

## INTRODUCTION TO STREAMER: A USER FRIENDLY RADIATIVE TRANSFER MODEL:

GEOGRAPHY 497B  
LAB-1

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This lab is intended to introduce you to the STREAMER RT model. You will use the STREAMER online interface to build the input parameter file. PLEASE READ DOCUMENTATION AT THE STREAMER WEBSITE:

(<http://stratus.ssec.wisc.edu/streamer/streamer.html>)

### I. INTRUCTIONS FOR RUNNING AND USING CODE-FOLLOW THESE INSTRUCTIONS EACH TIME YOU START A NEW SIMULATION SESSION:

- 1-Log into PC using your account
- 2-Copy primary STREAMER executable from the following path to the local C:\temp directory.

Disk name:\labserver\geog497b\streamer\_win.exe

- 3-Open an internet browser and go to the STREAMER parameter file construction website at:

(<http://streamer.geog.psu.edu/cgi-bin/streamer.pl>)

ONCE YOUR SIMULATIONS ARE COMPLETE ERASE THE DOWNLOADED EXECUTABLE FROM THE LOCAL C:\TEMP DIRECTORY. DO THE ABOVE STEPS EVERY TIME YOU START A NEW SIMULATION SESSION

## II. LAB 1

1-This lab is intended to introduce you to STREAMER. A test case has been prepared for you to attempt to execute. This test case calculates downwelling shortwave irradiance ONTO our simulated pixel. This simulation specifies a standard atmosphere profile. This simulation is ran to derive downwelling solar irradiance in range of EM spectrum called solar reflective (i.e. shortwave energy between 0.4-2.8um) under clear sky conditions over a pixel filled with ONLY snow. The simulation is prescribed to estimate irradiance at 8am over the Mammoth Mountain Snow Research test site in the mountains of California's Sierra Nevadas (Figure 1).

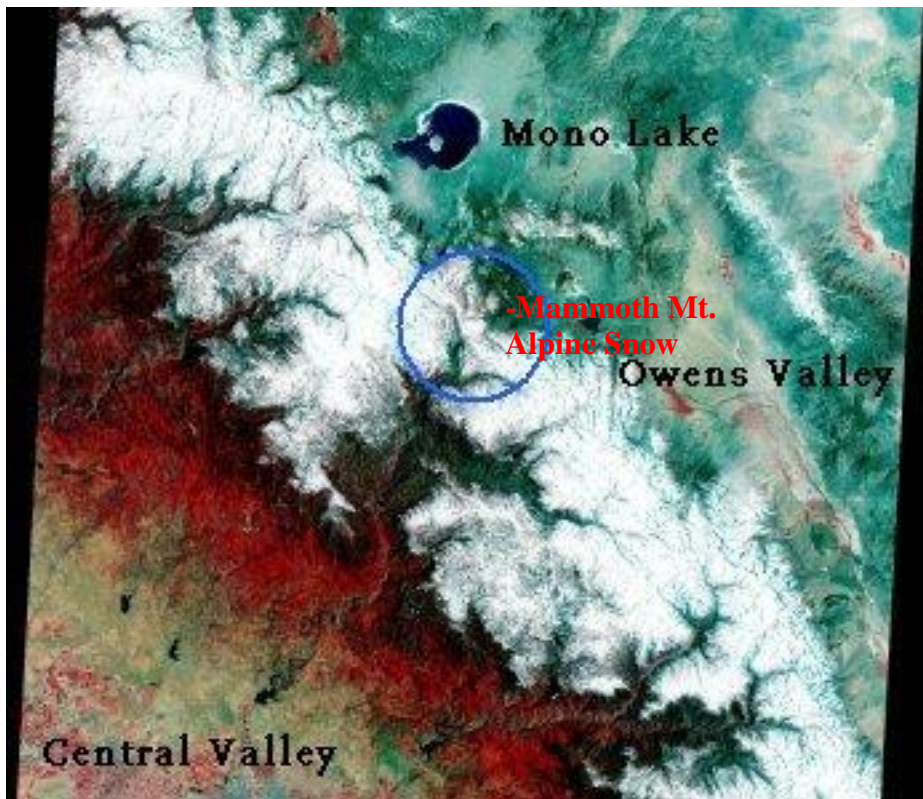
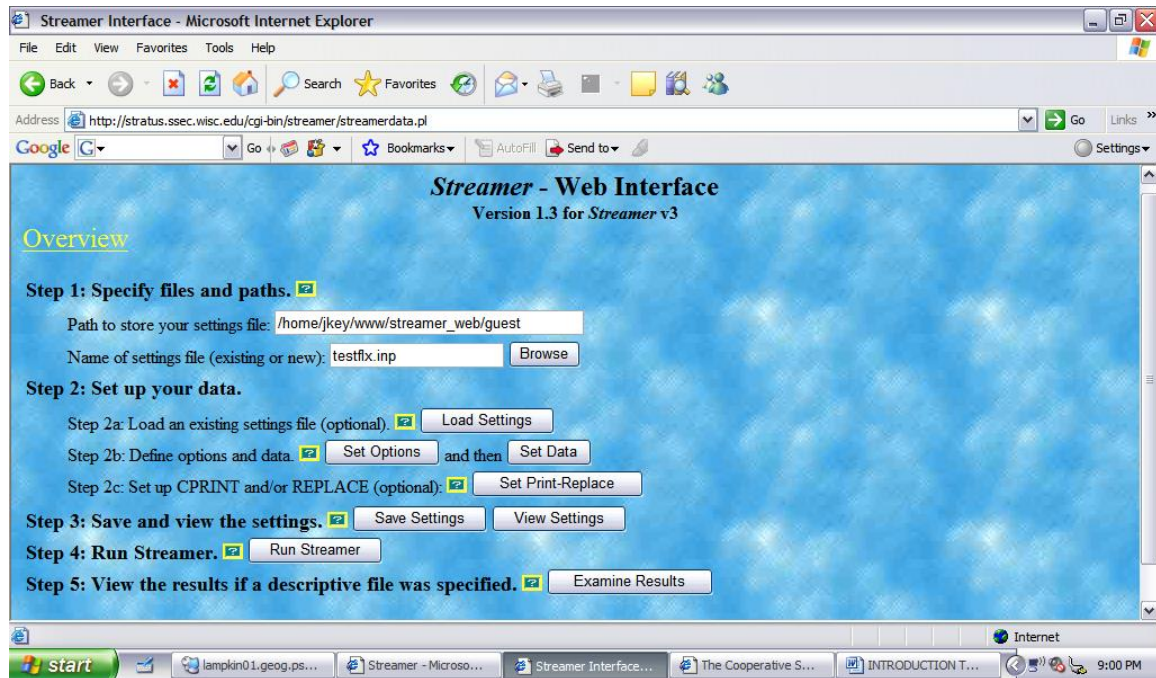


FIGURE 1: Location of simulation site: Mammoth Mountain Alpine Snow Research Station.

## 2-GOTO the STREAMER WEB INTERFACE.



-Don't change any information under STEP 1 path or the name of the settings file. You will make the web interface display the finished parameter file right in the web browser then save from the browser to the c:\temp directory where the STREAMER executable is that you downloaded from Part I.

-Under STEP 2 you have the option of loading a preexisting parameter file that you might have created in a previous session. If so select LOAD SETTINGS under STEP 2a.

-Proceed to STEP 2b and select SET OPTIONS. The following window will open. Populate the blanks with the values you see in the screen shot below:

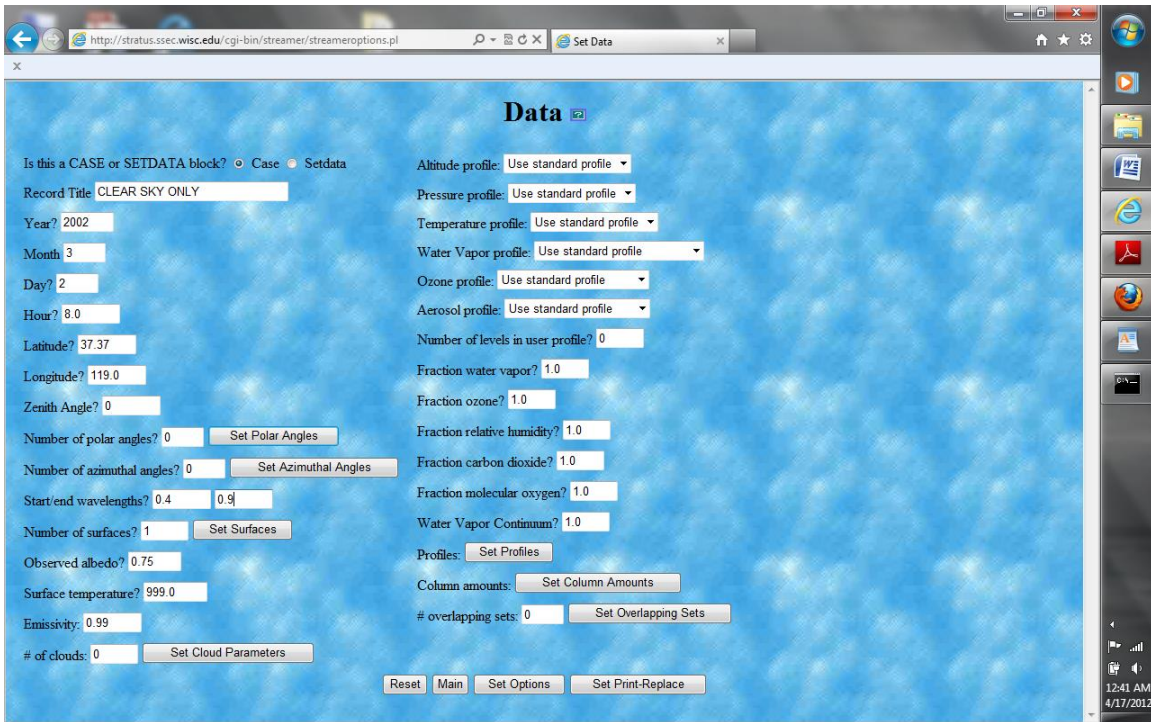
Compute Fluxes or Radiances?  Fluxes  Radiances  
 Compute Cloud Forcing?  Yes  No  
 Number of Coefficients: 24  
 Include gaseous absorption?  Yes  No  
 Surface emissivity control: Same value for all bands  
 Extend profile to space?  Yes  No  
 Aerosol profile: Background tropospheric & stratospheric  
 Units - Height: km  
 Units - Ozone: Density (g/m<sup>3</sup>)  
 Units - Cloud thickness: Thickness in mb  
 Output levels control: All levels  
 User-controlled output?  Yes  No  
 File: dummyname  
 Band Weights File:  
 File:  
 Surface BRDF file (if albedo control corresponds):  
 File:

Thermal emission in band 106?  Yes  No  
 Number of Streams: Shortwave 2 Longwave 2  
 Include Rayleigh Scattering?  Yes  No  
 Surface albedo control: Built-in model, no scaling  
 Standard Profile: Mid-latitude winter  
 Aerosol model: Rural  
 Units - Temperature: K  
 Units - Water vapor: Density (g/m<sup>3</sup>)  
 Units - Cloud top/bottom height: Top pressure (mb)  
 Units - Spectral range: Wavelengths in microns  
 Descriptive output?  Yes  No  
 File: Output.out  
 User cloud properties?  Yes  No  
 File:

Reset Main Set Data Set Print-Replace

**NOTE:** Under USER SPECIFIED OUPUT select NO, but there must be a dummy file so enter the name “dummyname as seen above. Under DESCRIPTIVE OUTPUT select YES and put the name of your desired output file. Naming the file Output.out can be standard. I suggest changing this output file name sequentially for each run (i.e. first run call the output file “Output1.out”, the next run “Output2.out” ...

-Once you completed filling in this form then SELECT SET DATA button at the bottom. It will open the following window:

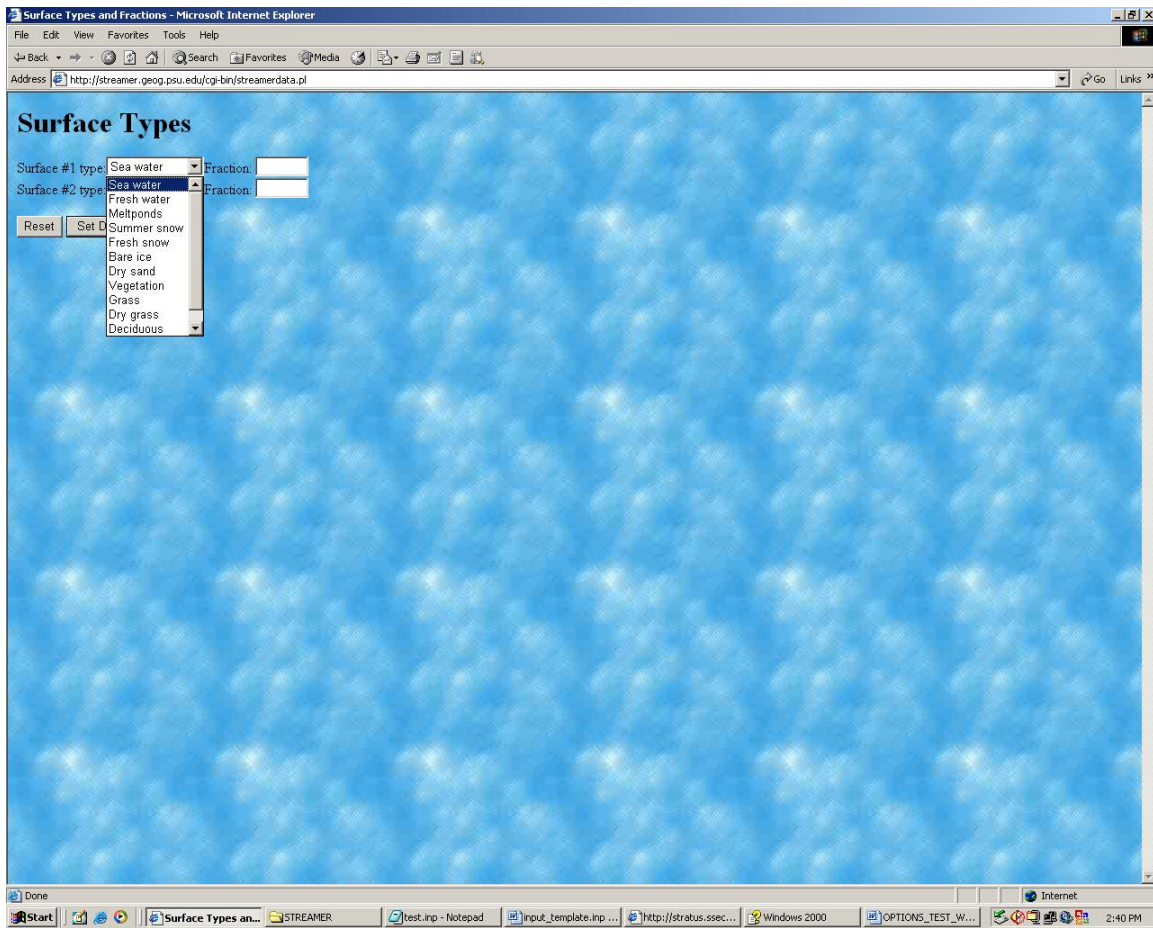


-Hit SET SURFACES and another window (below) will open. This is where you set the surface type to FRESH SNOW and FRACTION to 1.0

NOTE: Time in STREAMER is expressed in GMT (Military Time) scale. The table below is the GMT time scale:

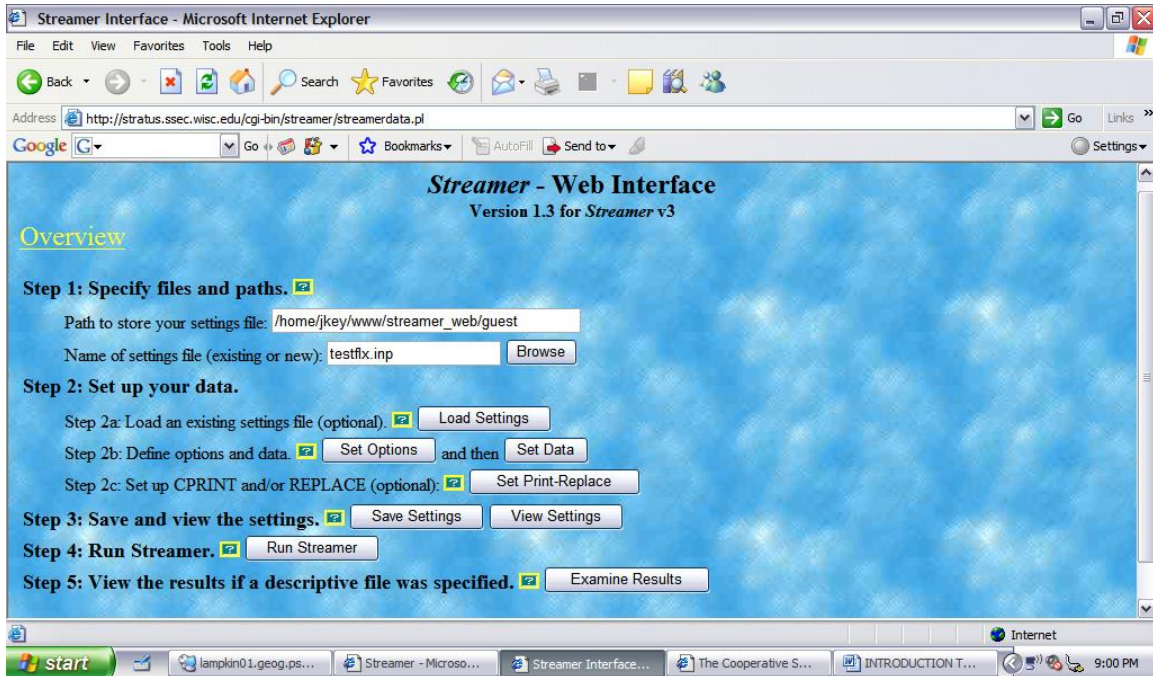
LOCAL TIME	GMT TIME
1 AM	1.0
2 AM	2.0
3 AM	3.0
4 AM	4.0
5 AM	5.0
6 AM	6.0
7 AM	7.0
8 AM	8.0
9 AM	9.0
10 AM	10.0
11 AM	11.0
12 NOON	12.0
1 PM	13.0
2 PM	14.0
3 PM	15.0

4 PM	16.0
5 PM	17.0
6 PM	18.0
7 PM	19.0
8 PM	20.0
9 PM	21.0
10 PM	22.0
11 PM	23.0
12 PM	24.0



-Once you have completed this, hit the SET DATA button to return to the previous window

-Complete filling in this form then SELECT MAIN at the bottom. This will take you back to the main window below:



-Now select VIEW SETTINGS under STEP 3. The automatically generated ASCII text input parameter file will appear in the viewer (see below)

```

; Streamer v3 input file from the HTML interface.
OPTIONS
.TRUE.
.FALSE.
.TRUE.
2 2
24
.TRUE.
.TRUE.
1
4
3 .TRUE.
2 1
1 1 1 1 1 1
4
.TRUE.
Output.out
.FALSE.
dummyname

.FALSE.

CASE
CLEAR SKY ONLY
2002 3 2 8.0 37.37 119.0 -99.0

0.4 2.5
0.75 1 5 1.0
999.0 0.99
0
0
2 2 2 2 2 0 1.0 1.0 1.0 1.0 1.0 1.0

```

-Copy the above text in the viewer to a text editor (WORDPAD) and save the file as ascii text to c:\temp directory. You can name your input parameter file whatever you choose, but make certain it has the suffix “.inp” (i.e. your file could be called testing, then save as testing.inp).

NOTE: WHEN YOU SAVE THE text file in your working directory save as “TEXT DOCUMENT” from WORDPAD. In the MSDOS command window type ht following command because when you save your file from WORDPAD it will save the file with the (.txt) suffix (i.e. testin.inp will be saved as testin.inp.txt)...so type this in the MSDOS command window:

**rename testin.inp.txt testin.inp**

this will ensure that STREAMER can read your file without incident.

### 3. RUNNING STREAMER WITH YOUR NEW INPUT PARAMETER FILE:

-Go to windows START button and select RUN. A window will appear and type in CMD. This opens a DOS command window prompt. From here you will need to navigate to the c:\temp directory:

Use the following DOS commands to navigate to the working c:\temp directory:

cd=change directory  
dir=list all folder names in current folder  
cd .. = go back to next folder up in directory structure

-to run STREAMER type the following at the DOS prompt when you get to the c:\temp directory (NOTE: Your parameter file must be in the same directory or the program will not be able to run your input file):

```
streamer_win <name of your input parameter file>
```

#### EXAMPLE:

If your input parameter file is called “testin.inp”  
Then the command would look like this:

```
streamer_win testin.inp
```

-An output file will be generated called Output.out.



## SIMULATION OBJECTIVES

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PLEASE EXECUTE THE FOLLOWING SIMULATIONS-SUBMIT GRAPHS AND BRIEF, SHORT ANSWERS TO QUESTIONS

### OBJECTIVE 1:

Execute streamer using the input parameter given for this training lab. Graph downwelling shortwave direct, diffuse and total solar irradiance as a function of atmospheric level.