**Exercise\_1\_soil\_texture\_precipitation**

There are 5 simulations in this exercise. The control simulation is based

a grassland with grazing simulation that we ran for a site in Xilingol,

Mongolia. The soil texture of the control site is 0.4908 sand, 0.3029 silt,

and 0.2063 clay. The average annual precipitation for this site is ~34 cm per

year.

The four scenarios are as follows:

1. Change the soil texture to a sandy soil. (0.8/0.15/0.05 sand/silt/clay)

2. Change the soil texture to a clay soil. (0.1/0.30/0.60 sand/silt/clay)

3. Change the average annual precipitation to ~25 cm per year.

4. Change the average annual precipitation to ~81 cm per year.

To help you with this I have created 4 new site files:

1. sandy.100 (Xilingol precipitation, sandy soil)

2. clay.100 (Xilingol precipitation, clay soil)

3. low\_ppt.100 (~25 cm precipitation per year, Xilingol soil)

4. high\_ppt.100 (~81 cm precipitation per year, Xilingol soil)

and 4 new schedule files:

1. sandy.sch

2. clay.sch

3. low\_ppt.sch

4. high\_ppt.sch

I have also provided a file named outvars.txt that contains a list of output

variables that can be extracted from the binary output files that are created

when you run the Century simulations and an Excel workbook,

soil\_texture\_ppt\_results\_template.xls, that contains a separate spreadsheet

for entering the output for each simulation, Xilingol, sandy, clay, high\_ppt,

and low\_ppt. In addition, there are sheets that contain graphs of NPP, SOM,

biomass, and N inputs for both yearly and monthly output that will display the

model results once you have the output data from all of the simulations

entered.

Run the five Century simulations, enter the model output into the Excel workbook,

and look at the graphs to see how modifying soil texture and precipitation

changes the modeled results.

To run all the simulations at once, open a DOS window and run the batch file by typing its name:

run\_soil\_texture\_sims.bat

There are three ways you can run an individual Century simulation:

1. Double click on the century\_47.exe file name in a "My Computer" window

and follow the on screen prompts that appear in the DOS box.

2. Open a DOS window, use the cd command to change to the directory where

your Century files have been saved, type century\_47.exe at the command line,

and follow the on screen prompts.

3. Open a DOS window, use the cd command to change to the directory where

your Century files have been saved, and you can enter the schedule file

name with the -s switch and binary output file name with the -n switch

on the command line. For example, to run the sandy.sch schedule file

and create a binary file named sandy.bin the command line would be:

century\_47.exe -s sandy -n sandy

Likewise, there are three ways to run the list100 utility to extract the

output data from the binary file:

1. Double click on the list100\_47.exe file name in a "My Computer" window and

follow the on screen prompts that appear in the DOS box. The list of

output variable names that match the format of the sheets in the

soil\_texture\_ppt\_results\_template.xls Excel workbook will have to be

entered one at a time and can be found in the outvars.txt file.

2. Open a DOS window, use the cd command to change to the directory where

your Century files have been saved, type list100\_47.exe at the command line,

and follow the on screen prompts. The list of output variable names

that match the format of the sheets in the

soil\_texture\_ppt\_results\_template.xls Excel workbook will have to be

entered one at a time and can be found in the outvars.txt file.

3. Open a DOS window, use the cd command to change to the directory where

your Century files have been saved, and you can use the command line

option to enter the binary file name that you want to read from, the

name of the \*.lis file that you want to create, and the list of output

variable names which will be read one at a time by the list100\_47.exe

utility. For example, to read the sandy.bin binary file and create a

sandy.lis list file containing output for all of the variables in the

outvars.txt file use the following command line:

list100\_47.exe sandy sandy outvars.txt

If you have time, try combining these scenarios to run more Century

simulations. For example, what happens when you run a clay soil with high

precipitation, a clay soil with low precipitation, a sandy soil with high

precipitation, or a sandy soil with low precipitation.