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# How to run the Venus Community Atmosphere Model

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## **How to run the Venus Community Atmosphere Model (VenusCAM)**

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This technical report provides a specific example of running VenusCAM at the Livermore Computing facility. General information about Livermore Computing may be found at <http://computing.llnl.gov>.

The example discussed below was run from file `/g/g18/covey1/CAM/vcam.104.tar`. Appendices 1 and 2 are transcripts of interactive sessions on [sierra.llnl.gov](http://sierra.llnl.gov), showing (1) the directory structure after uncompressing `vcam.104.tar`, which demonstrate how the model is built; and (2) typical output. Note in particular the “master control script” `run*.csh` printed in Appendix 1. [Running this script sets in motion a train of events that write other scripts and then run them to build the executable file \(if necessary\), submit it to a job queue, and automatically submit restarts after execution.](#) The process begins with the command `mjobctl -c [jobnumber].csh` and continues until the command `mjobctl -c [jobnumber]` cancels the next restart.

This particular example builds and runs Case `cesm1_0_4_V_I_f09_f09-RSS0T42R10`. The case name indicates:

- Community Earth System Model version 1.0.4 (including CAM5 atmosphere)<sup>2</sup>
- Modified for Venus (V)
- Idealized (I) sub-gridscale physics invoked by the `ideal` option upon configuring CAM, bypassing Earth-centric radiation code, etc.
- Finite-volume (f) dynamical core with  $\text{lat} \times \text{lon}$  resolution  $1.25^\circ \times 0.9^\circ$
- Realistic (R) radiation transport with a simple surface (SS, i.e. with surface temperature set to a fixed value)—as opposed to idealized (I) forcing by relaxation to prescribed fields (idealized forcing method originally proposed by Held and Suarez 1994; application to Venus as specified by Lebonnois et al., in *Towards Understanding the Climate of Venus*, Springer 2013).
- Starting from rest (O)
- Topography (T) included
- 4<sup>th</sup>-order divergence damping with 2<sup>nd</sup>-order Laplacian sponge layer (42)
- Default coefficient for damping reduced by a factor of 10 (R10)—as opposed to retaining its standard (S) value

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<sup>2</sup> The latest version at time of writing is CESM1.2, with a User’s Guide and other documentation at [www2.cesm.ucar.edu](http://www2.cesm.ucar.edu). See [http://www.cesm.ucar.edu/models/cesm1.0/cesm/cesm1\\_tutorial.pdf](http://www.cesm.ucar.edu/models/cesm1.0/cesm/cesm1_tutorial.pdf) for brief documentation of CESM1.0.4 and <https://wiki.ucar.edu/display/etcam/Extraterrestrial+CAM> for general information on “extraterrestrial” versions of CAM, including MarsCAM and TitanCAM.

Two important points must be kept in mind about the realistic radiation transport option. First, although it implements an algorithm validated in the LMD model (Lebonnois et al. 2010) this option has not been extensively tested in CAM; so far it is not working as it should in the finite volume version, giving a vertical temperature profile that's significantly different from the profile obtained in the LMD model. Second, switching between realistic radiation transport and Held-Suarez relaxation is hard-coded in `$CCSMROOT/models/atm/cam/src/physics/cam/venus_mod.F90`. Here the logical variable `relaxation` is set to either `.true` or `.false.`, and if `relaxation = .false.` then logical variable `diurnal` controls whether or not a diurnal cycle is included. The factor-of-10 reduction of damping (`q.v.`) is also hard-coded; this occurs in `$CCSMROOT/models/atm/cam/src/dynamics/fv/cd_core.F90`, in the assignment statement defining `tau4`.

To be actually compiled and implemented, code changes must be made in subdirectories under `$CCSMROOT/models/atm/cam/src`, *not* in directory `$CCSMROOT/Venus_add/Modifs_to_models/cam/phyvenus/` (which simply stores copies of modified models in a convenient place). A good test of code changes would be switching back to Held-Suarez relaxation. The resulting output should replicate Case IOT42R10 in Figure 5(c) of Lebonnois et al. 2012 (*JGR 117*). After this check, the next logical step would be to test the realistic radiation transport version with the spectral-element version of the dynamical core. This version conserves angular momentum much better than others (Lauritzen et al., *JAMES 6*, 129-140, 2014).

(showing input before running VenusCAM)

```
sierra648@covey1}60: date
Mon Jan 12 13:27:47 PST 2015
sierra648@covey1}61: pwd
```

```
/g/g18/covey1/SebastienLebonnois/cesm1_0_4/Venus_add
```

Directory name SebastienLebonnois must be changed to CAM for Sebastien's scripts to work.

```
sierra648@covey1}62: ls -lF
```

```
total 36
drwx----- 2 covey1 covey1 4096 Jul 15 02:58 Machines/
drwx----- 6 covey1 covey1 4096 Sep 12 2012 Modifs_to_models/
-rw----- 1 covey1 covey1 1151 Aug 30 2012 README
drwx----- 2 covey1 covey1 4096 Jul 15 03:02 Runs_201209/
drwx----- 2 covey1 covey1 4096 Aug 30 2012 Utils/
-rw----- 1 covey1 covey1 753 Aug 30 2012 config_compsets_venus.xml
drwx----- 1 covey1 covey1 36 Jan 8 11:35 inputdata/
-rw----- 1 covey1 covey1 436 Aug 30 2012 readme-serieangmom.txt
-rwx----- 1 covey1 covey1 5531 Jul 15 03:03 run_RSS0T.csh*
```

Then the highlighted path = \$CCSMROOT.

**This is the “master-control script” that carries out the steps in the Quick Start procedure given in Chapter 1 of the CESM User’s Guide. See below for details.**

```
sierra648@covey1}63: cat README
```

Machines: the files in this directory should be put in the scripts/ccsm\_utils/Machines directory, in the CESM root directory (ONLY if you plan to run on sierra).

Modifs\_to\_models: all modifications to the distribution are put here:

It is best to check the differences with new version before copying !

- files in phyvenus should go in atm/cam/src/physics/cam/
- files in fv should go in atm/cam/src/dynamics/fv/
- files in control should go in atm/cam/src/control/
- namelist\_definition.xml (in atm/cam/bld/namelist\_files/)
- shr\_const\_mod.F90 (in csm\_share/shr/)
- seq\_infodata\_mod.F90 ( in drv/shr/)
- cpl.template (in drv/bld/)
- files in clm should go in lnd/clm/src/...
- clm.cpl7.template (in lnd/clm/bld/)

inputdata:

For no topography ideal runs, use

(showing input before running VenusCAM)

- starting point : ideal.cam2.i.0030-09-23-00000.nc
  - topo file : venusnotopo.nc
- For topography ideal runs, use
- starting point : Test01.cam2.i.0095-06-01-00000.nc
  - topo file : venusreversetopo.nc
- For topo rtss (ideal, but with relaxation=.False. in venus\_mod.F90) runs, use
- starting point : DC03.cam2.i.0106-12-19-00000.nc
  - topo file : venusreversetopo.nc

```
sierra648{covey1}64: file run_RSS0T.csh
run_RSS0T.csh: C shell script text executable
sierra648{covey1}65: more run_RSS0T.csh
#!/bin/csh -f
#####
## P. Caldwell 7/20/10
# This script copies the CESM1 documentation "quickstart"
#
## Adaptation for Venus: S. Lebonnois, 02/2012
#
# Configuration for Venus CAM
#
#####

source /usr/global/tools/dotkit/init.csh
#use mvapich2-pgi-1.5 || echo "use mvapich2-pgi-1.5 FAILED" && exit 1
use mvapich2-pgi-1.7 || echo "use mvapich2-pgi-1.7 FAILED" && exit 1
use pgi-11.1 || echo "use pgi-11.1 FAILED" && exit 1
#use pgi-9.0.4 FAILS FOR cam5_1_15 and up.

#=====
# SET ENVIRO VARS
#=====
setenv LOGNAME `whoami`

#-----
# TO BE ADJUSTED BY USER:
```

(showing input before running VenusCAM)

```
#-----  
  
setenv RUN RSS0T42R10  
setenv CCSMROOT ${HOME}/CAM/cesm1_0_4  
setenv EXEROOT /p/lscratchd/${LOGNAME}/VENUS-CESM4/exeroot-${RUN}  
setenv VENUSCESM /p/lscratchd/${LOGNAME}/VENUS-CESM4  
  
setenv MACH prototype_sierra  
setenv COMPSET V_I # Venus cam  
setenv VENUSCASE ideal_phys # adiab or ideal_phys  
#setenv RES 0.9x1.25  
setenv RES f09_f09  
#-----  
  
# Automated  
  
setenv VER `basename $CCSMROOT`  
  
setenv CASE ${VER}_${COMPSET}_$RES-$RUN  
setenv CASEROOT $VENUSCESM/$CASE  
  
setenv CSMDATA $CCSMROOT/Venus_add/inputdata  
  
#NEEDED FOR MAKING DEBUGGER OUTPUT MAKE SENSE:  
#setenv F_OPTIMIZATION_OVERRIDE "-g -Mbounds -Mchkfstk -Mdclchk -O0"  
  
# Case adiab or ideal_phys for Venus  
cp -f $CCSMROOT/Venus_add/Modifs_to_models/drv.bld.cpl.template-$VENUSCASE $CCSMROOT/models/drv/bld/cpl.template
```

(showing input before running VenusCAM)

```
#=====
#CREATE WORK DIRECTORY AND POPULATE W/ NEEDED FILES
#=====
```

```
cd $CCSMROOT/scripts
```

```
create_newcase -case $CASEROOT \
  -mach $MACH \
  -compset $COMPSET \
  -compset_file $CCSMROOT/Venus_add/config_compsets_venus.xml \
  -res $RES
```

→ For CESM User's Guide, this creates files that will "configure the case."

```
cd $CASEROOT
```

→ For CESM User's Guide, this directory is "where the case will be created." In this example, it is /p/lscratchd/covey1/VENUS-CESM4/cesm1\_0\_4\_V\_I\_f09\_f09-RSS0T42R10/. The CESM User's Guide says this directory "is normally NOT the same as" either \$EXEROOT ("the executable directory") or \$RUNDIR ("the directory where CESM actually runs . . . normally set to \$EXEROOT/run.") In this example, \$EXEROOT = /p/lscratchd/covey1/VENUS-CESM4/exeroot-RSS0T42R10.

```
#=====
#SET CAM OPTIONS:
#=====
```

```
# TO BE ADJUSTED BY USER: → Fortran NAMELIST input parameters are set below. Parameters
#===== that are not mentioned below assume their default values (listed
in $CCSMROOT/models/atm/cam/bld/namelist_files/ together with
definitions of all NAMELIST parameters).
```

```
cat <<EOF >! user_nl_cam
&camexp
ncdata='$CSMDATA/etatinitT_c.cam2.i.0001.nc'
bnd_topo='$CSMDATA/atm/cam/topo/venusreversetopo.nc'
venus_ksi='$CSMDATA/atm/ksi_global_theo_cont4.txt'
venus_vis='$CSMDATA/atm/dataDCrisp1.dat'
iradsw=-5
```



(showing input before running VenusCAM)

```
nlvdry=49
inithist='ENDOFRUN'
div24del2flag=42
nhtfrq=-280
mfilt=10
nsplit=4
nsptrac=2
fexcl1='PSL','TMQ','US','VS'
fincl1='DTCORE'
/
EOF
## pas passes dans drv_in ... :
#start_ymd=01061219
#ref_ymd=00970518
#ref_tod=00000

#=====
#SET CLM OPTIONS:
#=====
# TO BE ADJUSTED BY USER:
#=====
cat <<EOF >! user_nl_clm
&clmexp
hist_nhtfrq=-2800
hist_mfilt=1
finidat=' '
/
EOF

#=====
#CUSTOMIZE THE CASE:
#=====
# TO BE ADJUSTED BY USER:
#=====
#Note env_run stuff can be done after configure, but env_conf
#stuff does need to be done before configure.
#DON'T ARCHIVE
```

(showing input before running VenusCAM)

```
./xmlchange -file env_run.xml -id DOUT_S -val FALSE

#DON'T RESUBMIT
./xmlchange -file env_run.xml -id RESUBMIT -val 5
#MODIFY PE LAYOUT
./xmlchange -file env_mach_pes.xml -id NTASKS_ATM -val 192
./xmlchange -file env_mach_pes.xml -id NTASKS_LND -val 192
./xmlchange -file env_mach_pes.xml -id NTASKS_ICE -val 192
./xmlchange -file env_mach_pes.xml -id NTASKS_OCN -val 192
./xmlchange -file env_mach_pes.xml -id NTASKS_GLC -val 192
./xmlchange -file env_mach_pes.xml -id NTASKS_CPL -val 192
#STOP TIME FOR ALL OF CCSM.
./xmlchange -file env_run.xml -id STOP_OPTION -val ndays
./xmlchange -file env_run.xml -id STOP_N -val 350
#RESTART FREQUENCY
./xmlchange -file env_run.xml -id REST_OPTION -val ndays
./xmlchange -file env_run.xml -id REST_N -val 350
# DETERMINING DTIME=86400/ATM_NCPL
./xmlchange -file env_run.xml -id ATM_NCPL -val 144
# LOCATION OF THE INPUT FILES
./xmlchange -file env_run.xml -id DIN_LOC_ROOT_CSMDATA -val $CSMDATA
./xmlchange -file env_run.xml -id DIN_LOC_ROOT_CLMQUIAN -val $CSMDATA
# LOCATION OF THE LIBRARIES AND RUN
./xmlchange -file env_build.xml -id EXEROOT -val $EXEROOT
```

```
#=====
```

```
#CONFIGURE
```

```
#=====
```

```
echo 'Configuring'
```

```
configure -case
```

This script (which the CESM User's Guide calls `ccsm_setup`) creates the “build script” and the “run script,” which are invoked below.

```
#=====
```

```
#ARTIFICIALLY MODIFYING THE FILES NEEDED
```

```
#=====
```

```
# TO BE ADJUSTED BY USER:
```

(showing input before running VenusCAM)

```
#=====
#configure creates these files with lots of stuff not needed for Venus...
#they are adjusted here.

rm -f $CASEROOT/Buildconf/cam.input_data_list
cat <<EOF >! $CASEROOT/Buildconf/cam.input_data_list
ncdata = $CSMDATA/etatinitT_c.cam2.i.0001.nc
bnd_topo = $CSMDATA/atm/cam/topo/venusreversetopo.nc
/
EOF

#=====
#BUILD EXECUTABLE
#=====
echo 'Building'
$CASE.$MACH.build

#=====
#CHANGES TO THE MSUB OPTIONS
#=====
cat $CASE.$MACH.run | sed "s/walltime=12:00:00/walltime=04:00:00/g" > run.tmp
#cat run.tmp | sed "s/pbatch/pdebug/g" > run.tmp2
mv run.tmp $CASE.$MACH.run

#=====
#RUN THE CASE
#=====
echo 'Running'
```

At LC, this “run script” is a Moab job-control script containing #MSUB options that specify time limits, resubmission, parallel-processing options, etc. In this example, the name of this script is cesm1\_0\_4\_V\_I\_f09\_f09-RSS0T42R10.prototype\_sierra.run.

```
msub $CASE.$MACH.run
```

sierra648{covey1}66:

(showing output after running VenusCAM)

sierra6{covey1}158: date

Thu Jul 16 11:22:53 PDT 2015

sierra6{covey1}159: pwd

/p/lscratchd/covey1/VENUS-CESM4/exeroot-RSS0T42R10/run [= \$RUNDIR] NOTE: Contents of /p/lscratchd/covey1/VENUS-CESM4/are also

sierra6{covey1}160: ls -ltrF  
total 25387100  
-rw----- 1 covey1 covey1 150 Jul 15 15:13 [cpl.bldlog.150715-150616.gz](#)  
-rw----- 1 covey1 covey1 6116 Jul 15 15:15 [atm.bldlog.150715-150616.gz](#)  
-rw----- 1 covey1 covey1 2790 Jul 15 15:16 [lnd.bldlog.150715-150616.gz](#)  
-rw----- 1 covey1 covey1 1732 Jul 15 15:17 [ice.bldlog.150715-150616.gz](#)  
-rw----- 1 covey1 covey1 568 Jul 15 15:17 [ocn.bldlog.150715-150616.gz](#)  
-rw----- 1 covey1 covey1 532 Jul 15 15:17 [glc.bldlog.150715-150616.gz](#)  
-rw----- 1 covey1 covey1 1121 Jul 15 15:17 [ccsm.bldlog.150715-150616.gz](#)  
-rwx----- 1 covey1 covey1 171493319 Jul 15 15:17 [ccsm.exe\\*](#)  
-rw----- 1 covey1 covey1 1884512320 Jul 15 16:09 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0001-01-01-00000.nc](#)  
-rw----- 1 covey1 covey1 1884512320 Jul 15 17:05 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0001-04-27-57600.nc](#)  
-rw----- 1 covey1 covey1 1884512320 Jul 15 18:01 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0001-08-22-28800.nc](#)  
-rw----- 1 covey1 covey1 316176852 Jul 15 18:06 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.r.0001-12-17-00000.nc](#)  
-rw----- 1 covey1 covey1 88820256 Jul 15 18:06 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.i.0001-12-17-00000.nc](#)  
-rw----- 1 covey1 covey1 9101 Jul 15 18:06 [cpl.log.150715-151755.gz](#)  
-rw----- 1 covey1 covey1 16849916 Jul 15 18:06 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cpl.r.0001-12-17-00000.nc](#)  
-rw----- 1 covey1 covey1 26989524 Jul 15 18:06 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.rs.0001-12-17-00000.nc](#)  
-rw----- 1 covey1 covey1 10137 Jul 15 18:06 [ccsm.log.150715-151755.gz](#)  
-rw----- 1 covey1 covey1 1727970 Jul 15 18:06 [atm.log.150715-151755.gz](#)  
-rw----- 1 covey1 covey1 1884512320 Jul 15 18:58 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0001-12-17-00000.nc](#)  
-rw----- 1 covey1 covey1 1884512324 Jul 15 19:54 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0002-04-12-57600.nc](#)  
-rw----- 1 covey1 covey1 1884512324 Jul 15 20:50 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0002-08-07-28800.nc](#)  
-rw----- 1 covey1 covey1 316176852 Jul 15 20:56 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.r.0002-12-02-00000.nc](#)  
-rw----- 1 covey1 covey1 88820260 Jul 15 20:56 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.i.0002-12-02-00000.nc](#)  
-rw----- 1 covey1 covey1 9074 Jul 15 20:56 [cpl.log.150715-180709.gz](#)  
-rw----- 1 covey1 covey1 16849916 Jul 15 20:56 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cpl.r.0002-12-02-00000.nc](#)  
-rw----- 1 covey1 covey1 26989524 Jul 15 20:56 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.rs.0002-12-02-00000.nc](#)  
-rw----- 1 covey1 covey1 9146 Jul 15 20:56 [ccsm.log.150715-180709.gz](#)  
-rw----- 1 covey1 covey1 1714225 Jul 15 20:56 [atm.log.150715-180709.gz](#)  
-rw----- 1 covey1 covey1 1884512324 Jul 15 22:07 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0002-12-02-00000.nc](#)  
-rw----- 1 covey1 covey1 1884512324 Jul 15 23:23 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0003-03-28-57600.nc](#)  
-rw----- 1 covey1 covey1 1884512324 Jul 16 00:39 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0003-07-23-28800.nc](#)  
-rw----- 1 covey1 covey1 316176852 Jul 16 00:47 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.r.0003-11-17-00000.nc](#)  
-rw----- 1 covey1 covey1 88820260 Jul 16 00:47 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.i.0003-11-17-00000.nc](#)  
-rw----- 1 covey1 covey1 9310 Jul 16 00:47 [cpl.log.150715-205709.gz](#)  
-rw----- 1 covey1 covey1 16849916 Jul 16 00:47 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cpl.r.0003-11-17-00000.nc](#)  
-rw----- 1 covey1 covey1 26989524 Jul 16 00:47 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.rs.0003-11-17-00000.nc](#)  
-rw----- 1 covey1 covey1 9087 Jul 16 00:47 [ccsm.log.150715-205709.gz](#)  
-rw----- 1 covey1 covey1 1715972 Jul 16 00:47 [atm.log.150715-205709.gz](#)  
-rw----- 1 covey1 covey1 1884512324 Jul 16 04:45 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0003-11-17-00000.nc](#)  
-rw----- 1 covey1 covey1 1884512324 Jul 16 05:42 [cesm1\\_0\\_4\\_V\\_I\\_f09\\_f09-RSS0T42R10.cam2.h0.0004-03-13-57600.nc](#)

(showing output after running VenusCAM)

```
-rw----- 1 covey1 covey1 1884512324 Jul 16 06:38 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.h0.0004-07-08-28800.nc
-rw----- 1 covey1 covey1 316176852 Jul 16 06:44 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.r.0004-11-02-00000.nc
-rw----- 1 covey1 covey1 88820260 Jul 16 06:44 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.i.0004-11-02-00000.nc
-rw----- 1 covey1 covey1 9131 Jul 16 06:44 cpl.log.150716-035415.gz
-rw----- 1 covey1 covey1 16849916 Jul 16 06:44 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cpl.r.0004-11-02-00000.nc
-rw----- 1 covey1 covey1 26989524 Jul 16 06:44 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.rs.0004-11-02-00000.nc
-rw----- 1 covey1 covey1 9174 Jul 16 06:44 ccsm.log.150716-035415.gz
-rw----- 1 covey1 covey1 1712173 Jul 16 06:44 atm.log.150716-035415.gz [ There are 5 sets of 3 log files, one set for each run
-rw----- 1 covey1 covey1 1242 Jul 16 06:44 seq_maps.rc of VenusCAM (the model will normally resubmit itself).
-rw----- 1 covey1 covey1 197 Jul 16 06:44 ocn_modelio.nml File names are component.log.yymmdd-hhmmss, where
-rw----- 1 covey1 covey1 197 Jul 16 06:44 lnd_modelio.nml component = atm, ccsm or cpl. Each of the cpl.log.*
-rw----- 1 covey1 covey1 1817 Jul 16 06:44 lnd_in files ends with "SUCCESSFUL TERMINATION OF CPL7-CCSM."]
-rw----- 1 covey1 covey1 197 Jul 16 06:44 ice_modelio.nml
-rw----- 1 covey1 covey1 2337 Jul 16 06:44 ice_in [ There are 5 sets of 3 history ("h0") files, one set for
-rw----- 1 covey1 covey1 197 Jul 16 06:44 glc_modelio.nml each run of VenusCAM, plus a final short history file
-rw----- 1 covey1 covey1 2585 Jul 16 06:44 drv_in at the end of the last run. Each history file except
-rw----- 1 covey1 covey1 50 Jul 16 06:44 drv_fds_in for the final short ones span 117 days (= 1 Venus solar
-rw----- 1 covey1 covey1 307 Jul 16 06:44 docn_ocn_in day). The final short history file contains just one
-rw----- 1 covey1 covey1 63 Jul 16 06:44 docn_in timepoint. There are also 5 restart (*cam2.r*) files
-rw----- 1 covey1 covey1 1884 Jul 16 06:44 docn.stream.txt and 5 initialization (*cam2.i*) files. All of these
-rw----- 1 covey1 covey1 197 Jul 16 06:44 cpl_modelio.nml files are in netCDF format.]
-rw----- 1 covey1 covey1 197 Jul 16 06:44 atm_modelio.nml |
-rw----- 1 covey1 covey1 4147 Jul 16 06:44 atm_in V
-rw----- 1 covey1 covey1 1884512324 Jul 16 07:36 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.h0.0004-11-02-00000.nc
-rw----- 1 covey1 covey1 1884512324 Jul 16 08:32 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.h0.0005-02-26-57600.nc
-rw----- 1 covey1 covey1 1884512324 Jul 16 09:28 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.h0.0005-06-23-28800.nc
-rw----- 1 covey1 covey1 376 Jul 16 09:34 rpointer.atm
-rw----- 1 covey1 covey1 316176852 Jul 16 09:34 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.r.0005-10-18-00000.nc
-rw----- 1 covey1 covey1 88820260 Jul 16 09:34 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.i.0005-10-18-00000.nc
-rw----- 1 covey1 covey1 188472440 Jul 16 09:34 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.h0.0005-10-18-00000.nc
-rw----- 1 covey1 covey1 257 Jul 16 09:34 rpointer.drv
-rw----- 1 covey1 covey1 26989524 Jul 16 09:34 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cam2.rs.0005-10-18-00000.nc
drwx----- 3 covey1 covey1 30208 Jul 16 09:34 timing/
-rw----- 1 covey1 covey1 9384 Jul 16 09:34 cpl.log.150716-064442.gz
-rw----- 1 covey1 covey1 16849916 Jul 16 09:34 cesm1_0_4_V_I_f09_f09-RSS0T42R10.cpl.r.0005-10-18-00000.nc
-rw----- 1 covey1 covey1 9365 Jul 16 09:34 ccsm.log.150716-064442.gz
-rw----- 1 covey1 covey1 1702496 Jul 16 09:34 atm.log.150716-064442.gz
sierra6{covey1}161:
```

(showing output after running VenusCAM)

```
sierra1626{covey1}179: date
Wed Oct 28 17:27:10 PDT 2015
sierra1626{covey1}180: pwd
/p/lscratchd/covey1/VENUS-CESM4/cesm1_0_4_V_I_f09_f09-RSS0T42R10 [= $CASEROOT]
sierra1626{covey1}181: ls -ltrF
total 253
-rwx----- 1 covey1 covey1 10726 Jul 20 2012 xmlchange*
-rwx----- 1 covey1 covey1 3085 Jul 20 2012 create_production_test*
-rwx----- 1 covey1 covey1 10563 Jul 20 2012 configure*
-rwx----- 1 covey1 covey1 9330 Jul 20 2012 check_input_data*
-rwx----- 1 covey1 covey1 845 Jul 20 2012 check_case*
drwx----- 4 covey1 covey1 6656 Jul 15 15:06 Tools/
drwx----- 9 covey1 covey1 5632 Jul 15 15:06 SourceMods/
-rwx----- 1 covey1 covey1 114 Jul 15 15:06 env_mach_specific*
-rw----- 1 covey1 covey1 6543 Jul 15 15:06 env_conf.xml
-rw----- 1 covey1 covey1 5639 Jul 15 15:06 env_case.xml
-rw----- 1 covey1 covey1 213 Jul 15 15:06 README.case
drwx----- 2 covey1 covey1 4608 Jul 15 15:06 README/
-rw----- 1 covey1 covey1 7448 Jul 15 15:06 Macros.prototype_sierra
-rwxrwxr-x 1 covey1 covey1 214 Jul 15 15:06 cesm1_0_4_V_I_f09_f09-RSS0T42R10.prototype_sierra.submit*
-rwxrwxr-x 1 covey1 covey1 836 Jul 15 15:06 cesm1_0_4_V_I_f09_f09-RSS0T42R10.prototype_sierra.clean_build*
-rwxrwxr-x 1 covey1 covey1 677 Jul 15 15:06 cesm1_0_4_V_I_f09_f09-RSS0T42R10.prototype_sierra.build*
drwx----- 2 covey1 covey1 5632 Jul 15 15:06 CaseDocs/
-rw----- 1 covey1 covey1 53 Oct 26 13:53 user_nl_clm
-rw----- 1 covey1 covey1 499 Oct 26 13:53 user_nl_cam
-rw----- 1 covey1 covey1 5929 Oct 26 13:53 env_mach_pes.xml
-rw----- 1 covey1 covey1 4122 Oct 26 13:54 cesm1_0_4_V_I_f09_f09-RSS0T42R10.prototype_sierra.run
drwx----- 2 covey1 covey1 5632 Oct 26 13:54 LockedFiles/
drwx----- 3 covey1 covey1 6656 Oct 27 07:34 logs/
-rw----- 1 covey1 covey1 10727 Oct 27 07:34 env_run.xml
drwx----- 2 covey1 covey1 5632 Oct 27 07:34 timing/
-rw----- 1 covey1 covey1 3865 Oct 27 07:35 env_build.xml
-rw----- 1 covey1 covey1 614 Oct 27 07:35 env_derived
drwx----- 5 covey1 covey1 6656 Oct 27 07:35 Buildconf/
-rw----- 1 covey1 covey1 1023 Oct 27 07:35 CaseStatus
-rw----- 1 covey1 covey1 106730 Oct 27 07:35 cesm1_0_4_V_I_f09_f09-RSS0T42R10.out
-rw----- 1 covey1 covey1 1796 Oct 27 10:18 cesm1_0_4_V_I_f09_f09-RSS0T42R10.err
sierra1626{covey1}182:
.
.
.
```

↑ This is the Moab job-control script, including the key "srun" command near its end (see next page).

(showing output after running VenusCAM)

```
sierra1626@covey1:184: tail cesm1_0_4_V_I_f09_f09-RSS0T42R10.prototype_sierra.run
  wait
else
  ./ccsm.exe >&! ccsml.log.$LID
endif
echo "Wed Jul 15 15:06:15 PDT 2015 -- CSM EXECUTION HAS FINISHED"
```

```
cd $CASEROOT
./Tools/ccsm_postrun.csh || exit 1
```

```
sierra1626@covey1:185:
```