

Installing RegCM4

G. Giuliani

ICTP - Earth System Physics Section

Advanced School on Regional Climate Modeling
over South America
February 15-19, 2015

Home

The model is distributed from the ICTP GForge site:

<https://gforge.ictp.it/gf/project/regcm>

Description

The model is distributed as Fortran2003 source code.
A compiler is needed to transform to executable.

- GNU GNU gfortran compiler >4.6
- intel Intel[®] ifort compiler >12.0
- pgi Portland[®] pgf95 compiler >12.0
- xlf2003 IBM xlf compiler

On your target system GNU compiler is installed.

Requirements

The model needs at least two libraries:

- netCDF netCDF Library

```
nf-config --version
```

- MPI MPI Library

```
mpi_info --version ompi release
```

The software is already installed on the desktops from Ubuntu repositories. You can find a script in the Tools/Script directory to compile required library from source.

GPL license primer

The usual way to install a package on Linux is to compile the software. The Free Software distributed with GPL license empowers the user giving

- the freedom to use the software for any reason
- the freedom to study how it works
- the freedom to modify it to fit any personal need
- the freedom to develop any product depending on it
- the limit to contribute modifications to the original software developer
- the limit to distribute any derived work with the same license again as source code

Software Install on Linux

The normal steps to install software relies usually on GNU autotools

- Download source package as compressed archive
- Unpack it on disk
- Configure software build
- Translate source code in machine executable
- Install software either on system or user path
- Modify environment to use the software

RegCM4 home

The RegCM4 package is distributed by the Gforge site

<http://gforge.ictp.it/gf/project/regcm>

- Files section on the left sidebar
- Package RegCM4 click on the tar.gz file

Download packed release file, unpack on local disk.

```
mkdir -p regcm
```

```
cd regcm
```

```
cp Downloads/RegCM-4.x.x.x.tar.gz .
```

```
tar zxvf RegCM-4.x.x.x.tar.gz
```

Configure RegCM4 builder

```
cd RegCM-4.x.x.x
```

Let the `configure` script do some work for you.

```
./configure
```

- Find the required software listed above in 4
- Set up the correct flag for the compiler
- Add or remove from compilation part of the code

Make the executable

How to make executables?

make install

Is the build complete?

```
ls bin
```

```
GrADSNcPlot      chem_icbc  interp_bionox  regcmMPI  sigma2z
GrADSNcPrepare  emcre_grid interp_emissions regrid     sst
average          icbc      interp_pollen  sigma2p   terrain
```

Now we can start play around with the model.

Run Environment

We setup a run environment

```
mkdir -p run/{input,output}
cd run
ln -sf ../bin .
cp ../Testing/test_.in .
gedit test_001.in
```

Running the model

```
./bin/terrain test_001.in  
./bin/sst test_001.in  
./bin/icbc test_001.in  
mpirun -np 8 ./bin/regcmMPI test_001.in
```

CLM Option

The Community Land Model CLM in RegCM is a surface model option which substitutes the Biosphere-Atmosphere Transfer Scheme BATS.

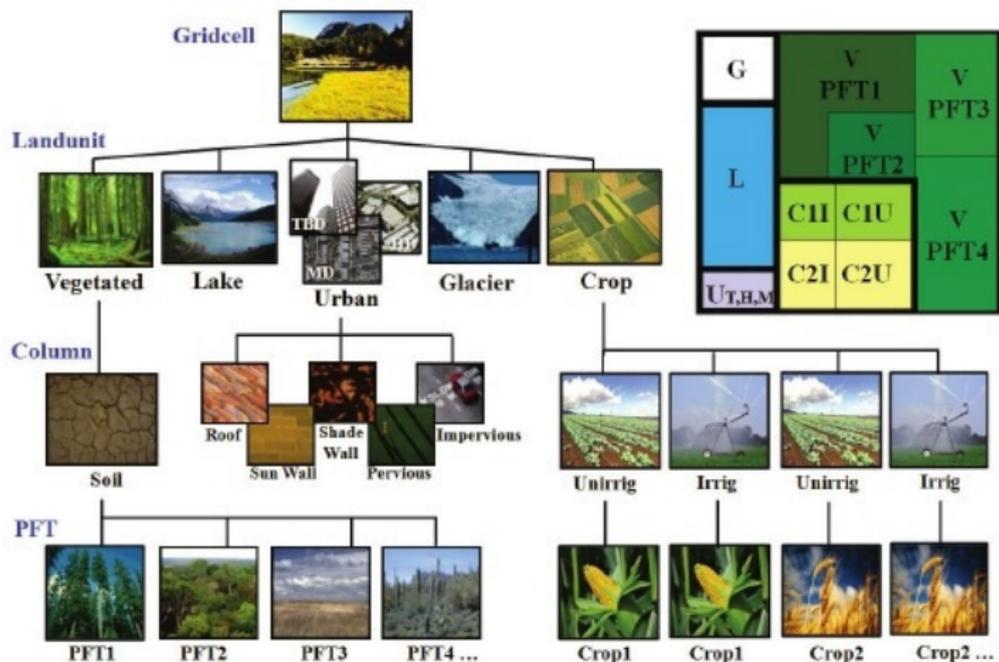
The compilation of the CLM is optional.

The build system creates a different executable compiling different source files.

BATS Surface Model

- Crop/mixed farming
- Short grass
- Evergreen needleleaf tree
- Deciduous needleleaf tree
- Deciduous broadleaf tree
- Evergreen broadleaf tree
- Tall grass
- Desert
- Tundra
- Irrigated Crop
- Semi-desert
- Ice cap/glacier
- Bog or marsh
- Evergreen shrub
- Deciduous shrub
- Mixed Woodland
- Forest/Field mosaic
- Water and Land mixture

CLM Surface Model



Compilation of the CLM4.5

```
cd ~/regcm/RegCM-4.x.x.x  
make distclean  
./configure --enable-clm45
```

Running CLM PreProcessing

```
cd run  
./bin/mksurfddataCLM45 test_001.in
```

Running CLM-RegCM Model

```
# Modify executable name in mpirun line  
mpirun -np 8 ./bin/regcmMPI_CLM45 test_001.in
```