# Trajectory Error

A trajectory calculation is composed of three error components: the computational error due to numerical inaccuracies, the inadequacy of the data's representation of the atmosphere, and measurement errors in creating the model's meteorological data fields.

The numerical accuracy of the computation can be estimated by running a forward and backward trajectory to the origin point. Run the previous 700 hPA isobaric example. View the endpoints file, and use the final position (46.104N, 23.727E, 2694.7 m AGL) as the starting point (on the 14th 0000 UTC) for a backward trajectory calculation. Insure that the endpoints file names are different for both the forward and backward calculations. Then display both trajectories on the same plot by enter both file names using a + symbol (e.g. tdump1+tdump2). Note how the return trajectory is very close to the initial origin point.
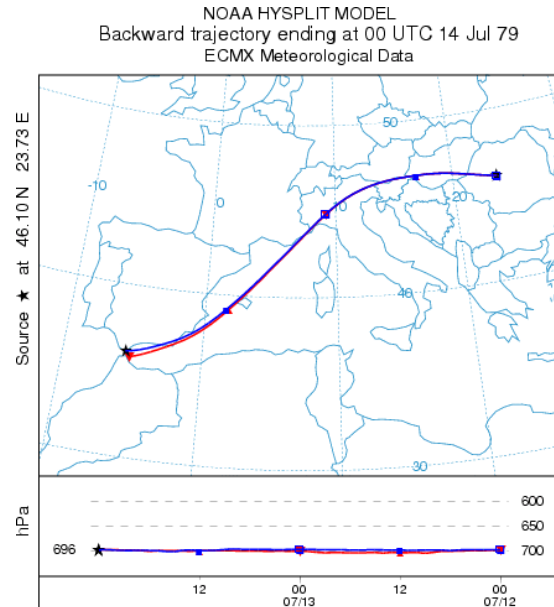
A greater source of error is due to the difficulty in representing atmospheric variables, which are continuous in space and time, by discrete data points on a grid. This error is difficult to quantify, but a sense of the error can be determined by running trajectories using meteorological data from several different sources. In the adjacent calculation, trajectories have been computed using meteorological data from ECMWF, NOAA, and MM5 (108 km and 36-km resolution). Within the first 24-h, differences between trajectories is much greater than the numerical error. These calculations are more consistent than most simulations due to the isobaric assumption.