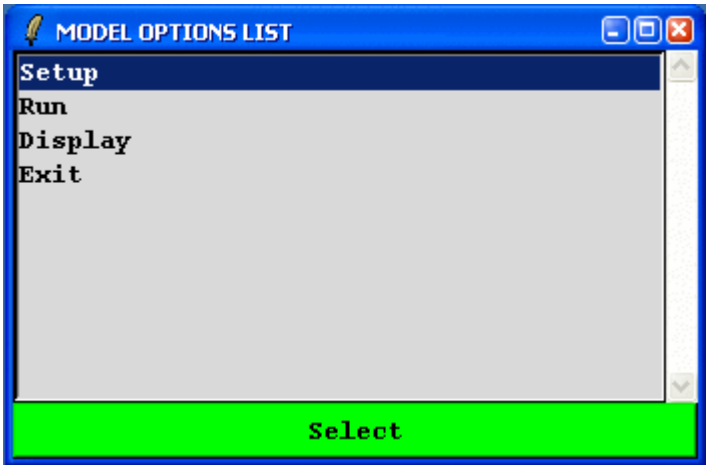
HYSPLIT AUTO CONFIGURATION
Version 2.00 – March 2008

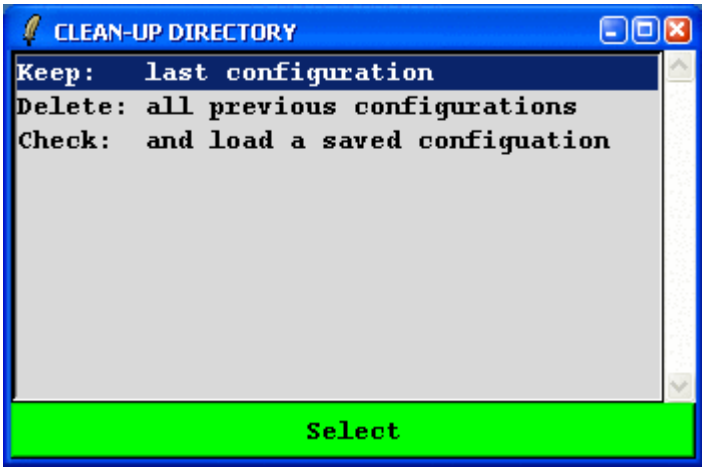
The HYSPLIT "QWIK" Graphical User Interface (GUI) is designed to quickly configure, run, and display dispersion simulations. The options are limited to the ones most relevant for shorter-range emergency response applications using the current forecast meteorological data from National Center's for Environmental Prediction's (NCEP) 12 km resolution North American Mesoscale Model (NAM). If greater simulation flexibility is required, the last QWIK configuration would be loaded automatically when the standard HYSPLIT GUI is invoked. This document only discusses the options available through the QWIK GUI, which requires a complete HYSPLIT installation, including all auxiliary software, as described in the index file on the accompanying CD.

The primary difference between this version (2.00) and the version introduced last year (1.00) is that the vertical and temporal resolution of the meteorological data has been enhanced from interpolated pressure levels to terrain following sigma levels, from three-hourly to hourly data intervals, and increased forecast duration from 18 to 48 hours. As in the previous version, meteorological data are only available to about 3 km above ground level. However, to reduce the file size, the previously single CONUS file has been divided into four quadrants representing the Northeast (NEtile), the Southeast (SEtile), the Northwest (NWtile), and the Southwest (SWtile). The QWIK interface automatically selects the correct tile based upon the starting location. Furthermore, the meteorological file download is now available from a 24/7 operationally supported server supported and backed up through the NOAA's CIO office.

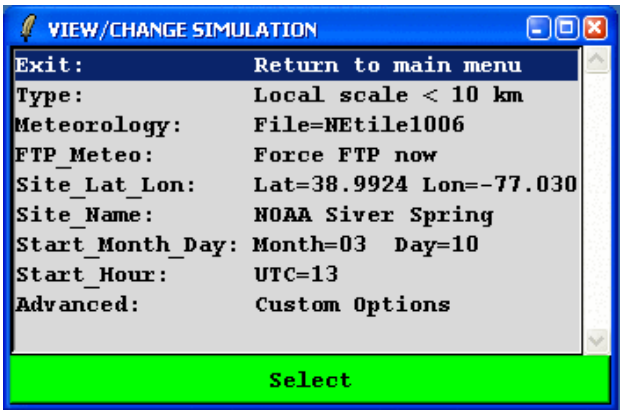
Starting the "QWIK" GUI opens two windows, the small red **auto configuration** menu bar that anchors all subsequent menus

and either the main **model options list** window that is used to select and open one of the three menu functions: setup, run, and display or the clean-up directory window if previous simulation files are detected. Upon deleting or selecting a simulation the main model options list window will open.

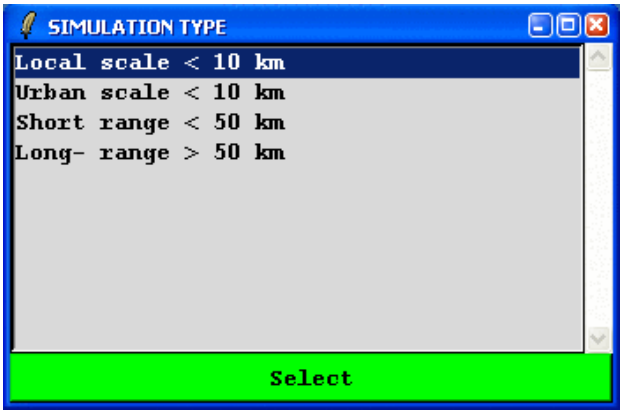




1. The Setup Menu



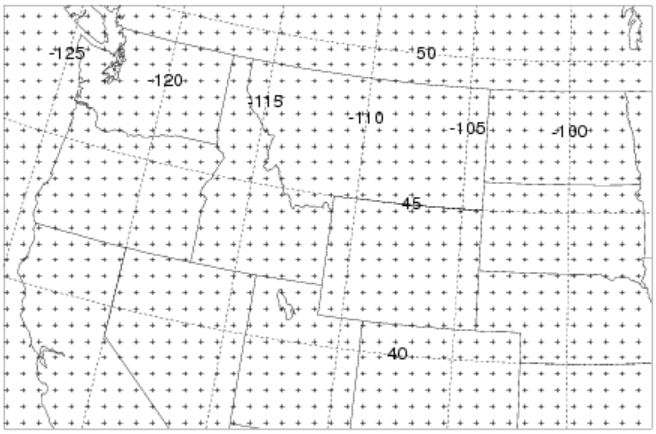
Selecting the setup menu opens another menu that is used to **view or change** the most important simulation parameters. The menu item name is shown on the left side and the current value for each item is shown on the right side. Each menu item will be discussed in more detail in the following paragraphs.

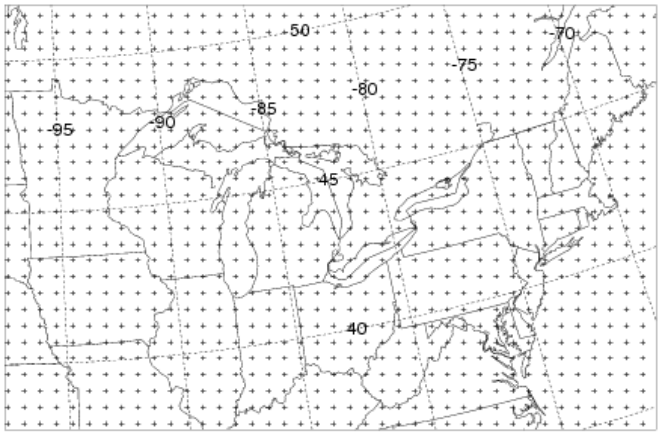


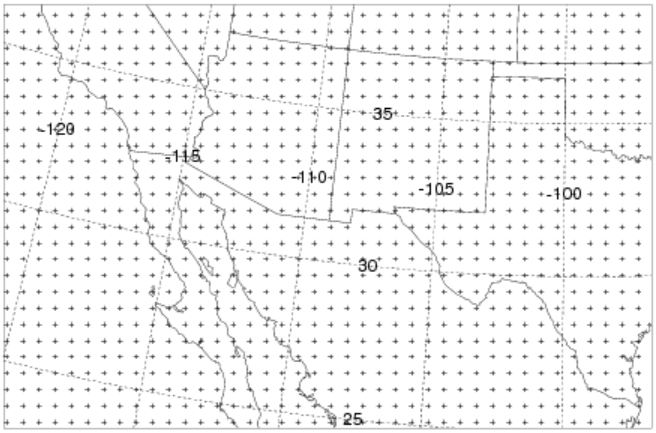
Simulation **Type** defines a local scale, short range, or longer-range simulation. The selection of type automatically sets the run duration and concentration grid resolution. The urban scale settings are the same as those for the local scale except that the nighttime turbulence is slightly enhanced and a greater amount of turbulence is directed toward the vertical component. This setting should only be used for release locations within a central urban area.

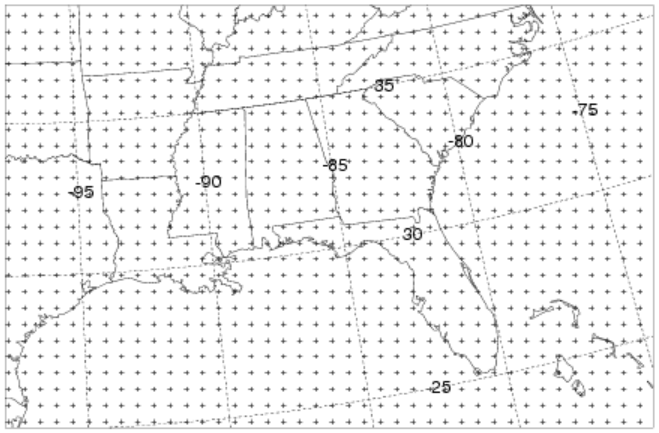
The **Meteorology** selection (not shown) opens up a menu with a list of available data files. Upon the initial GUI installation, no meteorological data files are available in the working directory and therefore this menu will not open. The file name is automatically constructed from the current day and forecast cycle as determined from the computer's internal clock. File names always follow the convention of {NE|SE|NW|SW}tile{DD}{HH}, where DD is the day of the month (00 to 31) and HH is the GMT hour of the forecast cycle (00, 06, 12, or 18). A forecast is normally available about 3 hours after the cycle time. The forecast data downloaded through QWIK are a spatial extract over the CONUS of the full-domain NAM forecast over four different spatial domains (tiles) and are valid out to +48 hours after the cycle time. Meteorological data files are always saved in the *\hysplit4\working* directory.

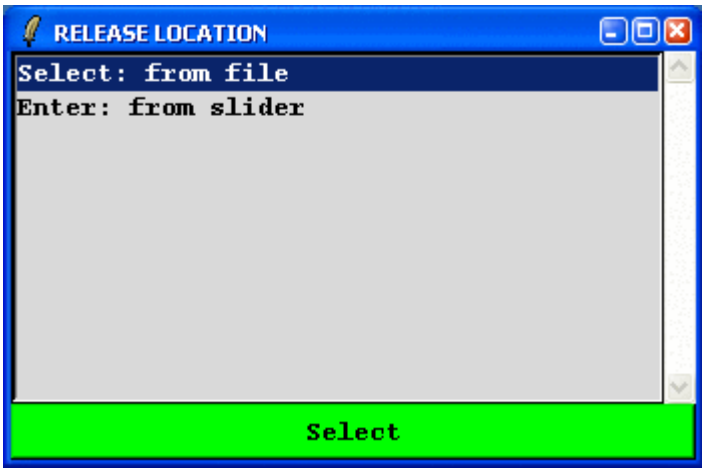
The meteorological tiles (NE|SE|NW|SW) are selected automatically based upon the starting location and the domain for each are shown below, with the + representing every 5th grid point for clarity. There is a five grid point overlap between all tiles eliminating the need to force a tile selection in the event a starting location is near a tile boundary. Although the tile selection is automatic, a particular tile can be forced by first setting the starting location within the desired tile region and updating the meteorological file and then resetting the starting location to the original position but not re-computing the meteorology file name.



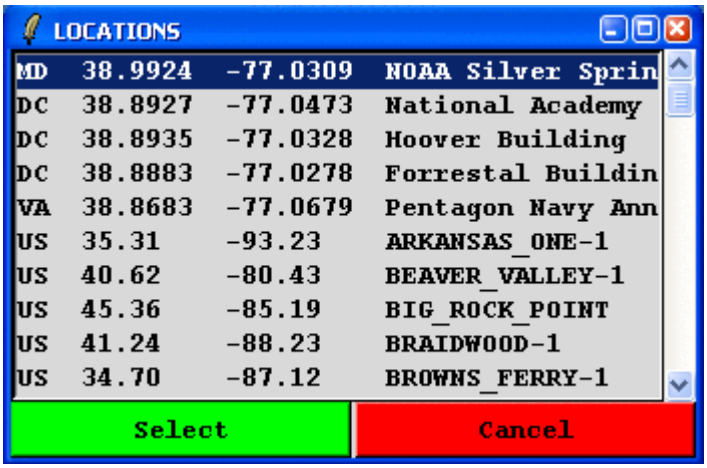




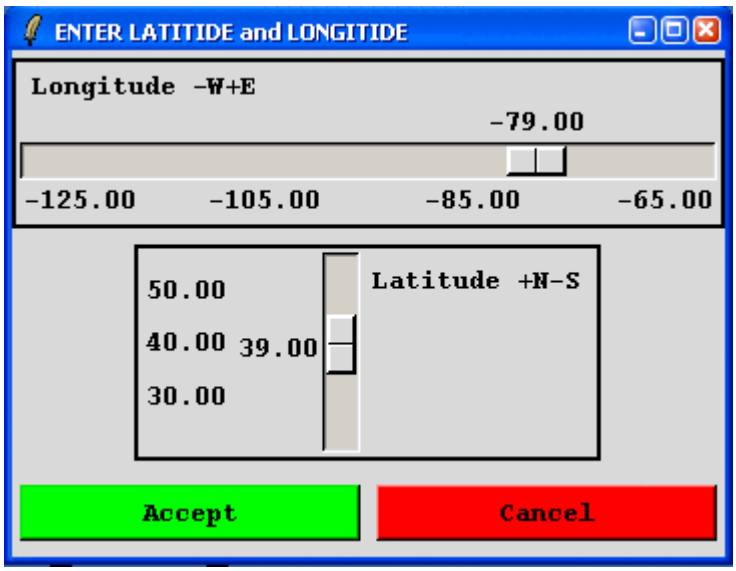




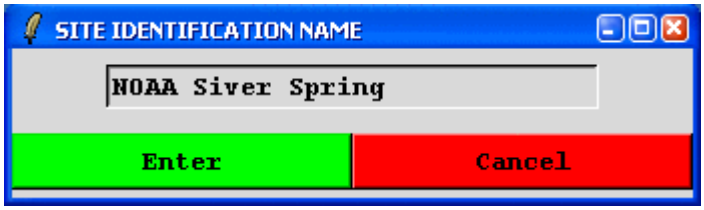
The **Site_Lat_Lon** from the setup menu sets the **Location** from which the pollutant will be released. A new location can be selected either from a list tabulated in the *plants.txt* file or entered directly by moving a set of slider bars. The plants.txt file of starting locations can be customized in any editor such as Notepad.



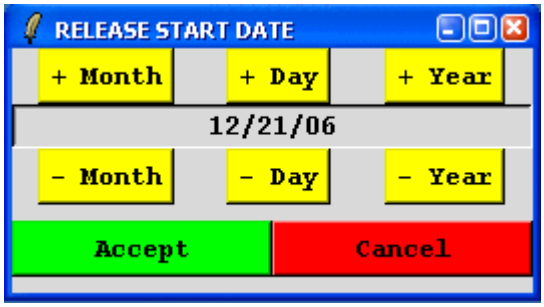
The starting **Locations** in the supplied file show several locations in the Washington DC metropolitan area and also the general (0.01 degree resolution) location of every commercial nuclear power plant in the U.S. The latitude and longitude can be given in as many significant digits as required to locate the pollutant release location. The file is located in the *\hysplit4\qwikcode* directory.



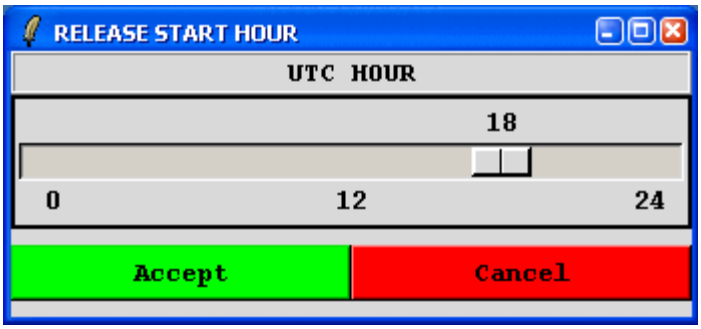
The release location **Latitude and Longitude** can also be entered using a set of slider bars. The slider bars should be dragged to the approximate location and then by placing the pointer either to the left or to the right of the bar, clicking the left mouse button will move the slider at 0.01-degree increments.



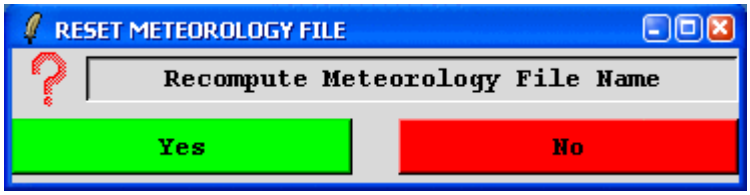
The **Site Identification Name** is just a text string that identifies the release location. It plays no role in the simulation configuration and it is only used to label the output graphics.



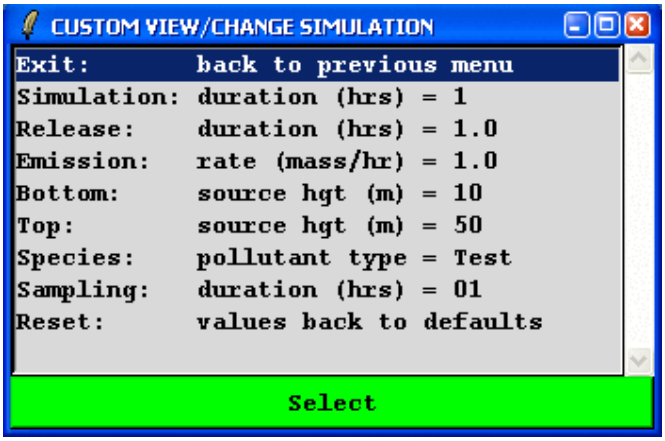
The initial values of the **Release Start Date** are always set from the current value of the computer's internal clock regardless of the value set in the last entry from this menu. Times are always shown, and should be set in GMT, which is either 4 or 5 hours later than EDT or EST, respectively.



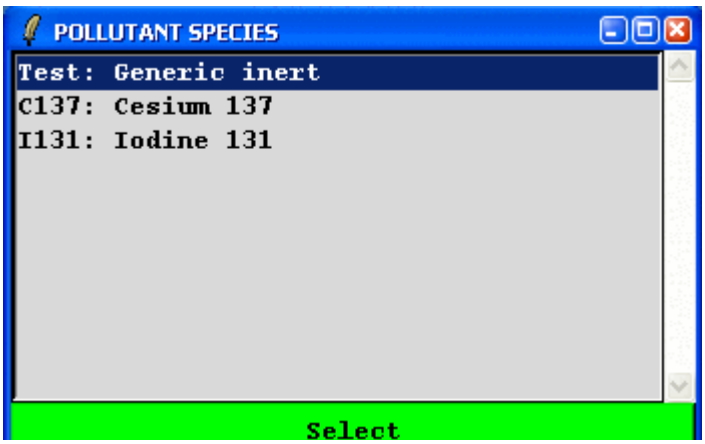
The **Release Start Hour** is set using a slider bar in increments of one hour. As with the date, all times are in GMT. A start hour of 24 is considered to be the same as 0 for the current day.



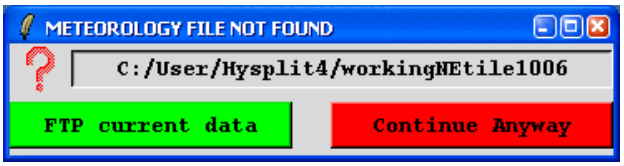
If either the release location, date, hour is modified, a new window appears requesting whether the **meteorological file name** should be changed to reflect the new release time. For example, the file name would NOT be changed if the release time were after the current forecast cycle time but before the new forecast data are available for download. In this case it would be necessary to use the previous forecast data file.



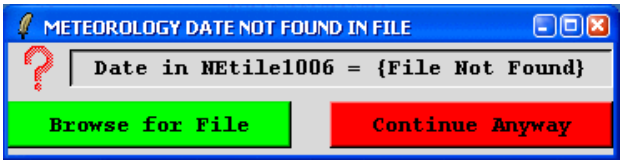
The **Advanced** menu brings up additional options that normally would require more detailed information about the incident. For instance, the simulation duration would be the number of hours the pollutant is tracked while the release duration is the number of hours the pollutant is emitted from the source. The release duration should be less than or equal to the simulation duration. The bottom and top of the pollutant release layer represents the initial vertical distribution of the pollutant release. For instance, a release within the urban complex would suggest that the initial vertical distribution should be comparable to the height of the nearby buildings. Changing the sampling duration time would change the number of frames of output graphics. The default is a one hour simulation and a one hour average output.



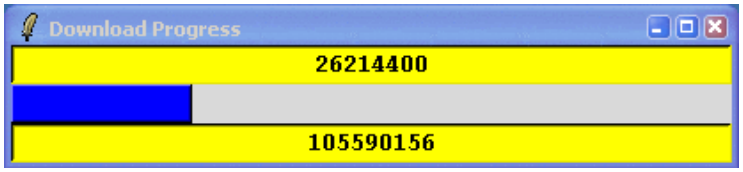
If nothing is known about the release, the **pollutant species** should be left as the test generic inert species, which does not transform or deposit. Two other pollutants are available. For instance, selecting either Cs137 (Cesium) or I131 (Iodine) sets the appropriate value for radioactive decay and wet and dry deposition.



Once the simulation has been configured, exiting from the setup menu causes the script to check to see if the **requested meteorological data file** is in the *\hysplit4\working* directory and if it contains appropriate data for the requested start time. There are two options. The FTP button will open a new window and transfer the most current forecast data file. The continue button goes on to the next section of the script to check the contents of the selected meteorological file. Note that the contents of a missing file cannot be determined.

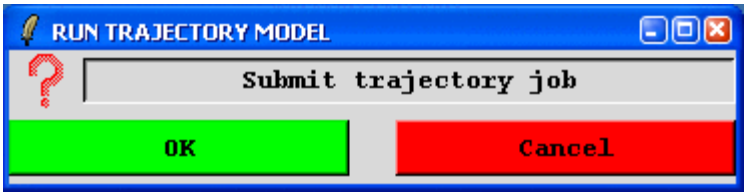


If the meteorological data file doesn't exist or if the file's **data contents** don't match the request, then the browse button opens the file selection menu. If the required file is in the *\working* directory, then select the file according to its day and cycle name suffix. Continuing anyway will take you back to the main options selection menu.

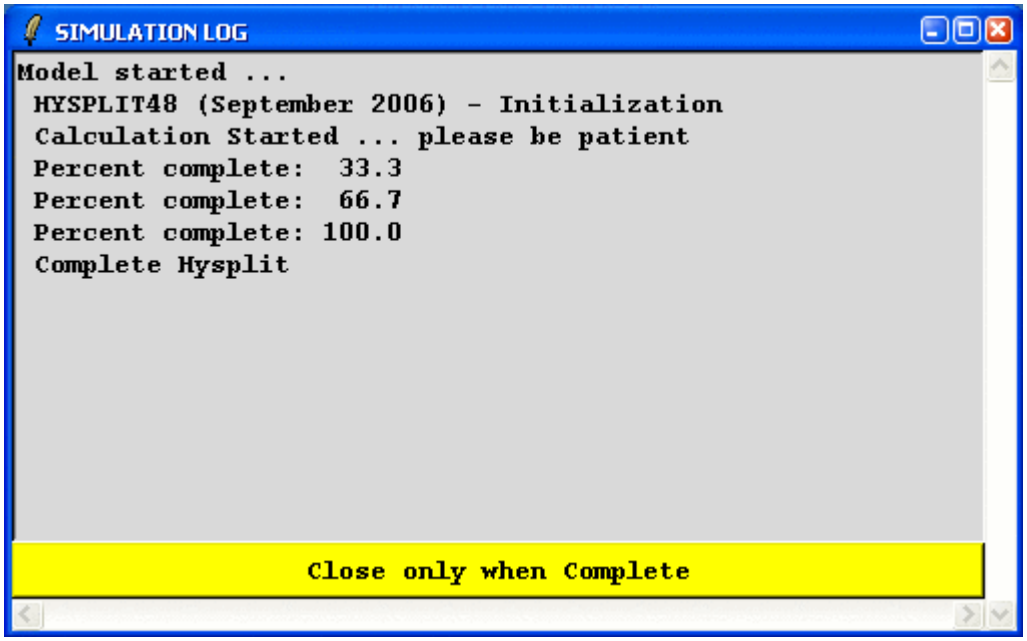


In the previous menu, selecting FTP opens a **download progress** menu that shows the number of bytes downloaded on the top line and the total number of bytes in the file on the bottom line. The file names of the current forecast data on the FTP server are always the same. The script determines the file's contents after the download has completed and then renames the file according to the valid day and cycle time of the forecast data. If required, the new data FTP download can be forced from the main setup menu.

2. The Run Menu

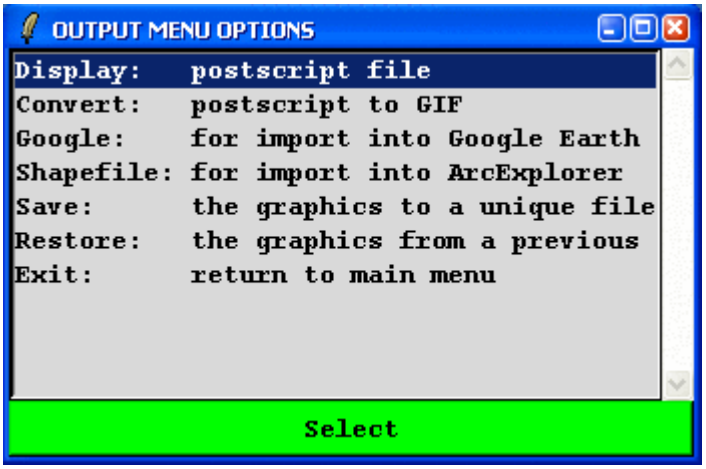


Once setup has completed and there are no longer any unresolved meteorological data issues, selecting run first starts the **trajectory calculation**. Canceling this step skips directly to the run dispersion model menu.

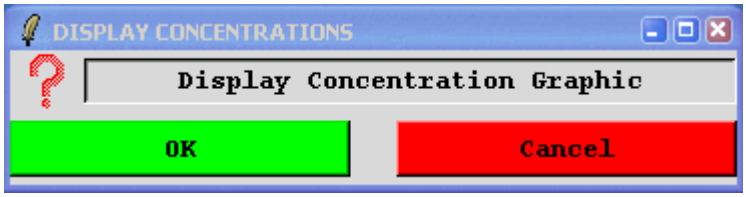


Running either the trajectory or dispersion model opens the **simulation log**, which shows the calculation progress and any standard output or error messages from the model simulation. ONLY when the log message indicates that HYSPLIT has completed, press the yellow close button to continue to the next step. A similar sequence of menus is displayed during the plume dispersion calculation.

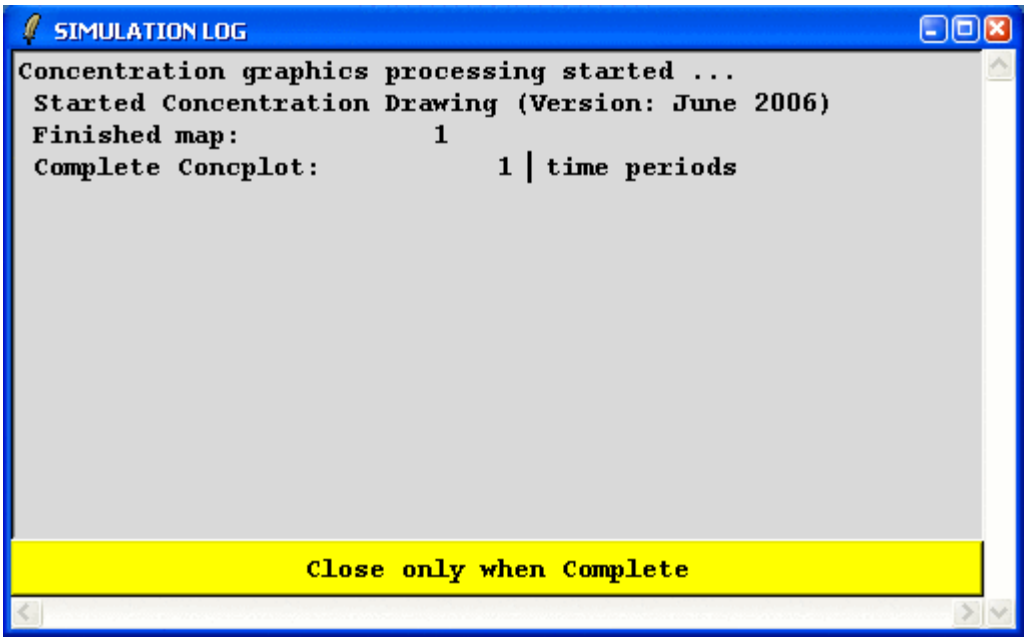
3. The Display Menu



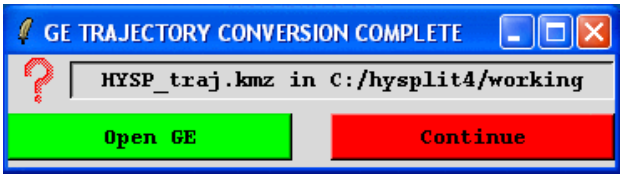
Upon completion of the trajectory and dispersion runs, the script reopens the main options window and now selecting display opens the **output menu options** window. All the options here are used to convert the raw model output files to another format for graphical display. For some of these conversions, no additional menu is opened. During the conversion computation, the output menu options window temporarily disappears and reappears when the conversion has completed.



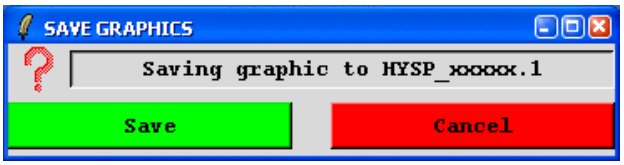
Selecting **display** opens a trajectory and concentration graphic option in sequence, so that either display can be skipped if desired. The HYSPLIT output files are first converted to Postscript prior to opening the viewer.



Both the **trajectory and concentration plotting** programs open a simulation log window during the conversion of model format to Postscript. This window needs to be closed only when the conversion has completed to open the Postscript viewer.



The **Google Earth** conversion will create two output files, *HYSP_traj.kmz* for trajectories and *HYSP_conc.kmz* for concentrations. Both of these files are compressed zip files that contain all the files required by Google Earth. Double clicking on these files from Windows Explorer will open GE if it has been previously installed. Note that due to certain incompatibilities between the GUI interpreter and GE, it is not possible to open GE from within the GUI.



The **Save Graphics** option appends a sequential number at the end of all configurations, model output, and graphics files so that they can be loaded as a starting point for setting up future simulations or redisplayed upon subsequent initiations of the GUI. Note that when saved simulations are present in the working directory, a window is displayed upon opening the GUI that gives the user the option to select one of the saved simulations or delete them all.

4. Automated Operations

Although the previous discussion focused on the manual aspects of configuring and running various simulations, the entire process could be automated on any PC running XP through the use of the scheduler. The easiest process to automate would be the retrieval of the most current meteorological forecast data file. An FTP script (*qwik_data.tcl*) is provided in the *\hysplit4\qwikcode* directory that can be used to automate the data retrieval process. The script should be run four times per day at 0000, 0600, 1200, and 1800 hours local time to obtain the corresponding GMT forecast cycle data. For instance, the 1200 GMT forecast cycle would be available for download at 1200 EST. In this way, whenever the GUI is started, the most recent forecast data are already available in the *\hysplit4\working* directory. Note that for non-standard installations it may be necessary to edit the script to insure that the data files are copied to the correct directory. Also it is necessary to run the script once manually to permit windows the opportunity to open the firewall protections for this program. By default the script will obtain all four tiles, 200 Mb each, 800 Mb per cycle, or 3.2 Gb per day. Because files are named by day (month and year is omitted), only data for the last 30/31 days are stored in the HYSPLIT working directory, requiring about 100 Gb of disk space. If not all tiles are required, then simply edit the *qwik_data.tcl* script to remove the lines for the tiles not required to be downloaded:

```
append input "get hysplit.t${CYC}z.namsf.$tile(1) $tile(1)\n"  (NEtile)
append input "get hysplit.t${CYC}z.namsf.$tile(2) $tile(2)\n"  (NWtile)
append input "get hysplit.t${CYC}z.namsf.$tile(3) $tile(3)\n"  (SEtile)
append input "get hysplit.t${CYC}z.namsf.$tile(4) $tile(4)\n"  (SWtile)
```

When the script is run, messages are written to the *msg_ftp.txt* file. The most common reason for a "download error" would be that the script is run prematurely before the data files for that cycle are available for download.