In this section we will use the source receptor matrix approach and the measurement data to determine which source location gives us the best fit with the measurements. If you are continuing on from the previous section, then no changes, no changes are required, except for one. If not, you should retrieve the CONTROL file and the setup file that were saved in that section. And briefly, when you have loaded that, you will see that in the concentration, advanced section, in the conversion modules, we have set the flag to restructure the concentration grid to the source receptor format, which means that we will be saving an independent array element for each source location in the concentration grid. And the CONTROL file, we are starting with three locations that defines the domain over which the lower left to upper right corners, half a degree resolution for this first interior grid point. This defines the domain which the preprocessor program will used to populate the CONTROL file with starting locations. And we are only running for 19 hours to the end of the three hour sampling. There is however one slight change we need to make from the previous source receptor configuration, and that is we need to go back and use the real source term. As you recall, it was 67,000 grams per hour, and we will leave it, so that we only look at one output time period. The next step is just to run the simulation, and that is special runs, matrix.

So this run is identical to the run that was done in the previous section, except the source term is now the realistic source term, the actual source term. Once the

simulation has completed we go to the concentration display menu, source receptor again, but now instead of view, we can still certainly do a view, but we will do stats instead. And we need to select the measured data file, which will be the three hour samples in the tutorial/captex directory, and we should convert the model output to pg, therefore E+12 should be the multiplier. And what this will do is convert for each source, the predictions, to DATEM format and compare them with the measurements and summarize the statistics in an output file called sumstats.txt. In addition, we will compute a graphic and that graphic will be whatever we want to use here, and I think for the default, let's take a look at the correlation, as the output graphic. So once we've made all the selections, we can just go ahead and process the data files for each source.

This does take a little bit of time, there are 214 sources that need to be processed, and for each one we do the conversion to DATEM format and then run the statistical program, like we had done for the basic CAPTEX release from the Dayton, Ohio, source.

We could monitor the progress in the working directory, but we don't generate any unique filenames. It’s just adding to the output file as we process each source location. So you can see we're still adding to that and in fact while we were talking, the processing has completed. Click on continue and we can open up the graphic now, of the correlation as the statistic. And we find that the best statistical result and in this case, and it's not great, but it's

.2, .3, somewhere in this range for a correlation was for a grid cell, source grid cell, that was near the Dayton, Ohio, location. To look at this a little more precisely, we could go to the working directory and look at the output file, that shows the statistics for each source location, and if I were to scroll down here, the correlation would be this column, and the highest correlation is near the, not close, but it's around that corner, and as far as the total, this one has the lowest normalized mean square error, I believe as well, and probably also has the highest rank.

So this is a way of using the matrix approach to find out in one simulation for many multiple sources which source could give us the best fit with the measured data. Now we probably could get some more robust results if we had released more particles. Because what happens is the number of particles is proportional, for sources, is divided into the particle emit rate, so if I were to look at the MESSAGE file for the simulation, you can see all our sources were defined, but we still have 50,000 particles, so we've spread 50,000 particles over those 214 source locations, so the particle release rate per source is actually quite small. So you may want to try redoing this with a larger particle release rate to see if the convergence toward a source location improves.

And this concludes our discussion of the source receptor matrix in this particular type of application. We will continue on looking at the source receptor matrix approach in more complicated configurations, where we will try to determine the time of release given a known

source location.

And that concludes the discussion for the source receptor statistics.