case

./ \${case}.\${mach}.build

\$RUNDIR will be created

```
cases/mycase1>ls -l $RUNDIR
```

```
total 167552
```

```
-rw-r--r-- 1 userx ncar 9960 May 18 18:10 atm.bldlog.100518-180630.gz
-rw-r--r-- 1 userx ncar 2867 May 18 18:06 atm_in
-rw-r--r-- 1 userx ncar 133 May 18 18:06 atm_modelio.nml
-rw-r--r-- 1 userx ncar 1398 May 18 18:15 ccsn.bldlog.100518-180630.gz
-rwxr-xr-x 1 userx ncar 84463482 May 18 18:15 ccsn.exe
-rw-r--r-- 1 userx ncar 120 May 18 18:08 cpl.bldlog.100518-180630.gz
-rw-r--r-- 1 userx ncar 133 May 18 18:06 cpl_modelio.nml
-rw-r--r-- 1 userx ncar 50 May 18 18:06 drv_flds_in
-rw-r--r-- 1 userx ncar 2545 May 18 18:06 drv_in
-rw-r--r-- 1 userx ncar 589 May 18 18:14 glc.bldlog.100518-180630.gz
-rw-r--r-- 1 userx ncar 133 May 18 18:06 glc_modelio.nml
-rw-r--r-- 1 userx ncar 2569 May 18 18:12 ice.bldlog.100518-180630.gz
-rw-r--r-- 1 userx ncar 3279 May 18 18:06 ice_in
-rw-r--r-- 1 userx ncar 133 May 18 18:06 ice_modelio.nml
-rw-r--r-- 1 userx ncar 4591 May 18 18:11 lnd.bldlog.100518-180630.gz
-rw-r--r-- 1 userx ncar 1918 May 18 18:06 lnd_in
-rw-r--r-- 1 userx ncar 133 May 18 18:06 lnd_modelio.nml
-rw-r--r-- 1 userx ncar 3668 May 18 18:14 ocn.bldlog.100518-180630.gz
-rw-r--r-- 1 userx ncar 133 May 18 18:06 ocn_modelio.nml
-rw-r--r-- 1 userx ncar 14976 May 18 18:06 pop2_in
-rw-r--r-- 1 userx ncar 1882 May 18 18:06 seq_maps.rc
```

executable

.bld.log files

namelist files

◆ 4. Run the Case

- ◆ `qsub ${case}.${mach}.run`
- ◆ Use `qstat` to track the status of your case
- ◆ Use `qdel` to kill the job
- ◆ If the model runs successfully, you'll get history output in your run directory.

Namelist and Code Modification

- ◆ xml files you may want to modify in the case directory
- ◆ **env_conf.xml** variables specify various component information
 - ◆ RUN_TYPE, RUN_STARTDATE, RUN_REFCASE, RUN_REFDATE --defines initial conditions
- ◆ **env_build.xml** variables specify some build information
 - ◆ EXEROOT, RUNDIR
- ◆ **env_run.xml** variables specify run time information
 - ◆ STOP_OPTION, STOP_N
- ◆ **env_mach_pes.xml** variables specify the layout of components on hardware processors
- ◆ Suggested way to modify xml files
- ◆ Xmlchange -file [filename] -id [variable to be modified] --val [value of the variable]
- ◆ For example, xmlchange -file env_run.xml -id STOP_OPTION -val ndays

- ❖ Never change the code in the model directory!
- ❖ Find the corresponding file, copy it to the SourceMods in your case directory, modify it before the case was built.

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-rw-r--r--  1 userx  ncar       66 May 13 14:32 README.case
drwxr-xr-x  9 userx  ncar      8192 May 13 14:32 SourceMods
drwxr-xr-x  4 userx  ncar      8192 May 13 14:32 Tools
-rwxr-xr-x  1 userx  ncar     9330 May 12 11:33 check_input_data
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-rwxr-xr-x  1 userx  ncar     2199 May 13 14:32 env_mach_specifi
-rw-r--r--  1 userx  ncar    10466 May 13 14:32 env_run.xml
-rwxr-xr-x  1 userx  ncar    10388 May 12 11:33 xmlchange
```

SourceMods

configure

env files

xmlchange

Important Tips

- ◆ 1. Do not change any code in your model directory. Copy the code to the SourceMods in your case directory and modify it before the case is built.
- ◆ 2. Do not manually download the input data.
- ◆ 3. Always record what you've done to the case in README.case in your case directory.
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