

# Installing RegCM4

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## From Source to Executable

The RegCM4 model is distributed as Fortran2003 source code, and another program, a compiler, is needed to transform source code to executable:

```
program simple
  implicit none
  integer :: i
  do i = 1 , 10
    print *, i
  end do
end program simple
```

- GNU gfortran compiler > 4.8
- Intel<sup>®</sup> ifort compiler > 13.0
- Portland<sup>®</sup> pgf95 compiler > 12.0
- IBM<sup>®</sup> xlf compiler

We will use for this tutorial the GNU gfortran compiler

# GPL license

The RegCM is distributed under the Free Software GPL license

User has:

- 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

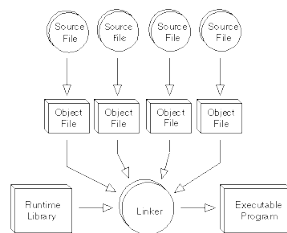
But also has:

- 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

## Requirements

Apart from the compiler, the model needs at least two runtime libraries:

- netCDF Library
- MPI Library



These libraries are already installed on the desktops from distro repositories, compiled with GNU compilers.

Because the compiler used to compile libraries must match the one used for compiling model, you can find a script in the Tools/Script directory in model package to compile required library from source.

# Software Install on Linux

The normal steps to install software using GNU tools are:

- 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

# Home

The RegCM4 model is distributed from the ICTP GForge site:

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

- Files section on the left sidebar
- Click on the tar.gz file
- Save as or copy link for wget

# Home

RegCM4 model Development releases can be usually found on my public directory at:

<http://clima-dods.ictp.it/Users/ggiulian/>

- Update not regular !!!

## Connecting to Amazonia cluster

```
[rcmXX@amazonia ~]$ ssh -Y rcmXX@amazonia
```

Username and passwords will be provided to user groups.

To compile RegCM4 model we need to load this modules:

```
[rcmXX@amazonia ~]$ module list
```

Currently Loaded Modulefiles:

- 1) gcc-4.7-dev
- 2) mvagfortran-4.7



## Shell survival

Make a directory on local disk and copy/move the model package there.

```
[rcmXX@amazonia ~]$ mkdir -p tutorial
```

Program Name + option(s) + argument(s)

Path is series of character sequences separated by /

\$USER is a shell variable (echo \$USER)

```
[rcmXX@amazonia ~]$ cd tutorial
```

```
[rcmXX@amazonia ~]$ \
```

```
cp ${HOME}/RegCM-4.7.1_smr3195.tar.gz .
```

```
[rcmXX@amazonia ~]$ ls
```

```
RegCM-4.7.1_smr3195.tar.gz
```

# Unpack code

Type in terminal window:

```
[rcmXX@amazonia ~]$ \  
tar zxvf RegCM-4.7.1_smr3195.tar.gz
```

## Configure RegCM4 builder

```
[rcmXX@amazonia ~]$ cd RegCM-4.7.1_smr3195
```

Let the configure script do some work for you.

```
[rcmXX@amazonia ~]$ ./configure FC=gfortran
```

- Find a Fortran2003 compiler
- Find the required software listed above
- 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?

```
[rcmXX@amazonia ~]$ ls bin
average          interp_emissions_bioburn.sh
chem_icbc        interp_pollen
emcre_grid       regcmMPI
GrADSNcPlot      regrid
GrADSNcPrepare  sigma2p
icbc             sigma2z
interp_bionox    sst
interp_emissions terrain
```

Now we can start play around with the model.

## Run Environment

We setup a run environment

```
[rcmXX@amazonia ~]$ ln -sf $HOME/dados run
[rcmXX@amazonia ~]$ cd run
[rcmXX@amazonia ~]$ mkdir input output
[rcmXX@amazonia ~]$ \
  ln -sf $HOME/RegCM-4.7.1_smr3195/bin .
[rcmXX@amazonia ~]$ ln -sf $HOME/RCMDATA .
[rcmXX@amazonia ~]$ \
  cp $HOME/RegCM-4.7.1_smr3195/Testing/test_001.in .
[rcmXX@amazonia ~]$ gedit test_001.in
```