To complete the source attribution methods section we will do a simple exercise. In this exercise we're going to try to determine the time variation of the emissions using the ratio method. You will use the nine output files, the nine HYSPLIT output files, one for each release hour, from 15 UTC until 23 UTC, that were created in the previous sections. The hint for this exercise is that instead of just doing a simple measured to calculated ratio, as we did in the original section, that is 12.2 I believe, where the emission rate was equal to the measured value divided by the unit source solution factor. So instead of that approach, I mean you could do it that way, but what I'm proposing is that you use the dilution factors already tabulated in the coefficient matrix, and compute a regression slope of measured over calculated. So that would actually give you a slightly more, or a slightly better fit of the measured and calculated data than just doing a ratio of the means.

So at this stage you should pause the calculation, pause the video, and when you've completed the exercise go ahead and start it up again.

Now that you're ready to continue, the best way to approach this is to go back into the working directory and find the coefficient matrix file which was called c2array.csv. We generated the same file in each of the previous two sections, and hopefully you would have Excel, or some version of Excel on your computer. And you can see here are the dilution factors for release time number one, and these are the measurement data that are

associated with those calculations and those dilution factors. And of course release 2, 3, 4, and so on.

So what we need to do is we want to generate the slope for, let's say the first release, and we will put that answer here. So you should go to formulas, functions, statistical, and find the slope. This'll be a regression slope, linear regression slope. And in this case we want the Y's to be the measured data, that is J2 to J17. And we want the X's to be the model dilution factors, that is A2 to A17. And then, okay, and there's our answer, 9641 g for that emission rate. And we can simply just go, now there's a trick, and I don't know remember what it is, to keep the J values the same, so if we do a copy it's going to … I made a mess over here.

Okay back to where we were. So now we can copy this and paste it across and for this value we just need to put the J's back.

So if your recall this is hour 17, 18, 19, so these are the three hours that we know the emissions to have occurred and instead of 67,000, we're seeing numbers like 130,000, 180, 200, and then the numbers drop again. So they're small here going up, reaching a peak during the hours that we know the emissions occurred, well, and then dropping again. So this approach does give us also some reasonable robust answers, and of course the regression line does fall through the slope, or the ratio of the means that we were doing in the first example. So you should've gotten something like this and these were the hours where

we had the actual emissions occurring.

And that completes the exercise.