

**## b.day4.001**

set case=b.day4.001

**## Create new case**

cd /glade/p/cesm/tutorial/cesm1\_2\_2.tutorial/scripts

./create\_newcase -case ~/cases/\${case} -res T31\_gx3v7 -mach yellowstone -compset B\_1850\_CN

**## Invoke cesm\_setup**

cd ~/cases/\${case}

./cesm\_setup

**# edit user\_nl\_cam and add the variables**

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

fincl3='T:A','Q:A','U:A','V:A'

nhtfrq=0,-3,-24

mfilt=1,8,1

**# Change length of the run**

./xmlchange STOP\_OPTION=nmonths

./xmlchange STOP\_N=1

**## Build and submit the job**

./\${case}.build

./\${case}.submit

**## Look at the output**

cd /glade/scratch/\$USER/archive/\${case}

There should be:

b.day4.001.cam.h0.0001-01.nc

b.day4.001.cam.h1.0001-01-01-00000.nc

...

b.day4.001.cam.h1.0001-02-01-00000.nc

...

b.day4.001.cam.h2.0001-01-01-00000.nc

...

b.day4.001.cam.h2.0001-02-01-00000.nc

You can use `ncdump/ncview` to look at the files

Differences between the files:

h0 => monthly mean

h1 => instantaneous values

h2 => daily means

Look at the differences between the attribute in h1 and h2.

h2 attribute: `cell_methods = "time: mean"` which means it is `mean`

h1: there is `no cell methods attribute` which means it is `instantaneous`

## ## b.day4.002

```
set case=b.day4.002
```

## ## Create new case

```
cd /glade/p/cesm/tutorial/cesm1_2_2.tutorial/scripts  
./create_newcase -case ~/cases/${case} -res T31_gx3v7 -mach yellowstone -compset B_1850_CN
```

## ## Invoke cesm\_setup

```
cd ~/cases/${case}  
./cesm_setup
```

## ## Locate the subroutine containing zlnd and copy it into SourceMods/src.clm/

```
cp /glade/p/cesm/tutorial/cesm1_2_2.tutorial/models/ind/clm/src/clm4_0/main/clm_varcon.F90  
SourceMods/src.clm/
```

## ## Make your source modifications.

Edit [SourceMods/src.clm/clm\\_varcon.F90](#)

Change zlnd from 0.01\_r8 to 0.02\_r8

In the code:

```
real(r8) :: zlnd = 0.02_r8    !Roughness length for soil [m]
```

## ## set the length of the run to 1 month

```
/xmlchange STOP_OPTION=nmonths
```

```
./xmlchange STOP_N=1
```

## ## Build and submit

```
./${case}.build
```

```
./${case}.submit
```

## ## Tools to look at output

Output is in: [/glade/scratch/\\$USER/archive/\\$case](#)

Use ncdiff to look at the difference between the 2 runs.

```
ncdiff /glade/scratch/$user/archive/b.day4.002/ind/hist/b.day4.002.clm2.h0.0001-01.nc
```

```
/glade/scratch/$user/archive/b.day4.001/ind/hist/b.day4.001.clm2.h0.0001-01.nc diff.nc
```

Look at snow cover with ncview

```
ncview diff.nc
```

## ## b.day4.003

```
set case=b.day4.003
```

## ## create new case

```
cd /glade/p/cesm/tutorial/cesm1_2_2.tutorial/scripts  
./create_newcase -case ~/cases/${case} -res T31_gx3v7 -mach yellowstone -compset B_1850_CN
```

## ## Invoke cesm\_setup

```
cd ~/cases/${case}  
./cesm_setup
```

## ## locate the subroutine where you can add T750 and copy it into SourceMods/src.cam/

```
cp /glade/p/cesm/tutorial/cesm1_2_2.tutorial/models/atm/cam/src/physics/cam/cam_diagnostics.F90  
SourceMods/src.cam/
```

## ## Make your source modifications.

Edit [SourceMods/src.cam/cam\\_diagnostics.F90](#)

add code to output T750 (use T850 as a clue).

Basically you need to:

- add the field T750 to the history files
  - add the line (around line 236):

```
call addfld ('T750 ', 'K ', 1, 'A', 'Temperature at 850 mbar pressure surface', phys_decomp)
```
- interpolate on 750mb level
  - add the following lines (around line 1002)

```
if (hist_fld_active('T750')) then  
    call vertinterp(ncol, pcols, pver, state%pmid, 75000._r8, state%t, p_surf)  
end if
```
- output the field T750
  - add the following an outfld call just after the interpolation (previous step)

```
if (hist_fld_active('T750')) then  
    call vertinterp(ncol, pcols, pver, state%pmid, 75000._r8, state%t, p_surf)  
    call outfld('T750 ', p_surf, pcols, lchnk )  
end if
```

## ## edit user\_nl\_cam and add the variable T750

```
fincl2='T750', 'T500'  
nhtfrq = 0,-24
```

## ## set the length of the run to 1 month

```
./xmlchange STOP_OPTION=nmonths  
./xmlchange STOP_N=1
```

## ## Build and submit

```
./${case}.build  
./${case}.submit
```

## ## Look at output

When the run is completed, look at the output.

Output is in: [/glade/scratch/\\$USER/archive/\\$case](#)

Check the CAM history output

- check the field T750 and T500 are in the file h1
- create a file with the difference between T750-T500

For instance, you can use:

```
ncap2 -s 'T750_minus_T500=T750-T500' b.day4.003.cam.h1.0001-01-01-0000.nc T750-T500.nc
```

Look at the difference with ncview.