

terminal emulator runs programming language bash

$\sim \%$ = prompt for commands

L or clear = clear

$\sim \%$ echo

C = exit running command

pwd = print working directory (where you are) \rightarrow pwd -P (where you actually are)

ls = list

cd = change directory \rightarrow cd .. goes backwards

mkdir = create a directory

\hookrightarrow cd of album name

touch = make a file

cat = read file

echo "text" > file \rightarrow adds text to file (can be new)

-l = extended file info

\hookrightarrow -t sorts by date

man = info about command

wc = word count

| = takes output of first command and makes it input of the second

ls > new-file \rightarrow put names of files in new file

*.jpg only selects that type of file

mv = moves file or renames it

cp = copy file

rm = remove file

\hookrightarrow rm -rf = remove directory

$$\vec{x}_{ijk}^t = \{ \begin{matrix} \text{E/W wind} \\ \text{N/S wind} \\ \text{humidity} \\ \text{temperature} \\ \text{surface pressure} \end{matrix} \}$$

$$\text{climate model: } \vec{x}_{ijk}^t \rightarrow \vec{x}_{ijk}^{t+\Delta t} \rightarrow \vec{x}_{ijk}^{t+2\Delta t}$$

cd /N/project/orbienta_Startup/

ls

Set up simulation

Step 0:

```
cd slate_mitshort  
cd regcm_tutorial  
mkdir btrn_30km  
cd btrn_30km  
cp namelist file (ex. btrn_001.in) get classification  
gedit btrn_001.in → to edit text file (grid cells, lat/long, etc.)  
mkdir input  
mkdir output
```

do not want wind going through multiple grid boxes,
at once → shrink grid → do boxes and shrink number → do 1/3 and 1/2, round numbers
So maybe do $ds=15$, $dt=30$ or 36

PREPARE SURFACE boundary conditions

Step 1:

```
module use /N/slate/obrienta/software/quartz/modulefiles  
module load REGCM → loads software  
terrain btrn_001.in  
ls input  
module load ncview  
ncview input/btrn_30km_DOMAIN000.nc zeros  
look at topo to ensure map looks reasonable  
sst btrn_001.in  
ls input  
ncview input/btrn_30km_SST.nc  
look at SST to ensure map looks reasonable
```

Shortcuts/General:

ctrl+shift+v = paste
^c = exit running command
gedit .bashrc → add shortcuts
alias ls="ls --color"

PREPARE Lateral boundary conditions

Step 2:

```
ibrc btrn_001.in
```

OPEN BR200 Login or Terminal

```
cd slate_mitshort  
cd regcm_tutorial  
cd btrn_30km  
module use /N/slate/obrienta/software/quartz/modulefiles  
module load REGCM  
Salloc -N1 -n 64 -t 30 -A R00387 -P general  
srun -n 64 regcmMPI btrn_001.in  
exit → free up queue
```

run the model

Step 3:

```
open interactive Job  
cd slate_mitshort  
cd Regcm_tutorial  
cd btrn_30km  
module use /N/slate/obrienta/software/quartz/modulefiles  
module load REGCM → loads software  
export OMP_NUM_THREADS=8 → not sure if this works  
regcm btrn_001.in
```

Converting atmosphere file to height:

```
cp -R output postprocessing  
cd postprocessing  
pwd → tells you where you are  
cd .. → use output from pwd  
cp sigma2z.in postprocessing
```

In ProgRad200: → use output from pwd

```
cd postprocessing  
salloc -N1 -n1 -t 60 -k 200389 -p debug --mem=16GB  
srun -n 1 /N/late/obrienta/REDCM_development/RegCM/min/sigma2z sigma2z.in *ATM*.nc
```

functions:

```
import numpy as np  
val = np.cos(np.pi)
```

input →  → output
np.pi
cos(pi)

ds.v. differentiate
ds.u. differentiate

finite difference theorem

$$\frac{df}{dx} = \lim_{\Delta x \rightarrow 0} \frac{f(x + \Delta x) - f(x)}{\Delta x}$$

Recipe
dish

```
#define a new function  
def linear2d(x,y,a,b):  
    return a*x + b*y  
z = linear2d(5,4,0,1)
```

$z = ax + by$
 x_5 →  → $z = 0 \cdot 5 + 1 \cdot 4$
 y_4 →  → $z = 4$
 a_0 → 
 b_1 → 

*100% np update before
calculations *