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 $>$ 4.6
- Intel® ifort compiler $>$ 12.0
- Portland® pgf95 compiler $>$ 12.0
- IBM® 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

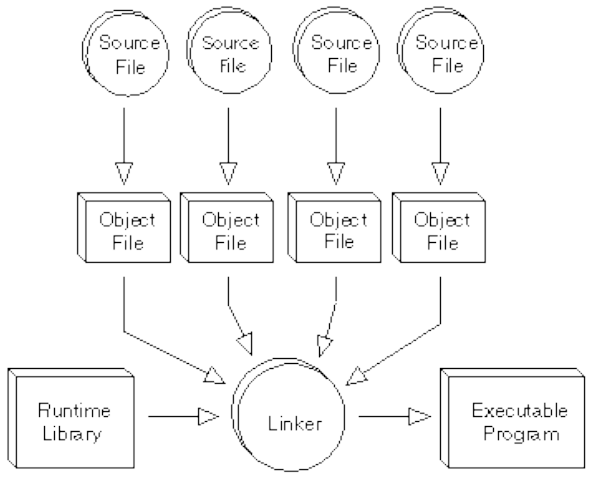
But also has:

- 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:

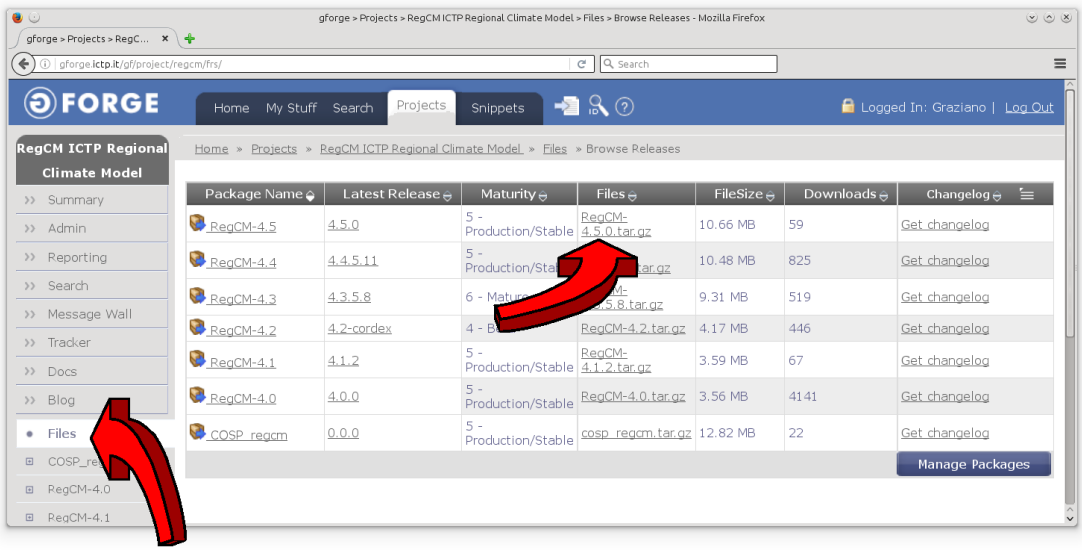
- Download source package as compressed archive
- Unpack it on disk
- Configure software build
- Translate source code in machine executable
- Install software either on system or user path
- Modify environment to use the software

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



Download code

Not quite.... We will use a development snapshot of the model code:

`RegCM-4.7.0-rc10.tar.gz`

`http://clima-dods.ictp.it/Users/ggiulian/`

Unpack code

Type in terminal window:

```
tar zxvf RegCM-4.7.0-rc10.tar.gz
```

Configure RegCM4 builder

```
cd RegCM-4.7.0-rc10
```

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

```
./configure
```

- 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?

*m*ake 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 run
cd run
mkdir input output
ln -sf ../bin .
cp ../Testing/test_.in .
xed test_001.in
```

Running the model

```
./bin/terrain test_001.in
./bin/sst test_001.in
./bin/icbc test_001.in
mpirun ./bin/regcmMPI test_001.in
```

CLM Option

The Community Lamd 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.

Compilation of the CLM4.5

```
cd ..
make distclean
./configure --enable-clm45
```

Running CLM PreProcessing

```
cd run
./bin/mksurfdataCLM45 test_001.in
```

Running CLM-RegCM Model

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