In this section we will create a meteorological data file using user-entered data. The user entered menu permits one to manually enter data from one observation point, but for several time periods, to create a spatially homogeneous, custom meteorological file, at ten kilometer resolution, covering a 250 x 250 km domain.

To start this, go to the meteorology tab, convert to a ARL, user entered. The first thing we need to do is select the center of the domain. We know that the CAPTEX release location is Dayton, Ohio. So the suggestion, because we know that the winds will take the material to the East, we will center our data grid set slightly to the east, so at 40.7 North and 83.5 West. Now we need to create a text file with the meteorological observations. We do not have a file already created so we will create rather than select an existing file. So clicking on this button gives us a menu to enter data. It defaults to the current clock on the computer, but we know we want to do this calculation for the year 1983, in September, 09, starting on the 25th, hour 12 and minute 00. We know that, well for the example calculation, the winds are from the southwest, 225°, at six meters per second. And we're going to leave the default here of a mixed layer depth of 1500 above ground level. We also need to select a stability category; this is how the mixing will be computed. And the stability categories run from 1 to 7, one being the most unstable and four being neutral. So we will select a slightly unstable category. Now if you're not familiar with this stability category, you can go to a few websites to read about it. For instance Wikipedia and the stability category is a discrete

representation of how quickly a pollutant plume will mix in the horizontal and vertical.

Going back to the menu, once we've filled in the first information, click on the repeat button to save us entering data at different times. And now all we need to do is change values. So for each subsequent line we are only going to change the day and hour at six hour intervals. So for instance, the next time will be the 25th at hour 18, and then the 26th at hour zero, and then the 26th at hour six, and the 26th at hour 12, and the 26th at hour 18. Now for simplicity, looking to leave the direction and speed alone, so this is a very, say, unique situation, and that we're using a single wind to represent a much larger domain and this is really only valid at one height and should not be used for any complex calculations.

This approach is ideal if you're trying to produce results to match some other scenario. Perhaps an exercise where the wind directions and speeds might be prescribed for an incident. So let's save data to file and now we created this file call stndata.txt. If I were to look in the HYSPLIT working directory, you see here is stndata.txt, which just contains information that we entered.

So the next step is to just run the convert process which will then create the binary file that HYSPLIT can run with and that process is very quick, and if I were to go back to that working directory, we now see the binary file that is HYSPLIT compatible.

Well how do we know, you know, what's in here and did we create this correctly. We can go to the meteorology tab and display data that lets us, for instance, do a text profile. In this case we would select the file, the ARL formatted binary file which we know is stndata.bin. And then we want the winds to display in polar coordinates, direction and speed. We're going to start to display it at the first time and we can look at the output every hour, if you want to look at multiple frames, but we know there'll be the same. In this case we would not be setting the profile location, we could set it anywhere on the domain. We're just going to find out if we leave it at zero and what it will do, it will default to the center of the domain.

So if we click on run profile, we now created a text file that shows starting and stopping time of the file 2512 to 2618. Happens to be grid point 13 x 13, the approximate center of the domain. This is a very simple data set, and as you can see, the winds are from the southwest, which means that both the U and V components are both positive and equal. And the temperature profile follows a standard atmosphere, and the mixing components, these are the turbulent components in the U and the V and in the vertical direction. So that is how much of the fluctuation in the wind speeds, in the different component directions, which is a measure of the strength of the mixing and is just what was computed from the stability category and these winds apply, this mixing applies all way up to 1500 m, which is the top of the mixed layer and above that there's very little mixing. So this, no matter what grid point you look at, you will get a similar result, and of course all the

results are the same for every time, because we entered data, the same data, for every time period.

This sounding will be used later on …, not so much sounding, but this data set will be use later on in the calculations. But the main use of this is not to do complex simulations because really you cannot use one level of information to apply over a much larger domain. This would be mostly used in conjunction with other meteorological data, so for instance you might have a power plant with a meteorological observation at the stack and you could use that information to start the HYSPLIT calculation in the right direction. And then once it runs off the domain in either space or time, the HYSPLIT calculation could continue using other meteorological data such as NARR or WRF, a data set that might be appropriate for the calculation we are doing.

This this concludes our discussion of user entered meteorological data.