Biome-BGC: Modeling Carbon Dynamics in Ponderosa Pine Stands (Law et al. 2003)

Data model citation at ORNL DAAC:

Law, B. E. and P.E. Thornton. 2005. Biome-BGC: Modeling Carbon Dynamics in Ponderosa Pine Stands (Law et al. 2003). Model product. Available on-line [http://www.daac.ornl.gov] from Oak Ridge National Laboratory Distributed Active Archive Center, Oak Ridge, Tennessee, U.S.A.

Modeling Manuscript Archive Entry for: Law et al., 2003.

Model release documentation for Biome-BGC, Version 4.1.2

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Published manuscript reference:
Law BE, Sun OJ, Campbell J, Van Tuyl S, Thornton PE, 2003. Changes in carbon storage and fluxes in a chronosequence of ponderosa pine. Global Change Biology, 9(4), 510-514.

Target compute platform:
Microsoft Windows.

Model build environment:
Microsoft Visual C++ version 6.0. Produces win32 console applications as the main model executables.

Additional analysis environment requirements:
Requires IDL, a commercial software package available from Research Systems, Inc. (www.rsinc.com) for generation of scripts that automate calls to the main executables and for post-processing of model output to produce the manuscript figures. IDL Version 5.2 was used for this study, but the IDL procedures used are general enough that both older and newer versions should also work. All final output is to postscript files, so some

utility is required to read and display or print these files. The main archive file is stored as a WinZip file.

Detailed instructions:
The following instructions describe how to run Biome-BGC v 4.1.2 using the executables and procedures associated with this archive to recreate results from the published manuscript referenced above.

1. Extract the winzip file **`law_2003_msarch.zip`** to your local disk. For the simplest possible execution, extract to the root of your **`C:`** drive, and skip ahead to step 4. This will create a new directory – **`C:\ME_chrono_archive`**. Extracting this way means that you won't have to change any of the path information in the IDL procedures that generate run control files. For the rest of these instructions, paths will be given relative to the root of the directory tree: e.g. **`idl`** refers to the directory **`C:\ME_chrono_archive\idl`**, if you follow the suggested directory naming given above.
2. **(NOTE: This step is only necessary if you have installed the archive to a location other than the root of your C: drive).** You need to change the path names in the spinup *.ini files. The path information appears multiple times in the following *.ini files, and in each file you need to replace C: with the full pathname of the drive and directory where you installed the archive:
   ini\ME_spinup.ini
   ini\ME_9990yr_postspinup.ini
   ini\ME_ss.ini
3. **(NOTE: This step is only necessary if you have installed the archive to a location other than the root of your C: drive).** You need to change the path names in the IDL procedures that create run control files. There are four *.pro files in the idl directory, and near the top of each file is a line specifying a path name. This line will need to be changed to reflect the drive and directory under which you installed the archive. The four IDL procedures are:
   idl\MEC_equil_ensemble.pro
   idl\MEC_allsites_history12.pro
   idl\MEC_history_analysis12.pro
   idl\MEC_history_plot12.pro
4. Execute the batch file scripts\ME_spinup.bat. You can execute it either by double clicking, or you can open a command prompt window, navigate to the scripts subdirectory, and enter **`ME_spinup.bat`** on the command line. This uses the three *.ini files in the ini directory to run a spinup simulation, a 9990-year post-spinup simulation to eliminate any small transients in net ecosystem exchange of carbon, and a short steady state simulation. These simulations create model restart files that are used by the following simulation steps.
5. Compile and run the IDL procedure **`idl\MEC_equil_ensemble.pro`**. This will create a file called scripts\M**`EC_equil_ensemble.bat`**.
6. Execute the batch file **`scripts\MEC_ensemble.bat`**. This runs a series of simulations designed to eliminate the interannual variability in signals of disturbance recovery.

(You can look at all the **`*.bat`** files using Word or WordPad to see how Biome-BGC and its ancillary programs are being called.)

7. Compile and run the IDL procedure **`idl\.pro`**. This will create a file called scripts\MEC_allsites_history12.bat.
8. Execute the batch file **`scripts\MEC_allsites_history.bat`**. This performs the site history simulations specific to each of the chronosequence sites.
9. Compile and run the IDL procedure **`idl\MEC_history_analysis12.pro`**. This reads the output from site history simulations and creates a series of summary analysis files used as input to the plotting routines (step 10).
10. Compile and run the IDL procedure **`idl\MEC_history_plot12.pro`**. This generates all the postscript plots exactly as they appear in Figures 9-14 in the manuscript. This output is created in the directory analysis\site_history12.