**MetSim code library workflow**

-This document describes how this MODEL-EVALUATION code library is used

• First you will follow instructions in the DATA\_ACQUISITION folder, then the METSIM\_ INSTALLATION folder, and then the CREATE\_METSIM\_INPUTS folder

DATA\_ACQUISITION ⇒⇒ METSIM\_ INSTALLATION⇒⇒CREATE\_METSIM\_INPUTS

**DATA\_ACQUISITION** You will first have to install R(https://www.r-project.org), programming platform, and the complimentary SNOTELR package (https://github.com/khufkens/snotelr). In the DATA\_ACQUISITION folder, you will paste the commands from the SNOTELR\_COMMANDS.txt file into an R terminal. The first couple commands: 1) will activate the SNOTELR package and 2) set the directory that the snotel data files will be downloaded too. The rest of the commands download site specific data from each of the 800+ snotel sites. I wouldn’t recommend pasting all of the commands at one time. I just went through state by state copying and pasting until all of the data was downloaded. This information will be in a .csv files that have decimal points marked with a semicolon. To replace these semicolons with a period, a script called REPLACE\_CHAR.sh was created. This script uses the STATION\_LIST file, which is a list of all the names of the snoTEL data files, to cycle through all the download files and replace the odd character.

**METSIM\_ INSTALLATION** in the METSIM\_INSTALLATION folder there is a single file, INSTALL\_METSIM.sh. This file is a python file that will not run. It’s best to paste the commands into a terminal one by one and follow the download instructions, marked DOWNLOAD:. This procedure is used every time plato (usask high performance computing cluster) is reopened to make sure all of the necessary modules are loaded and MetSim is properly installed.

**CREATE\_METSIM\_INPUTS** Once the data is downloaded and MetSim is installed, paste the scripts from CREATE\_METSIM\_INPUTS folder into the folder with the snotel.csv files. These files include three broad categories of scripts

**1)** **list files** used for reading file lists and creating output file names

**2)** **file creation scripts** SNOTEL\_STATE.sh, SNOTEL\_DOMAIN.sh, and SNOTEL\_FORCING.sh are used for creating model STATE, DOMAIN, and FORCING input files for MetSim; SNOTEL\_CONFIG is used for creating a configuration script for MetSim; SNOTEL\_SUBMIT is used for creating plato-based submission scripts for each snotel file; and SNOTEL\_RUN runs MetSim simulations for each snotel site. Read the READ.ME file within the folder for more descriptions of these files.

**3) submission scripts** submit each of these scripts to the plato super computer to automate the process. These submit\_ scripts are the only ones that you’ll have to run on plato.

SUBMIT\_RUN.sh has to be executed last. Command ⇒ “sbatch SUBMIT\_RUN.sh”. Other than that, it doesn’t matter the order in which the submission scripts are executed. I’d recommend the procedure of:

sbatch submit\_DOMAIN.sh

sbatch submit\_FORCING.sh

sbatch submit\_STATE.sh

sbatch submit\_CONFIG.sh

sbatch submit\_SUBMIT.sh

Then, you’ll have to wait for a few minutes until these thousands of files have been created.

Afterwards, use

sbatch submit\_RUN.sh

After a few more minutes, that will finish too. And, the output files will be in the form of:

snotel\_308\_20170101-20180831.nc

Where 308 is the station number and the two dates are the start and finish of the simulation.