

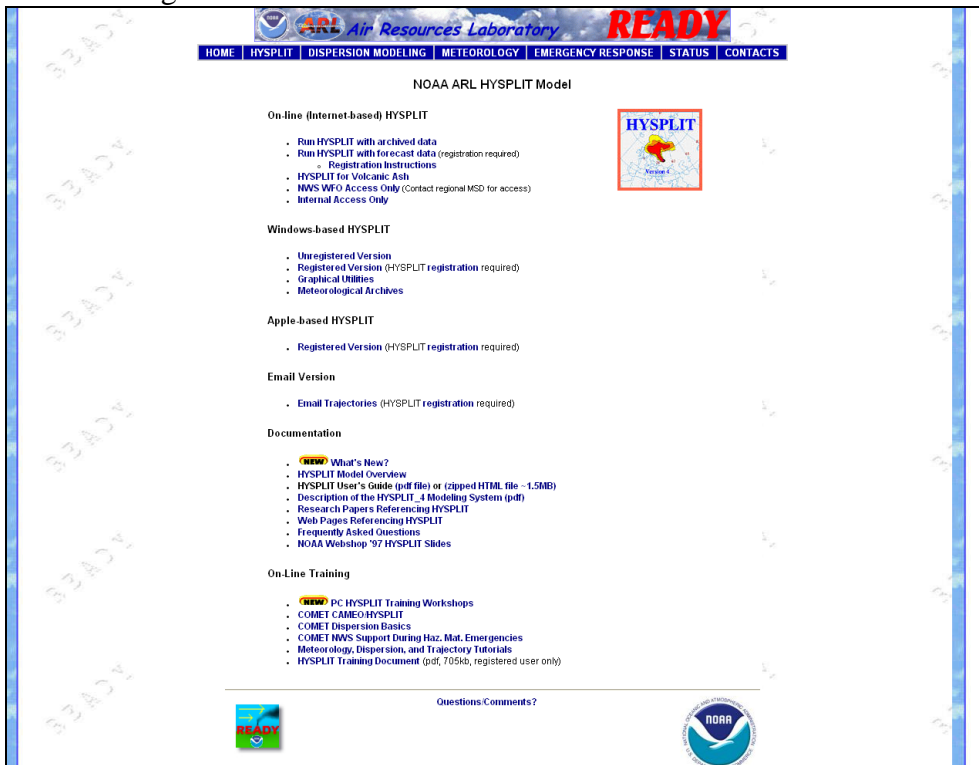
How to calculate trajectories on-line on noaa's web-page.

This is a “getting started” document created by M. Engardt September 2006. Most steps also have very good explanations on the web-page.

(Updated August 2007, Magnuz Engardt)

1) Start your browser (e.g. Internet Explorer) and go to:
<http://www.arl.noaa.gov/ready/hysplit4.html>

You should get a window similar to this one:



We will use **HYSPLIT-WEB (internet-based)**.

You may also want to check the **Documentation** and **On-Line Training** for additional information.

At a later stage you can of course also download a “Registered Version” of HYSPLIT to your personal computer. This will probably turn out much more practical if you are to use the trajectory model extensively.

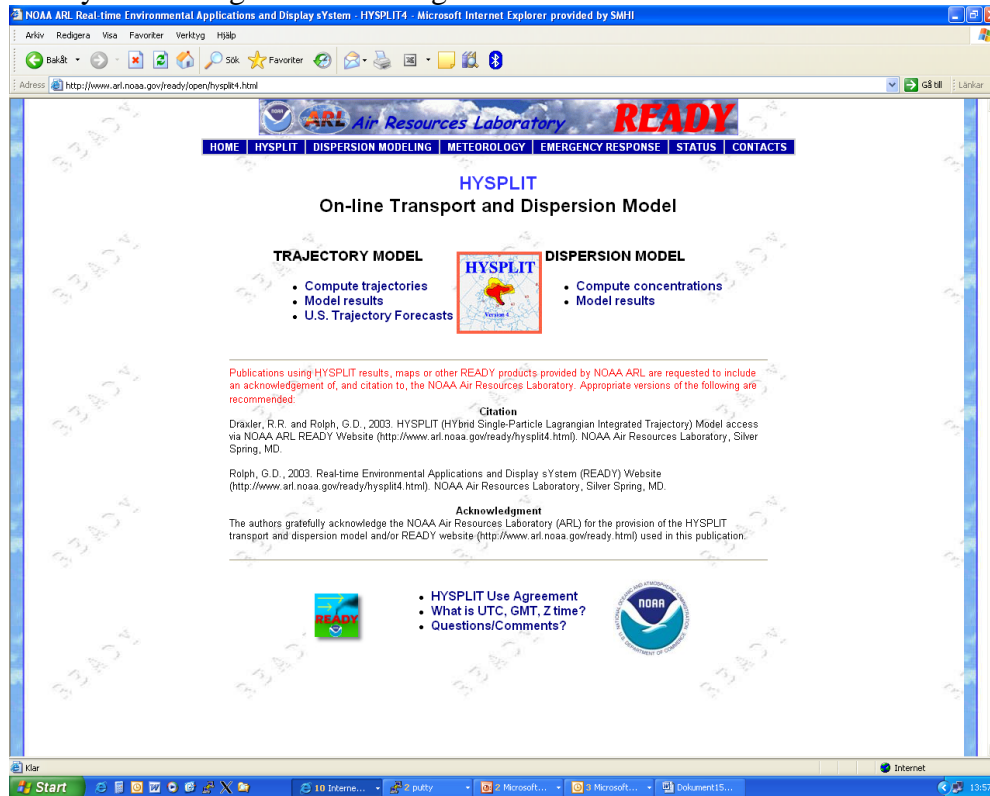
2) Click on:

- **Run HYSPLIT with archived data**

(Alternatively go to the **HYSPLIT**-meny and choose **Run with Archived Data**)

If it appears, read the HYSPLIT USE AGREEMENT and click the **Close Window** –bottom.

Now you should get the following window:



3) Click on:

- **Compute trajectories**

4) **Choose an archived meteorological dataset.**

GDAS: Global data on $1^{\circ} \times 1^{\circ}$ (~110 km \times 110 km) resolution, 23 pressure-levels up to 20 hPa. [Data available: December 2004 \rightarrow present]

FNL: Global data on 190 km \times 190 km resolution, 13 pressure-levels up to 20 hPa. [1997-2006]

EDAS: Data for USA only

NGM: Data for USA only.

GLOBAL REANALYSIS: Global data on $2.5^{\circ} \times 2.5^{\circ}$ (~280 km \times 280 km) resolution, 17 model levels. [1948-almost present]

We will use GDAS as far as possible, thus click on GDAS.

5) On the next window you have to **Select an archive file** which covers the period you are interested in. The filename tells you what period is covered in each file. At the bottom of the page is explanatory text on the name convention. There is also a link to a table with missing data periods. After selecting an appropriate file, click the **Next >>** –bottom.

In the on-line trajectory model, the meteorological data is stored in 3- to 15-day archives (which you select manually depending on arrival/departure date of your trajectory). The trajectory calculation can most often extend into the period immediately preceding or succeeding the selected one. To calculate trajectories that extend over several periods requires manual adding of the trajectory results.

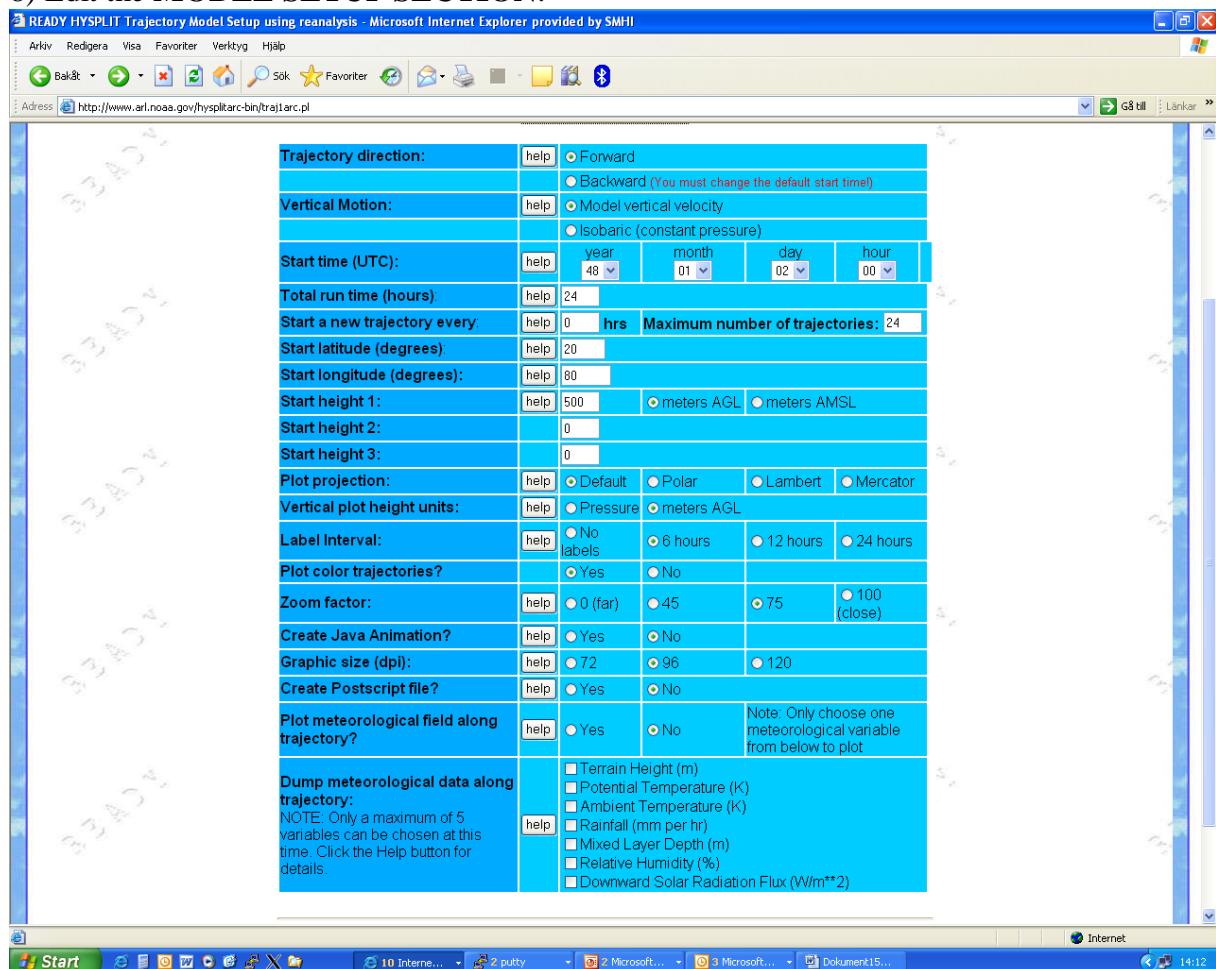
6) Choose the Number of Trajectory Starting Locations.

It is most convenient to select only 1. You can request multiple trajectories at a later stage.

7) Choose a Trajectory Starting Location... (or Arrival Location –in case of backward trajectories)

Enter latitude and longitude of the arrival/departure location you are interested in. In case you do not know the exact co-ordinates you may choose an approximate location by selecting it on the map provided (not possible for the GLOBAL REANALYSIS).

8) Edit the MODEL SETUP SECTION:



8a) You may want to change/check the following items. The others can be left at their standard values. Many entries relate to the type and quality of the output (which can be adjusted later).

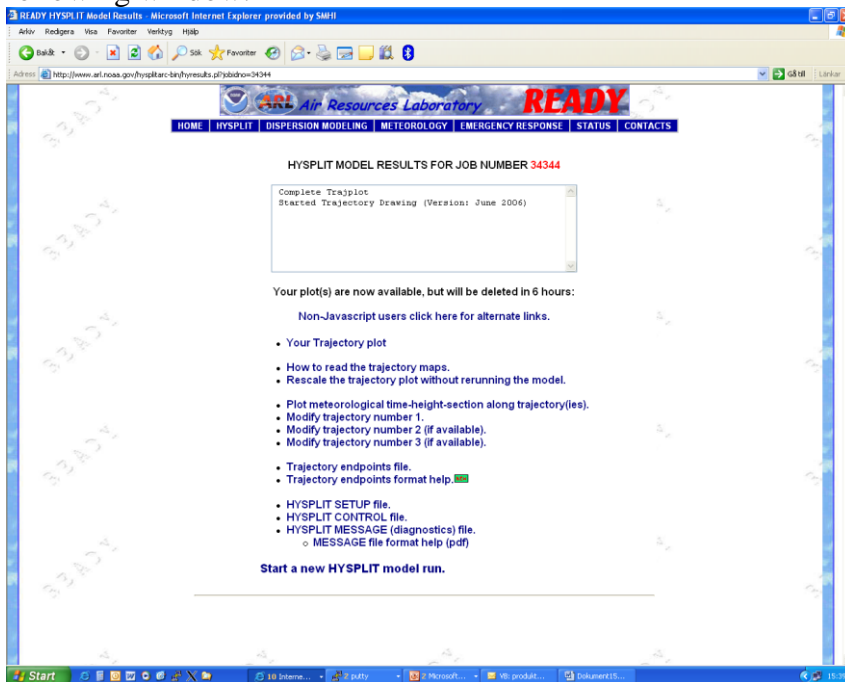
Trajectory direction:	Forward or Backward? Use Backward if you want to know where the air is coming from.
Start time (UTC):	Use curtain-menus to set your desired arrival- (backward trajectory) / departure (forward trajectory) date. If the date you want is not available in the menu, you must go back and select another archive file (see section 5 in this manual).
Total run time (hours): (Start a new trajectory every:)	Set length of trajectories (e.g. 120 hours = 5 days) If you want several trajectories arriving/departing to/from the same position, but at different times, you should give interval (in hours) of new trajectories here. [Trajectory length seems to be affected by choosing this utility!]
(Maximum number of trajectories:)	The number of trajectories arriving/departing at different times to/from the same point.
(Start latitude 1 (degrees):)	Should be the value you have already provided
(Start longitude 1 (degrees):)	Should be the value you have already provided
(Start 2/3 latitude/longitude ...)	If you want several trajectories (of same length and at the same arrival/departure date) on the same map, give co-ordinates here.
Start height 1,2,3:	Vertical height of arrival/departure location 1,2,3 The height could be given as meters above ground, (AGL) or meters above mean-sea level (AMSL).
Plot meteorological field along trajectory?	By choosing Yes you replace the information about vertical position of the airparcel with a time-series of one meteorological variable selected in the next entry.
Dump meteorological data along trajectory:	You can examine the co-ordinates (latitude, longitude, height (m) height (hPa), plus extra meteorological variables in a separate file.

8b) When done editing the table, click on the -box

8c) On the following web-page, click on the -box

8d) Wait until your request is completed (the web-page is updated automatically; you may also hit on your keyboard to manually force an update of the web-page).

9) When your requested trajectories are calculated and the plot is ready, you should have the following window:



9a) Select:

- **Your trajectory plot** to see the results.

The results will be displayed in a new window (which will be overwritten when a new trajectory is requested).

To save the graphics, use one of (i-iii):

- (i) Right-click on the figure and choose "Copy". Go to a Word-document and paste (Ctrl-V) the figure at a suitable position.
- (ii) Go to "Archive"-menu of your browser, select "Save as ...", Choose a suitable file-name and remember the directory where you store your gif- or bmp- file.
- (iii) Hit the Print Scrn button on your keyboard, Paste the buffer into your word-document.

9b) To change the appearance of the plot you chose:

- **Modify the trajectory plot without rerunning the model.**

9c) To examine the exact co-ordinates of your trajectory or to check the auxiliary data along the trajectory, click:

- **Trajectory endpoints file.**

The trajectory endpoints file look something like this (a somewhat outdated explanation is available on the web-page):

```

2      1
GDAS   6      6      29      0      0
GDAS   6      6      22      0      0
1 FORWARD  OMEGA
6      6      29      0      20.000      80.000      500.0
2 PRESSURE RELHUMID
1  1  6  6  29  0  0  0  0.0  20.000  80.000  500.0  920.0  88.7
1  1  6  6  29  1  0  1  1.0  19.925  80.193  529.5  914.1  88.7
1  1  6  6  29  2  0  2  2.0  19.834  80.382  554.5  908.5  88.9
1  1  6  6  29  3  0  3  3.0  19.731  80.563  576.5  903.0  89.5
1  1  6  6  29  4  0  2  4.0  19.618  80.733  615.4  897.0  88.1
1  1  6  6  29  5  0  1  5.0  19.495  80.898  673.1  888.2  88.2
1  1  6  6  29  6  0  0  6.0  19.355  81.058  742.6  878.4  89.8
1  1  6  6  29  7  0  1  7.0  19.215  81.215  817.0  867.5  92.0
1  1  6  6  29  8  0  2  8.0  19.095  81.371  887.4  857.6  93.4
1  1  6  6  29  9  0  3  9.0  18.992  81.529  941.6  848.1  94.0
.  .  .  .  ..  ..  .  .  ...  ...  ...  ...  ...  ...
.  .  .  .  ..  ..  .  .  ...  ...  ...  ...  ...  ...
.  .  .  .  ..  ..  .  .  ...  ...  ...  ...  ...  ...

        <-----date and time----->          Hour    Lat.    Long.    z (m)  p (hPa)
                                                    |
                                                    extra
                                                    Meteorological
                                                    Parameter(s)

```

10a) To rerun the trajectory model using the same archived meteorological dataset, select:

- **Rerun the model with user entered defaults.**

10b) To rerun the trajectory model using a *new* archived meteorological dataset, select:

Start a new HYSPLIT model run.

then

- **Compute trajectories**

etc.