In the previous section, we looked at various display programs that could be used to view the HYSPLIT output files. In this section we will review utility programs that can be used to convert the output files to different formats. Both of these sections, and the next section as well, rely upon you having completed section 8.1, that is actually running the model for the CAPTEX 2 tracer release and generating the output.

The concentration utility programs that are available to you are several, and they can be found in the utilities menu. Let's start with simple listing.   There is a button where you need to select the input file. These are not text entry windows.   And the output can be found in the hysplit4/working directory.   And we know hysplit2.bin was the name of the file that we created from the simulation. And all we need to do is show the file contents here, and this runs a program that gives a simple listing of the output. And this file is also written, the conversion results, are written to the working directory and that shows several things. It provides some information about the output, the meteorology file that was used, the source location, the concentration grid, and as well as the different time periods that are available every three hours, but it also lists the maximum and minimum concentrations, their locations at each time. So this is a quick way to view the contents of a concentration output file, the contents in a simplified fashion.   And as I mentioned, this file is available in the working directory and it is called conread.txt and this is the same file we just displayed.

Another option is to convert the entire binary file to an ASCII file, a simple text file.   This brings up a menu where the binary file is already pre-selected for you, which you may override.   There are output options.   You can output the information as a single file or as a file, a new file for each output time period.   You may just decide to include, or not include, values that are zero, grid points that are zero.   We can have different precision. At this point we're not going to select these options, but we will convert the output to pg by multiplying by 10^{12}, and execute the conversion.   This file was written to the working directory. And the default for this, and there're no options to change it right now, is that it takes the name of the input file and appends .txt to it.   And if I would open this file, you'll see a very simple listing of every single grid point and there $0.25°$ resolution, so in this case we incremented from grid cell one to grid cell two here and these are all the non-zero concentrations for all time periods. It's only the grid cells with non-zero values.   For some import, into certain programs, it might be useful to also output the zero grid point locations.

Another option, another display option, a conversion option if you will, is to convert the output to a station location.   Now we know that the during the CAPTEX experiment there were 60 or 80 so sampling stations, so we can essentially go through the binary file and interpolate the concentrations to a particular point on the grid.   And at this stage we will leave the conversion factor here.   Now we enter the conversion factor in the previous menu, and this conversion factor for grams, picograms

was then automatically populated into other menus that require a conversion factor.   And the output file name will be con2stn.txt.

Now we need to select a station location.   You can go back to the CAPTEX report, for instance, and it's in the tutorial directory, and find the list of stations, and we're going to select station 510 here, Little Valley, New York, and the reason I'm selecting it for this for this example is that we already know that it's going to be in the center of the plume, so it makes a good example case.   So we're going to give it an ID for 510, calculated at 510.   And we'll have to enter the latitude and longitude, 42.25 and west longitude of 78.8.   At this point we can do an extract data and this will have generated the output file in the working directory as well, of con2stn.txt, the one we just displayed here.   So you can see how the plume arrives and departs. There're different options for formatting the output, the output file. We will not go over them right now.

There is one other option, we can also plot the data and generate a nice time series plot. This is a simplified potting program, it does not have many features but it's a quick way of looking at the data.   And we can also add to this measurements.   Now some editing would be required to do this.   We need to find station 510.   Now it's provided in the tutorial directory, we know that, we mentioned it previously that the measured data are here in this file called captex2_meas.txt.   And like I said, the plotting program is relatively simple.   There are probably other commercial tools available that are much better. I know

there are. So what you have to do is extract from this file, every time you find Station 510. So for instance, edit, find, find station 510 and so here's station 510, so you need to extract this information or delete all the other records that are not station 510. And notice to that station 5 and has a duration, sample duration of six hours, only the sampling stations that were within three hundred kilometers of Dayton had a sampling duration of three hours, all the others were six hours.

Our output was, HYSPLIT output, was every three hours. To make this work from the standpoint of plotting, once you extracted the station 510 information, and we've done this for you in in the CAPTEX directory here at station 510. And for instance that first sample that I pointed you, the six hour sample, we had to edit this, and turn that one six hour sample in two to three hour samples. Of course they have to have the same value, because we do not know what the values were at three hour intervals. We only know what the model predicted at three hour intervals. So you can use this file, the M510 file, the measured 510, to also display.

So if you go back to utilities, convert to station menu, and now add the supplemental data file, the M510 file here, and now run the plot data, we can superimpose the measurements and the calculations on the same graph.

So these tools available through the HYSPLIT graphical interface can be helpful, but not all options are easily available here, and sometimes the best approach would

also be to just export these data into other commercial software for analysis purposes.   But these tools are provided as a package to make it a little bit easier without going through too many additional steps.

And this concludes the description of the utility programs.