To complete the smoke and dust section, we will do an exercise. This exercise is going to be a continuation of the last simulation. If you recall that was the one we just did where we corrected the emission factors to get us a much better prediction.

All of the calculations that were done for the dust and smoke at this point did not assume any gravitational settling. In fact they treated both smoke and dust as a gas. So what I would like you to do is redo the previous calculation, but set it up as a particle, and let's compare the results of the particle calculation with the gas calculation results in the previous section. The hint to do this is assume a particle density of 4 g per cc, and a diameter of 2 1/2 µm, and a shape factor of one. I will pause, or you should pause now, and once you have the solution, go ahead and start the video again.

Okay you have your answer. Let's see what you did. Everything in the configuration, that's in the menu, in the graphical user interface, was already set up from the last simulation, the dust simulation. Hopefully if you didn't have that you would've gone back and done that first, or you could have run the batch file, of course, to get the results.

In any event we need to go into the setup run menu, in the deposition menu bar, and define this is a particle. So I will let this menu populate first and you can see right here the numbers that define a particle, nonzero values in the first line. And we want to do a particle diameter of 2.5

micrometers with a density of 4 g per cc, and of course the shape factor of one. That's all that is required. We've defined this is a particle and it will have dry deposition as well as gravitational settling as part of the calculation. Presumably if you did not, you will have loaded the set up for dust and so on.

And now just run model again. Remember this was the 21 locations that have been predefined with the constant emission factor, the maximum value, which is for all of these. So I'm going to pause for a moment while this is running.

And the model finally completed and let's take a look at the statistics. We'll just go directly to the conversion menu, and everything else is good. We're using the AirNow data, micrograms, create the DATEM file, compute the statistics, and we have an even better correlation coefficient 0.81, but we do have, instead of .74, we have a .64 ratio, so the measured, or the calculated concentrations are somewhat less, and if I look at the scatter plot, you can see there is an under-prediction bias, a slight under-prediction bias.

And I am not sure that the difference in the correlation coefficient is significant, but the point that we wanted to make here was that in this particular case, the inclusion of dry deposition, gravitational settling, only had a minor affect compared with changing the emission factors. Now that this may not be true if we were looking at the dust carried over continental distances. These are very short

distances and the receptors, the samplers are very close to the source region. So you should have gotten something along these lines and you can see that the number, the 245, was calculated compared to the calculated value in the previous, 283, so there was an approximate difference of 40 units, or maybe about 20%, 15 to 20% difference in the calculated concentrations.

So this concludes exercise 14.