Up to this point you should have successfully configured a concentration simulation for CAPTEX release number 2 for surface level concentrations. In section 9 we will expand this configuration to include aircraft measurements, aircraft concentration measurements. And at the same time we will look at different optimizations, or different parameterizations, that the model has and how changes to those can affect the subsequent model predicted concentrations. We will start by doing a base set up, a baseline set up for the subsequent examples. However, before we get started, since you had been doing many different simulations, it might be best to go ahead and clean up the working directory. Go to the advanced, clean up working, and go ahead and save and let the graphical user interface rename the directory. And after it successfully closes, open up the graphical user interface again.

The next step would be to load the parameters, the CONTROL file and the name list file, from the surface ground level air concentration simulation. Go to the setup run menu and retrieve the CONTROL file. We will review the parameters, because we're going to have to change them for the simulations. Ah, so if you were following instructions, we created a new working directory, of course the captex_control.txt does not exist there, but we know it exists in the previous working directory. So we can do it two ways. I'm going to actually copy them and put them into the working directory. Now we can continue on. You could have browsed and found them in that directory as well. Save and do the same thing for the name list file.

The next step is to configure the model for the aircraft concentrations. We're going to look at the same aircraft data that we did the backward trajectory for, the samples that were collected at 914 m above mean sea level, that single flight. And for that calculation we do not have to run the model for 68 hours. We know that the high resolution 3 hour sampling stopped on the 26th, so at 0600 Z would be the last sample, so we could just go ahead and set this to 13 hours, which would take us to the hour six the next day. And of course the starting place is Dayton, and we're going to go forward.

Now instead of using the North American Regional Reanalysis data, we're doing high-resolution kind of simulations. The NARR are data are every three hours, but we have WRF data that are hourly, of comparable resolution, so let's select that, and will use the 27 km resolution WRF.

The next step is let's take a look at the grids menu. Now we know the pollutant stays the same. It's 67,000 g per hour for three hours. But the grid, the grid menu is going to be this way. Let's avoid having too many output frames, so we will just have one output frame, and we know that the sampling stops at the 26th at 06, so if we start the sampling at the 26th 03, will only get one output frame. So that makes it a little bit easier and let's do a save here, and a save again, and again, and we're ready to run the model. Now we didn't open the name list menu but it would be running with 50,000 particles, which is probably

way too many for just a short duration simulation of 13 hours. But we will look at those issues in a little more detail further on.

The next step is to configure the display. And let's set the map a little bit further to the west, because we know that the tracer is going from west to east, so perhaps 41 N and 82.5 W. And we need to make sure that the multiplier E+12 to give us picograms PG. And let's force the contours this time, we have not yet done this. So instead of letting the plotting program dynamically set the contours, let's set them ourselves. And we can use the plus symbol to identify the contours that we want. And knowing already what the, I mean you had looked for instance at the aircraft data when we did the backward trajectory and we know that the peak was about 20, over 20,000 pg/m^3, so let's draw the first contour at 50,000, and then we will go at intervals like 20000, 10000, 5000, 2000, 1000, and the last one being 500. And we will increase the zoom as well, perhaps, let’s say 80%, and let's take a look at the result.

So you should have, you should have this graphic, showing this peak concentration here at this grid cell, this 25 km^2 grid cell, being about 20,000 pg/m^3. There is one additional step that we can do here, that is we can also plot the measured data on top of this. Now to plot the measured data, for the aircraft we had looked at, under the tutorial CAPTEX directory. As you recall, we had this, a 914 m above mean sea level flight. And this is the one that we're looking at. And you can see that these

samples are occurring every six minutes. The model output was only every three hours, so to be able to plot this, the program, the plotting program needs to match things in terms of its time. And the sample time is, this particular sample here you see is centered about 0300, on the 26th, when that six minute sample was collected.

So in a sense, you would have to edit this file to make it usable and we did that for you already in this data case, this case study, and this is the same aircraft data as flight 914. We just took this, this pass here, and put it in its own file and changed the units, such that the start is 0300. So we just made it plot-able. So you just have to realize these samples are all 6 minutes apart, but they are all centered about 0300, the approximate start time of that 6 minute sample. And this is what we call DATEM format, and these programs will plot files in DATEM format. So use the browse button and select the file data_case.txt and select display again. Now you can see the concentrations, the measured concentrations, plotted on top of the same graph as the model predictions. And you can see the highest concentration, the one that's near 30,000 pg, corresponds to the centerline area of the plume prediction. And even the extent, the horizontal extent of the plume, is very comparable to the measured data.

So this is the basic configuration. We're going to enhance this a little bit and once we're finished with enhancing it, then we will save the configuration. We're not going to save it just yet.

And this concludes the first section of number 9.