

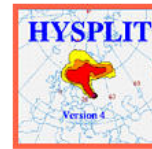
## Blog Help Files: HYSPLIT Airmass Trajectories

The HYbrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) transport model is provided by the U.S. National Atmospheric and Oceanic Administration (NOAA) Air Resources Laboratory (ARL). You can use HYSPLIT to estimate the forward or backward trajectory of an airmass, which is very useful for interpretation of an air quality event. Back trajectory analysis is useful for ascertaining the origins and sources of pollutants, while forward trajectory analysis is helpful for determining the dispersion of pollutants.

Below are instructions for running a basic trajectory using archived meteorological data. Note that with archived data, you can only run a trajectory for events that have already occurred. If you want to be able to use forecasted meteorological data, you must register with ARL and obtain a password.

1. Go to the HYSPLIT model home page: <http://www.ready.noaa.gov/ready/hysplit4.html>
2. Click “run HYSPLIT with archived data” to use HYSPLIT without registering. [If you want to run the model using forecasted data, you must register and obtain a password.]

### HYSPLIT MODEL



#### HYSPLIT-WEB (Internet-based)

- **Run HYSPLIT with archived data**
- Run HYSPLIT with forecast or archived data (registration required)
  - Registration Instructions
- HYSPLIT for Volcanic Ash
- NWS WFO Access Only (Contact regional MSD for access)
- Internal Access Only

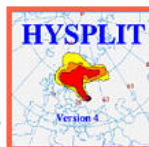
3. Under “TRAJECTORY MODEL” near the top left hand side of the page, click on “compute trajectories.”

### HYSPLIT

#### On-line Transport and Dispersion Model

##### TRAJECTORY MODEL

- **Compute trajectories**
- Model results
- U.S. Trajectory Forecasts



##### DISPERSION MODEL

- Compute concentrations
- Model results

4. Choose the “GDAS (global, 2005-present)” archived meteorological dataset.
5. Select the appropriate archive file. Files are listed by month, year, and week. For example, “gdsl.oct07.w4” includes all days in week 4 of October 2007.
6. Choose 1 trajectory starting location.
7. The easiest way to choose a trajectory starting location: in the box next to “WMO ID,” enter the station ID for the city where you would like to base the trajectory. Airport codes work well here; for example, New York’s John F. Kennedy Airport is “JFK”, Chicago’s O’Hare Airport is “ORD,” and Los Angeles’ International Airport is “LAX.” If you don’t know the station ID for your city of interest, click on “Station Lookup” next to the “WMO ID” box and follow the directions. Once you have entered the station ID, click the grey box that says “Next.” Alternatively, you can enter a latitude and longitude for the trajectory starting location or click a location on the map.

For this example, I will compute a trajectory for Dulles International Airport (IAD).

## GDAS1 TRAJECTORIES

### Choose a Trajectory Starting Location...

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1. Enter a WMO or ICAO station ID (i.e., dca) or a latitude/longitude pair (decimal degrees, XXX.XX):

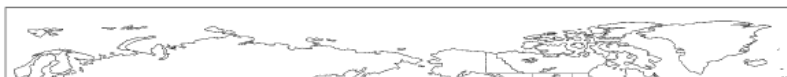
WMO ID: [Station lookup](#) [Convert Deg/Min/Sec into Decimal Degrees](#)

Latitude (South is negative, i.e. -25.50):

Longitude (West is negative, i.e. -140.95):

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Or  
2. click on a location on the following map(s):



8. Under “Model Run Time Options,” select the following for a basic trajectory:
  - Select “Forward” or “Backward” for the “Trajectory direction,” depending on whether you want to calculate a forward or back trajectory.
  - Select the appropriate end year, month, day, and hour to either start your forward trajectory or end your back trajectory. *Note: the hour is in UTC.\**
  - “Total run time (hours)” is the total time your trajectory will run. The default value is 24 hours. Depending on conditions of your analysis, you may want to enter a different run time.
  - Recommended starting heights for your trajectories: “1000” for “Start height 2” and “1500” for “Start height 3.” These are the meters above ground at which your trajectories will originate; 500 – 1500 meters will be in the boundary layer.

## MODEL RUNTIME OPTIONS

Trajectory direction:	help	<input checked="" type="radio"/> Forward			
		<input type="radio"/> Backward (You must change the default start time!)			
Vertical Motion:	help	<input checked="" type="radio"/> Model vertical velocity			
		<input type="radio"/> Isobaric			
		<input type="radio"/> Isentropic			
Start time (UTC):	help	year 09	month 09	day 14	hour 21
Total run time (hours):	help	24			
Start a new trajectory every:	help	0	hrs	Maximum number of trajectories:	24
Start latitude 1 (degrees):	help	38.95			
Start longitude 1 (degrees):	help	-77.45			
Start 2 latitude (degrees):					
Start 2 longitude (degrees):					
Start 3 latitude (degrees):					
Start 3 longitude (degrees):					
Start height 1:	help	500	<input checked="" type="radio"/> meters AGL	<input type="radio"/> meters AMSL	
Start height 2:		1000			
Start height 3:		1500			

9. Under “Display Options,” **if you want your trajectories in Google Earth format**, select “Google Earth” for the “GIS output.” Leave everything else unchanged.

## DISPLAY OPTIONS

Plot projection:	help	<input checked="" type="radio"/> Default	<input type="radio"/> Polar	<input type="radio"/> Lambert	<input type="radio"/> Mercator
Vertical plot height units:	help	<input type="radio"/> Pressure	<input checked="" type="radio"/> Meters AGL	<input type="radio"/> Theta	
Label Interval:	help	<input type="radio"/> No labels	<input checked="" type="radio"/> 6 hours	<input type="radio"/> 12 hours	<input type="radio"/> 24 hours
Plot color trajectories?		<input checked="" type="radio"/> Yes	<input type="radio"/> No		
Zoom factor:	help	<input type="radio"/> 0 (far)	<input type="radio"/> 45	<input checked="" type="radio"/> 75	<input type="radio"/> 100 (close)
Create Java Animation?	help	<input type="radio"/> Yes	<input checked="" type="radio"/> No		
Graphic size (dpi):	help	<input type="radio"/> 72	<input checked="" type="radio"/> 96	<input type="radio"/> 120	
Distance circle overlay:	help	<input checked="" type="radio"/> None	<input type="radio"/> Auto		
GIS output:	help	<input type="radio"/> None	<input type="radio"/> GIS Shapefile	<input checked="" type="radio"/> Google Earth	
Create Postscript file?	help	<input type="radio"/> Yes	<input checked="" type="radio"/> No		
Plot meteorological field along trajectory?	help	<input type="radio"/> Yes	<input checked="" type="radio"/> No		Note: Only choose one meteorological variable from below to plot
Dump meteorological data along trajectory:	help	<input type="checkbox"/> Terrain Height (m) <input type="checkbox"/> Potential Temperature (K) <input type="checkbox"/> Ambient Temperature (K) <input type="checkbox"/> Rainfall (mm per hr) <input type="checkbox"/> Mixed Layer Depth (m) <input type="checkbox"/> Relative Humidity (%) <input type="checkbox"/> Downward Solar Radiation Flux (W/m**2)			

10. Scroll to the bottom of the window and click the grey box that says “request trajectory.”
11. On the next screen, click the grey box that says “HYSPLIT RUN RESULTS.”
12. Wait for your results (it will take a minute or two to process the trajectory). When the model and graphics have finished, click on the link that says “Your trajectory plot” and a new window will appear with your trajectory (see Figure 1 for an example).

**To open your trajectories in Google Earth**, click on the link that says, “Google Earth File (kmz).” *Note this link is only available if you selected “Google Earth” as a display option in Step 9.*

**HYSPLIT MODEL RESULTS FOR JOB NUMBER 347967**

```
adding: logocon.gif (deflated 7%)
adding: HYSPLITtraj_347967_01.kml (deflated 92%)
Complete Trajplot
Started Trajectory Drawing (Version: February 2009)
Google Earth file creation for job 347967.
Complete Hysplit
Percent complete: 100.0
Percent complete: 95.8
```

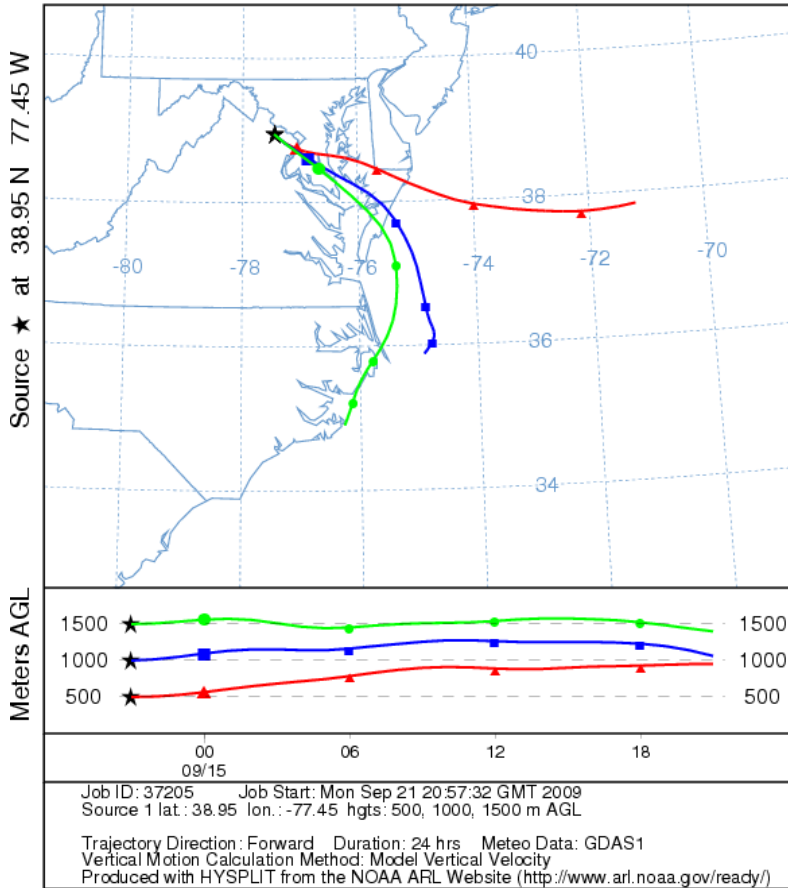
**Your plot(s) are now available, but will be deleted in 6 hours:**

[Non-Javascript users click here for alternate links.](#)

- [Your Trajectory plot](#)
  - [How to read the trajectory maps.](#)
- [Google Earth File \(kmz\)](#)
- [Trajectory endpoints file.](#)
  - [Trajectory endpoints format help.](#)

Your trajectory plot will resemble Figure 1 (page 5), which is a 24-hour forward trajectory from Dulles International Airport, beginning at 500 m, 1000 m, and 1500 m altitude at 21 UTC (5 PM local time). Both the horizontal and vertical paths of the trajectories are shown.

NOAA HYSPLIT MODEL  
 Forward trajectories starting at 2100 UTC 14 Sep 09  
 GDAS Meteorological Data



**Figure 1.** Example of a HYSPLIT forward trajectory.

\*For more information on Universal Coordinated Time (UTC), see the **UTC Help File**.