

Instructions for installing, compiling, and running OLAM-SOIL

1. Computer system requirements: Linux operating system, Fortran compiler (Intel Fortran strongly recommended), C compiler (gcc is good), Hdf5 library, MPI library, NCAR Graphics library (also called NCL). Compilers for Fortran and C, and libraries for hdf5 and MPI are commonly used and standard on most scientific computers. NCAR Graphics is less widely used. The easiest way to install NCAR Graphics is to download a pre-compiled binary (executable file that was compiled for Linux). Binaries and instructions for this procedure can be found at <https://www.ncl.ucar.edu/Download/> and <https://www.ncl.ucar.edu/Download/install.shtml>. Since the binary file is probably compiled with gfortran, it is necessary to install gfortran on your computer in addition to the Intel Fortran compiler used to compile the model.

2. Create a directory called olam on your computer. Download the OLAM-SOIL_5.2.1S.tar tarball from the OLAM-SOIL website <http://olam-soil.org/modeling/> and copy to your olam directory. Untar the file by giving the command 'tar xvf OLAM-SOIL_5.2.1S.tar'. This will create a subdirectory 5.2S, which is the model version designation, and the following directories beneath it:

```
build_SOIL4
build_test
CMAQ
convect
ED2
etc
hurricane
leaf
MEGAN
modules
oisan
omodel
outils
radiate
sea
SOIL
test_cases
```

Most of these directories contain the model source code files, but the build_SOIL4 directory is where you will compile and run the model.

3. Go to the build_SOIL4 directory and edit the file include.mk to match your computer system. A recent version of HDF5 with Fortran 90 wrappers is required to be installed on your computer. When compiled with Fortran support, HDF5 installs a script called "h5fc" or "h5pfc" that calls the Fortran compiler and links in the proper HDF5 library and Fortran modules. This should be used for the Fortran compiler F_COMP.

The variables HDF5_LIBS and HDF5_INCS should be left empty when using the HDF5 wrapper script "h5fc" or "h5pfc". HDF5_LIBS and HDF5_INCS are only

needed if F_COMP has been set to a Fortran compiler (such as "ifort"), in which case you will have to manually set the necessary HDF5 libraries and the location of the HDF5 Fortran modules.

Follow the comments in include.mk for setting paths to the MPI includes and libraries if your computer does not use an MPI compiler wrapper script. However, MPI requires further testing in the SOIL version of OLAM, so it is necessary to run without MPI. This means that you can remove the 'yes' specification from 'OLAM_MPI=yes', or, if MPI is already installed on your computer, retain OLAM_MPI=yes but then run the job without actually using MPI.

Set the NCARG_DIR path to where NCAR Graphics is installed on your computer. Note that the library links specified under LIBNCARG must include the gfortran library since gfortran was used to compile the NCAR Graphics binary (see instruction 1). This completes the required edits to include.mk.

4. Compile the model by simply typing "make". This executes the Makefile in your build_SOIL4 directory. The Makefile makes use of other files in the directory, namely include.mk which you edited as per instructions 3 and 4, paths.mk, and sources.mk. Sources.mk, together with paths.mk, point to each of the source code files in the various directories that will be compiled. Compilation produces the executable file olam-5.2S-mpi, or simply olam-5.2S if you removed 'yes' from the OLAM_MPI specification in instruction 3.

5. You can run the model (without MPI) simply by typing the executable file name on the command line: olam-5.2S-mpi (or olam-5.2S). If you are running on a larger computer with a batch job system, you can also execute the model in batch mode.

When the model begins execution, the first thing it does is to read the input namelist file, which has the name 'OLAMIN' and is located in the build_SOIL4 directory. The namelist variables in this file need to be modified by the user as appropriate to how the model is to be used for a given application. What each variable does and how it should be set is explained in detail in the OLAMIN User's Guide, a pdf file located in the etc subdirectory of OLAM.