

[circa 2013-11-01; PRAMS_2.8]

Obtain and install the necessary files

Prerequisites:

- 1) Fortran 95+ compiler (e.g., gfortran 4.3+, ifort, pgf90)
- 2) C compiler (e.g., gcc, icc, pgcc)
- 3) Python 2.7+
- 4) NetCDF (must have been compiled with Fortran 90+ bindings; version 4+ is preferable; <http://www.unidata.ucar.edu/software/netcdf/>)
- 5) MPI [e.g., Open MPI (<http://www.open-mpi.org>) or MPICH2 (<http://www.mcs.anl.gov/research/projects/mpich2/>); must have been compiled with Fortran 90+ bindings] **{necessary for parallel runs}**
- 6) NCL (<http://www.ncl.ucar.edu/>) **{optional}**, for grid placement visualization}

Install and configure the universal_lib source code tree:

Decompress and extract the universal_lib archive in a directory of your choice (e.g., */home/user*; will automatically be unpacked into a subdirectory named *universal_lib*):

```
bzip2 -dc universal_lib-1.2_r3-fs_dist.tar.bz2 | tar xvf - ;
```

Change directory:

```
cd universal_lib/infrastructure/build/build_env_config;
```

Copy *user_change_me-inclibs* **and** the “*user_change_me-**” files most relevant to your computer system to this directory – for example:

```
cp examples/user_change_me-inclibs . ;  
cp examples/gfortran_gcc-linux/* . ;
```

Edit the “*user_change_me-**” files as needed (e.g., with specific compiler options), testing the success of the compilation via the following (iteration may be needed, along with inspection of the on-screen output and *../configure_build_env/work/config.log*):

```
../../../../admin_script.py clean ALL; ../../../../admin_script.py build;
```

If you encounter a compilation error involving something not found in module *mpi*, try adding “*-DBROKEN_MPI_MOD*” to your universal_lib *user_change_me-compilers.** files (then clean, and compile again).

Install and configure the PRAMS source code tree:

Decompress and extract the PRAMS code archives in a directory of your choice (e.g., */home/user/PRAMS*; will automatically be unpacked into subdirectories named *common* and *Mars*):

```
bzip2 -dc PRAMS_common-2.8_r2-fs_dist.tar.bz2 | tar xvf - ;  
bzip2 -dc PRAMS_Mars-2.8_r2-fs_dist.tar.bz2 | tar xvf - ;
```

Change directory:

```
cd Mars/infrastructure/build;
```

Make a copy of *build_env_config.other_packages-template* called *build_env_config.other_packages*, then edit the new file appropriately (to specify where the relevant *universal_lib* and *common* directories are located):

```
cp build_env_config.other_packages-template  
   build_env_config.other_packages;
```

Change directory:

```
cd build_env_config;
```

Copy the “*user_change_me-**” files most relevant to your computer system to this directory – for example:

```
cp examples/gfortran_gcc-linux/* . ;
```

Edit the “*user_change_me-**” files as needed (e.g., with specific compiler options), testing the success of the compilation via the following (iteration may be needed, along with inspection of the on-screen output and *../../../../common/infrastructure/build/configure_build_env/work/config.log*):

```
../../../../admin_script.py clean ALL; ../../../../admin_script.py build;
```

Install the static data files:

This step does not necessarily have to be done every time – it is likely that one would not want too many copies of this on a single machine/filesystem, as these files (in total) are several GiB in size.

Decompress and extract the PRAMS data archives in a directory of your choice (e.g., */data/user/input_static-PRAMS_2.8*; will automatically be unpacked into subdirectories named *common* and *Mars*):

```
bzip2 -dc PRAMS_2.8_r0.common.full_data.tar.bz2 | tar xvf - ;  
bzip2 -dc PRAMS_2.8_r0.Mars.smaller_data.tar.bz2 | tar xvf - ;  
(OPTIONAL):  
bzip2 -dc PRAMS_2.8_r0.Mars.large_data.tar.bz2 | tar xvf - ;
```

Build the modeling system

Change directory to *Mars*.

List the possible options available:

```
./admin_script.py -h;
```

Typically, one would build the modeling system with the following commands:

```
./admin_script.py clean ALL;  
  
./admin_script.py build;      (serial)  
./admin_script.py build DM_only;  (parallel)
```

Prepare the run directory

This version of PRAMS offers a significant amount of flexibility regarding where its input and output data are located. However, in order to easily refer to those locations, it is suggested that a set of symbolic links pointing to those locations be created in the *run* directory. Also, in choosing a location for the PRAMS output, bear in mind that typical model output from a single PRAMS simulation can range in size from < 10 GiB to > 100 GiB, so ensure that the chosen directory resides on a data volume that can store significant quantities of data.

Change directory to *Mars/interface/run*

Examples of creating such symbolic links:

```
ln -s {dir_where_the_static_data_files_are} input_static;  
ln -s {dir_where_the_GCM_output_data_are} MGCM_output;  
ln -s {dir_for_PRAMS_output} output;
```

```
cp run_PRAMS-template run_PRAMS;  
cp run_postp-template run_postp;
```

Running the model

Prepare a model configuration/namelist file (e.g., *PRAMS_IN.test*; use *PRAMS_IN-template* as a template). The general way to run the model (in serial) is:

```
./run_PRAMS -f PRAMS_IN.test;
```

For a simulation with *INITIALIZATION_TYPE* = 2:

- 1) Set *RUN_TYPE* = 'MAKE_VAR_FILES' in the namelist, and run the model.
- 2) Then set *RUN_TYPE* = 'INITIAL' in the namelist, and run the model.

For a simulation with *INITIALIZATION_TYPE* = 1:

- 1) Set *RUN_TYPE* = 'INITIAL' in the namelist, and run the model.

To run in parallel with the computational load split between 6 nodes, with one supervisory/root node (note that the model must be compiled for parallel for this to work):

```
./run_PRAMS -n 7 -f PRAMS_IN.test;
```

Updating the codebase with “official” archive images

To update your codebase with an “official” archive image that you have obtained, use the install mode of the appropriate *admin_script.py* – note that the *.tar.bz2 can be in any directory, and will not be deleted or changed. For example:

```
cd common;  
./admin_script.py install PRAMS_common-2.8_r4-fs_dist.tar.bz2;
```

```
cd Mars;  
./admin_script.py install PRAMS_Mars-2.8_r4-fs_dist.tar.bz2;
```

```
cd universal_lib;  
./admin_script.py install universal_lib-1.2_r4-fs_dist.tar.bz2;
```