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EPA, REGION III
OFFICE OF REGIONAL ADMINISTRATOR

October 15, 2008

Mr. Donald S. Welsh (3RA00)
Regional Administrator
U. S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, PA, 19103-2029

Dear Mr. Welsh:

Thank you for your August 18, 2008, response to Delaware's December 12, 2007, letter regarding fine particulate matter ($PM_{2.5}$) designations and non-attainment area boundaries. I agree with you that Kent and Sussex Counties should be designed as attainment for the $PM_{2.5}$ NAAQS, and that New Castle County should be designed as non-attainment. However, I do not agree with EPA's modification to Delaware's recommendation letter that includes the boundaries of the New Castle County non-attainment area as those of the Philadelphia CSA.

As detailed in Delaware's December 12, 2007 letter, and as further detailed in the attachment to this letter, the New Castle County problem is separate and distinct from the Philadelphia CSA problem. I hereby, again, request that the EPA establish the boundaries of New Castle County, Delaware as the boundaries of the annual $PM_{2.5}$ NAAQS non-attainment area, and that New Castle County not be included as part of the Philadelphia CSA non-attainment area.

Given the importance of this decision, the technical complexity of the data involved, and the apparent arbitrary dismissal by EPA of the substantial analysis contained in Delaware's December 12, 2007, recommendation I request a technical meeting between my staff and yours to ensure that this analysis and our position are understood, before final designations are made in

December 2008. If you have any questions about this letter, please contact either Ali Mirzakhalili, Administrator, of the Air Quality Management Section, at (302) 739-9402 or me.

Sincerely,

John A. Hughes
Secretary

Attachments

pc: James D. Werner, DNREC AWM
Ali Mirzakhalili, DNREC AQM
Judith Katz, EPA Region III

ATTACHMENT

New Castle County, Delaware
$PM_{2.5}$ Non-attainment Area Boundaries
Technical Response to EPA's August 18, 2008 Analysis of
Delaware's December 12, 2007 Recommendation

New Castle County's $PM_{2.5}$ non-attainment problem is caused by local emissions, exacerbated by intra- and inter-state $PM_{2.5}$ and $PM_{2.5}$ precursor transport (i.e., urban excess puts the City of Wilmington over the standard). Because of this we believe that it is appropriate to address the New Castle County $PM_{2.5}$ non-attainment as a local problem, and transport as a regional problem.

Delaware has reviewed the EPA's August 18, 2008 analysis of its December 12, 2007 recommendation and believes that the EPA has arbitrarily discounted substantial analysis contained in Delaware's recommendation, and has instead relied upon its own analysis which does not properly evaluate the issue. For each air quality monitoring site, EPA developed a pollution trajectory plot (or "pollution rose") to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. EPA developed a pollution rose for Delaware, Chester, New Castle Counties, and pollution roses for two monitors in Philadelphia County. From those pollution roses, EPA went on to say that the wind direction was generally from the southwest, i.e. New Castle County, on the 5% highest $PM_{2.5}$ days, ergo; New Castle County is a significant contributor. What EPA didn't mention was that wind direction from New Castle County on high PM days ***does not mean*** sources in New Castle County are the only contributors (or even minor contributors).

Delaware has looked at the ten highest PM days for 2004, 2005, and 2006 using HYSPLIT 24-hour back trajectories. These trajectories do not correspond with EPA's pollution roses in their response letter. Below is a detailed technical response to EPA analysis of each of the 9-factors that Delaware analyzed in its recommendation. This analysis, when combined with the analysis in our December 12, 2007 recommendation, demonstrates that 1) The boundaries of New Castle County encompass the full area that is violating the standard, based on actual monitoring data, 2) Delaware emissions do not significantly impact any part of the Philadelphia CSA, based on EPA modeling, 3) Emissions from a broad area encompassing the states of Ohio, Indiana, Pennsylvania, Michigan, West Virginia, New York, Maryland, District of Columbia, New Jersey, North Carolina, and Illinois impact Delaware (i.e., an area much broader than the Philadelphia CSA boundaries), based on EPA modeling, and 4) while New Castle County, and the Philadelphia CSA, and all other areas in the region share a transport problem, there is no evidence that supports the linking of transport mitigation to small CSA scale areas.

Factor 1: Emissions in areas potentially included versus excluded from the non-attainment area.

This factor looks at the emissions in areas potentially included versus excluded from the non-attainment area. Delaware believes the EPA has substantially ignored Delaware's analysis of this factor in its recommendation. While New Castle County emissions were high relative to

other counties in the CSA, federally enforceable requirements have been adopted, approved by the EPA into Delaware's SIP, permits have been issued and construction has commenced, that reduce those emissions 1) to a level lower than other areas of the CSA, 2) by a percentage that is significantly more than any other county in the CSA, and 3) these reductions are required at least two years before the attainment date[1]. In fact, NOx and SO_2 emission reductions will occur in New Castle County by 2009, and by 2012, New Castle County will achieve a 75% reduction in sulfur dioxide (SO_2) emissions and a 47% reduction in nitrogen oxides (NOx) emissions from a 2002 baseline. This is significant, and EPA's failure to consider this shuns the work and decisions that made these reductions happen, and does not recognize that Delaware is unique relative to this factor, when compared to other states in the Philadelphia CSA.

Instead of recognizing this significant clean-up made by Delaware, the EPA has relied upon their own analysis that penalizes Delaware, as it is based on 2005 NEI data and a contributing emissions score (CES). This EPA approach does not take into account the information Delaware presented in its December 12, 2007 recommendation, and is not an appropriate means to judge New Castle County relative to this factor (i.e., emissions). Specifically:

- EPA used the 2005 NEI as a basis for evaluating this factor. The 2005 NEI is not a high quality inventory, as it was not developed in conjunction with state agencies, [2] nor has it been quality assured by states.
- The 2002 NEI was the basis for the 2005 NEI, so the emissions estimates EPA is using are based on information that is almost seven (7) years old. In doing this EPA has not used the best available current data for emissions in the Philadelphia area, which is peer-reviewed 2009 and 2012 projection inventories used in recent State Implementation Plans (SIPs).
- The 2005 NEI does not represent the level of emissions in New Castle County as it does not account for significant, federally enforceable measures such as Delaware's 2006 Refinery Consent Decree, federal on and off-road rules, and Delaware's 2006 Multi-Pollutant EGU Regulation 1146. The 2005 NEI completely misrepresents Delaware emissions.
- EPA has relied heavily on the CES in evaluating this factor. EPA is using CES as an arbitrary and inadequate means to evaluate transport, and apparently putting much weight on the CES in their analysis. First, the CES utilizes 2005 NEI emissions data, which has the problems identified above (i.e., it completely misrepresents Delaware emissions). Second, tools such as the CES should be considered only when more sophisticated tools like modeling are not available. EPA CAIR modeling has already demonstrated that the $PM_{2.5}$ transport problem is a regional problem, and explicitly demonstrates that Delaware does not significantly contribute to the Philadelphia CSA problem[3].

[1] EPA analyzed this factor based on 2005 NEI data. They conclude that Delaware has the highest emissions of all the counties in the Philadelphia-Wilmington nonattainment area. They indicate that in this designation process EPA is only considering emission controls in place and federally enforceable by December 2008

[2] http://www.epa.gov/ttn/chief/net/2005dataplan/2005_nei_comm_qanda.pdf

[3] The CES indicates that New Castle County impacts the Philadelphia area more than any other county, and the EPA CAIR modeling indicates that the entire State of Delaware does not contribute significantly to any part of the Philadelphia **C**SA (i.e., they reach opposite conclusions).

Delaware believes that New Castle County is unique, given the drastic reductions Delaware has required to be made since 2005. The most appropriate and equitable way to evaluate Delaware's emissions relative to other areas in the CSA is to use peer-reviewed Delaware/RPO 2009 or 2012 projection inventories. 2009 emission projections occur within only fourteen (14) days of EPA's December 18, 2008 designation date (not 4 years), and in the same time frame of the effective date of designations 60 days later, i.e. February 18, 2009. Delaware's 2009 and 2012 projection inventories realistically take into account those control measures that are required and federally enforceable well before the attainment date.

The tables below, which are copied from Delaware's December 12, 2007 recommendation, summarize Delaware's emissions relative to other counties in the CSA and the extent to which these emissions are projected to change as a result of federally enforceable requirements[4].

Table 1-1 2002 Actual Emissions[5]

COUNTY	NO_X	$PM_{2.5}$	SO_2	TOTAL
New Castle	**30,748**	**3,420**	**50,237**	**84,405**
Philadelphia	30,595	2,988	9,508	43,091
Delaware	23,699	2,292	16,028	42,018
Montgomery	25,686	3,642	5,171	34,499
Chester	18,476	3,075	5,507	27,058
Bucks	19,800	2,881	3,825	26,506
Burlington	17,832	2,102	3,429	23,364
Gloucester	14,106	1,411	7,169	22,685
Camden	14,785	1,461	1,909	18,154

Table 1-2 2012 Emissions Projection

COUNTY	NOx	$PM_{2.5}$	SO_2	TOTAL
Philadelphia	22,146	3,013	6,849	32,008
New Castle	**16,164**	**2,881**	**12,654**	**31,699**
Delaware	13,859	2,765	8,246	24,871
Montgomery	15,267	3,727	4,790	23,784
Chester	11,632	3,266	4,663	19,561
Bucks	12,307	2,976	3,559	18,842
Gloucester	8,454	1,544	3,309	13,307
Burlington	10,400	1,908	969	13,277
Camden	7,449	1,304	784	9,537

[4] Note that NOx and SO_2 emissions may actually be higher in counties outside of Delaware due to the vacature of CAIR. Delaware reductions from EGUs are federally enforceable under SIP approved Regulation No. 1146, and not contingent upon CAIR.

[5] EPA's guidance suggests using existing boundaries for annual standard, so Cecil County was excluded from this analysis.

Table 1-3 Changes in emissions between 2002 and 2012

COUNTY	NO_X	$PM_{2.5}$	SO_2	TOTAL
New Castle	**47%**	**16%**	**75%**	**62%**
Camden	50%	11%	59%	47%
Burlington	42%	9%	72%	43%
Gloucester	40%	-9%	54%	41%
Delaware	42%	-21%	49%	41%
Montgomery	41%	-2%	7%	31%
Bucks	38%	-3%	7%	29%
Chester	37%	-6%	15%	28%
Philadelphia	28%	-1%	28%	26%

In summary, Delaware believes the EPA use of 2005 NEI and CES are not reflective of its impact on the Philadelphia CMSA. This factor (i.e., emissions) must be evaluated with consideration given to the facts that make Delaware unique; that unlike any other area Delaware has already required significant reductions in $PM_{2.5}$ and $PM_{2.5}$ precursor emissions such that New Castle County emissions will be reduced 1) to a level lower than other areas of the CSA, 2) by a percentage that is significantly more than any other county in the CSA, and 3) these reductions are required at least two years before the attainment date. When such consideration is given, evaluation of this factor supports New Castle County non-attainment boundaries being separate from the remainder of the Philadelphia CMSA. Further, Delaware is not recommending that any emissions be excluded from a non-attainment area; Delaware believes that New Castle County, in its entirety, should be designated as non-attainment. The issue is that the New Castle County non-attainment problem is separate and distinct from the Philadelphia problem.

Factor 2: Air quality in potentially included versus excluded areas. .

Delaware provided in its December 12, 2007 recommendation an analysis of data from the four New Castle County air monitors, and the nearby monitors in Pennsylvania, Maryland and New Jersey. This analysis showed that the City of Wilmington's $PM_{2.5}$ concentrations at the Martin Luther King Boulevard monitor (MLK) range from 4 to 5 micrograms per cubic meter higher (μ/m^3) than the other monitors located north-east, west and south of MLK, and that the relatively high downtown concentrations clearly drop off quickly to below the NAAQS within the boundaries of New Castle County. In fact, the Bellefonte monitor which is only four (4) miles downwind from the MLK monitor indicates 11 percent lower ambient concentrations than the MLK monitor. These other monitors are placed in areas which represent most of the compass, thereby "encircling" the MLK monitor with "clean" ones.

This analysis summarized in Delaware's December 12, 1997 recommendation was done based on 2004-2006 data; the best data available at the time the recommendation was submitted to the EPA. EPA's only response was, "considering 2005-2007 data, monitors in Chester and Delaware Counties in Pennsylvania, which border New Castle County, are violating the

standard." EPA has completely ignored Delaware's analysis in that they apparently gave no credence to the 2004-2006 data presented by Delaware, and completely ignored the significant differences in the monitoring data around the city of Wilmington, and between the city of Wilmington and the rest of the Philadelphia CSA. While Delaware agrees with the EPA that the data shows that based on 2005-2007 data Chester and Delaware Counties are now monitoring marginal non-attainment with the NAAQS that alone is not an evaluation of factor 2, and is certainly not an evaluation of the Delaware recommendation. Evaluation of this factor clearly shows that the air quality is non-attainment problem in New Castle County is limited to the boundaries of New Castle County, and the monitors in New Castle County and in the adjacent counties in Pennsylvania support this.

Specifically regarding the EPA statement that based on 2005-2007 data monitors in Chester and Delaware Counties in Pennsylvania, which border New Castle County, are now violating the standard, Delaware believes this further supports the position that, based on factor 2, the non-attainment boundaries associated with New Castle County should not be those of the CSA. Comparison of the 2004 through 2006 data and the 2005 through 2007 data shows that Delaware monitored values did not change whatsoever between these two time periods, and only the values at the Pennsylvania monitors went up (see table 1 below).

Table 1 New Castle County Monitoring Values

	Bellefonte	MLK	Newark	Lums
04-06	33	37	32	32
05-07	33	37	32	32

The fact that Pennsylvania monitors went up while each of the New Castle County monitors remained exactly the same for 2004-2006 vs. 2005-2007, is compelling evidence that Delaware emission contributions, and in fact, emission transport in general, are not responsible for those higher Pennsylvania values. Otherwise, those same Delaware or other upwind state emissions would have caused Delaware monitored levels to rise as well. This non-correlation between Delaware and Pennsylvania monitored values confirms our assertion that the $PM_{2.5}$ nonattainment problem is highly localized in the CSA and that contributions from Delaware are not significant.

Despite the above, Delaware has spoken with the Pennsylvania Department of Environmental Protection (DEP) and obtained their 2008 air quality monitoring data for the downwind Chester monitor in Delaware County (the New Garden monitor is not considered "downwind" from Delaware). The data to-date shows Delaware County back into attainment (from 2005-2007), and if the trend continues will be attaining the 2006-2008 3-year average, as will Delaware (see table 2 – Trends).

Table 2 2005-2006 24-hr Trends

Year	Chester (DE County)	MLK
2005	37.0	37.7
2006	36.7	38.7
2007	34.5	33.6
2008	<35.0 to date	

EPA also completely ignored the Clarkson University/Phil Hopke study discussed in the December, 2007 letter, which showed that power plants west and southwest of Delaware, and local mobile sources in Wilmington were MLK's primary source drivers for nonattainment. A re-iteration of that discussion follows below.

In 2004, Dr. Phil Hopke conducted receptor modeling for Delaware's two Speciated trends Network (STN) sites; Wilmington-MLK (urban) and Dover (rural) STN sites. The objectives of this project were to identify major sources of particulate matter, and estimate their contributions to $PM_{2.5}$ mass concentrations[12]. The results of the MLK study are:

1. Sulfate had the highest source contribution to $PM_{2.5}$ mass concentrations, accounting for 38% (7.0 $\mu g/m^3$) of the $PM_{2.5}$ mass concentration. The elevated contributions were likely caused by the regional transport of secondary aerosols from Midwestern coal-fired power plants in the Ohio River Valley. Other potential source areas pathways that give rise to the high contribution to the Wilmington site are located in Mississippi, northern Alabama, Georgia, Tennessee, western South Carolina, and southern Kentucky.

2. The average PM mass contributions from gasoline vehicle, diesel emissions, bus depot, and railroad were 2.2 $\mu g/m^3$, 0.6 $\mu g/m^3$, 0.8 $\mu g/m^3$, and 1.1 $\mu g/m^3$ in Wilmington, respectively, for a total of 4.7 $\mu g/m^3$ due to local sources (29% of the 2001-2003 annual design value).

   Nitrate was harder to attribute to a specific local vs. regional sources. It is likely that the ammonium nitrate arises from a combination of local mobile and regional ammonia emissions. The average contributions of nitrate to the PM mass concentrations were 17% (3.1 $\mu g/m^3$).

3. Oil fired power plants and/or Industrial/ Commercial/ Institutional (ICI) boilers contributed 1.5 $\mu g/m^3$ of the PM mass concentration in Wilmington. Directional plots of these sources point to the northeast and southeast, which are directionally correct for three power plants burning coal and/or residual oil (one in DE, two in NJ). Note that the Delaware unit will make significant reductions in SO_2 and NO_X emission under Delaware Regulation No. 1146, EGU Multi-P regulation by 2009.

The Hopke study supports the results of CAIR modeling and monitoring discussion above, i.e. long-range transport of sulfate, and local mobile sources dominate the MLK $PM_{2.5}$ mass components. Discussions with Pennsylvania DEQ have ended with similar conclusions for the

Delaware and Broad Street, Philadelphia monitor. That is, they are heavily influenced by local traffic, and long range transport from mid-western power plants.

Therefore, Delaware stated in the December, 2007 designation recommendation letter that, in addition to long-range transport from power plants, nonattainment in New Castle County is a localized issue, within the county itself. Local mobile source emissions near the MLK monitor, including traffic on MLK Boulevard and Interstate 1-95, a large bus depot, and the CSX/Norfolk Southern Railroad, are one of the primary causes of the nonattainment problem.

In response, EPA argued similar local emission sources can be cited for the violating monitors in Philadelphia, Chester, and Camden Counties, which are also located near interstate highways, and that the Philadelphia monitors are located in highly urbanized areas, with traffic congestion. EPA has inadvertently backed up Delaware's argument, i.e. that local emissions from mobile sources are the primary driver of nonattainment (after mid-west power plants), which are not a significant CSA transport concern. Since they are not a significant CSA transport issue, then this would support New Castle being a stand-alone nonattainment area.

In summary, in evaluation of this factor (i.e., air quality) Delaware has shown that the air quality is bad in downtown Wilmington, the air quality is bad in downtown Philadelphia, and the monitors between the two demonstrate that these two areas are separate and distinct. EPA's analysis did not once reference the continually-attainment Bellefonte monitoring data in its evaluation, which was clearly discussed in Delaware's recommendation. The Bellefonte monitor is downwind of the Delaware's only non-attaining monitor, and is upwind of Philadelphia counties. It lies close to major point sources (Refinery and Conectiv EGUs), and also is located between those sources and Philadelphia Counties. Its design value is 33; and this holds true for 2004-2006 and 2005-2007 data. Based on an analysis of this factor, the area of non-attainment is clearly limited to the city of Wilmington, which is completely contained within New Castle County.

Factor 3: Population density and degree of urbanization including commercial development in included versus excluded areas.

Delaware's December 12, 2007 recommendation letter provided examples, like Philadelphia County which has nearly over 8½ times the population density of NCC, yet one of its monitors in Philadelphia County is recording ambient $PM_{2.5}$ concentrations of only 33 ug/m^3. And, similarly, Delaware and Montgomery Counties in PA have higher densities than NCC, yet they are currently monitoring attainment for 2007, while the MLK monitor in Wilmington is currently [the only monitor] showing non-attainment.

To further evaluate the relationship between population and non-attainment Delaware obtained a listing of the top 100 U.S. cities by population, and then looked at EPA's recommendation for twenty four (24) of those cities. Table 3 gives a partial listing of those cities with large populations that are in attainment of the 24-hr NAAQS. Note that Wilmington, DE (MLK monitor) is not even in the top 100.

Table 3 Partial Listing of Top 100
U.S. Cities by Population [6] in Attainment

Arlington	Houston
Atlanta	Las Vegas
Austin	Miami
Baton Rouge	New Orleans
Boston	Norfolk
Buffalo	Orlando
Charlotte	Raleigh
Corpus Christi	Sacramento
Dallas	San Antonio
Durham	Tampa
El Paso	Virginia Beach
Fort Worth	Washington, DC

Furthermore, Table 4 points out that New Castle population density ranks in fifth place among nine counties in the Philadelphia CSA.

Table 4 Population densities

County	Sq Miles	2006 pop	Persons/Sq Mi
Philadelphia	135	1,448,394	10,729
Delaware	184	555,996	3,022
Camden	222	517,001	2,329
Montgomery	483	775,688	1,606
New Castle	**426**	**525,587**	**1,234**
Bucks	607	623,205	1,027
Gloucester	325	282,031	868
Chester	756	482,112	638
Burlington	805	450,627	560

An analysis of this factor indicates that 1) based on the fact that there are many areas with high population densities that are attainment for $PM_{2.5}$, and 2) the New Castle County density is in line with the lower density counties in the CSA, population density is not a driving factor relative to $PM_{2.5}$ nonattainment. Delaware believes this criterion for boundary considerations should be of low priority.

EPA's response to Delaware's December 12, 2007 recommendation was that the EPA uses population data as one indicator of population-based emissions (i.e. area sources) that might

[6] http://www.city-data.com/top1.html

contribute to nonattainment, including downwind nonattainment. Delaware has two significant problems with this statement. First, while Delaware does agree with the EPA that population data is an indicator of population-based emissions (i.e. area sources) that might contribute to non-attainment; emissions are evaluated under factor 1. The emission inventories discussed in Factor 1 include emissions from all source sectors, including area sources. Because of this it is not appropriate to weigh emissions under both this factor and factor 1. Second, even though population data is an indicator of population-based emissions, this source category is not a driver relative to $PM_{2.5}$ non-attainment for Delaware. Area sources make up only six (6) percent of overall $PM_{2.5}$ and the primary precursor emissions (SO2 and NOx) in New Castle County.

However, if the EPA is to consider population density in drawing non-attainment boundaries, the New Castle County density is in line with the lower density counties in the CSA, and is 8 ½ times less than the highest county; and analysis of this factor does not provide justification to include New Castle County in a Philadelphia based non-attainment area.

Factor 4: Traffic and Commuting Patterns.

The traffic and commuting analysis looks at the number of commuters in each county who drive to another county within the metropolitan area, the percent of total commuters in each county who commute to other counties within the metropolitan area, as well as the total Vehicle Miles Traveled (VMT) for each county. A county with numerous commuters may be viewed, generally, an integral part of the area and it may be appropriate to include them in the same nonattainment area to facilitate the development of mobile strategies. Conversely, a lack of this type of relationship indicates it may be appropriate to draw separate non-attainment boundaries.

In our December 12, 2007 recommendation letter, Delaware demonstrated that less than one percent of the commuters in the Philadelphia-Wilmington area are from New Castle County, and that many of these commuters are likely to use public transportation. We also noted that the Southeastern Pennsylvania Transportation Authority (SEPTA) serves commuters from the Bucks, Chester, Delaware, Montgomery, Philadelphia and New Castle Counties, and brings many of them into Center City Philadelphia.

EPA's response was that, as a general matter, it is likely that commuters from most counties in the Philadelphia-Wilmington nonattainment area rely heavily on public transportation, and that currently available data does not clearly indicate the percentage of commuters from New Castle County to Pennsylvania which commute via SEPTA or other public transportation versus non-public transportation (such as private automobiles). Delaware believes this response does not reflect understanding of our recommendation. Delaware obtained best available data from EPA's own website in analyzing commuter patterns. We did not refer to the percentage of commuters using public transportation, but instead assumed ALL commuters were in automobiles when determining the "less than one percent." Repeating from our recommendation letter, *"Census Bureau (2000 census) data indicates that there are 660,050 Residence County to Workplace County Flows to Philadelphia, which is the only nonattaining County in PA.*[7] *Of this*

[7] http://www.census.gov/population/www/cen2000/commuting.html

660,050, only 20,386 are from NCC, which indicates that residents from NCC represent less than one percent of commuters to Philadelphia (0.8%). Also, it is likely that a significant portion of the 20,386 commuters are using the Southeastern Pennsylvania Transportation Authority (SEPTA) electric rail and bus service, and are not using cars." As can be seen from the original letter, the 0.8% referred to total commuters, not those using public transportation.

In addition to the percent of commuters, Delaware estimated emissions from [20,386] New Castle County commuters in the Philadelphia CSA based on EPA-supplied web links. In calculating the emissions, Delaware assumed a steady speed of 65 mph, a 60 mile round-trip and **zero commuters using SEPTA** (which represents a somewhat ridiculously conservative scenario). The contributions from NOx, PM and SO_2 combined represent less than one percent of CSA emissions (see table 6).

Table 6 Out-of-State Commuter emissions as a fraction of total CSA

2007 (VMT)	**NO_X**	**$PM_{2.5}$**	**SO_2**	**SUM (NO_x, SO_2 & $PM_{2.5}$)**
Emissions (TPY)	2,988	40	29	**3,057**
% of CSA	1.53%	0.17%	0.03%	**0.95**

EPA also presented an analysis of traffic and commuting patterns in table 4.0 of their August 18, 2008 response letter. This showed that the number of New Castle County commuters to <u>any</u> violating county is 228,630. However, this figure includes New Castle residents going to work within New Castle. This large number of New Castle County commuters within New Castle County, and the small number of New Castle County commuters to Philadelphia, indicate this factor supports New Castle County as being separate and not part of a Philadelphia CSA based non-attainment area. Lumping New Castle County commuters in with the rest of the violating counties shows that the EPA does not have an understanding of Delaware's recommendation, and is not evaluating this factor in light of Delaware's unique situation. Delaware is recommending that the boundaries of the New Castle County non-attainment area be the boundaries of New Castle County, and evaluation of this factor (i.e., Traffic and Commuting Patterns) relative to the number of commuters, the percentage of commuters, and the emission associated with those commuters clearly support that recommendation.

EPA also presented information on a relationship between emissions and VMT in their analysis of this factor. This is not appropriate as all emissions, to include mobile source emissions, are weighted under factor 1 above.

<u>Factor 5: Growth Rates and Patterns.</u>

The expected growth analysis looks at the percent growth for counties in each metropolitan area. In Delaware's December 12, 2007 designation recommendation letter, Delaware compared the New Castle County population growth rate to counties such as Gloucester which are monitoring

attainment. Delaware also compares New Castle County's VMT growth to that of Gloucester County, which is monitoring attainment.

EPA's only response was that, while population in Gloucester County has increased at a similar rate to New Castle County from 2002 to 2006, the 2005 population in New Castle County is nearly twice that of Gloucester County. EPA has apparently not evaluated growth rates and patterns in the context of Delaware's December 12, 2007 recommendation. In fact, EPA's August 2008 response does not appear to evaluate the "growth rate and pattern" factor at all, but rather it instead concentrates on total population, which is addressed in factor 4 above.

This factor (factor 5), as evaluated in our December 12, 2007 recommendation, clearly supports New Castle County as being different from the other counties in the Philadelphia area.

Factor 6: Meteorology (Weather/Transport Patterns).

For this factor, EPA considered data from National Weather Service instruments in the area. Wind direction and wind speed data for 2004-2006 were analyzed, with an emphasis on "high $PM_{2.5}$ days" for each of two seasons (an October-April "cold" season and a May-September "warm" season). These high $PM_{2.5}$ days are defined as days where any FRM or FEM air quality monitors had 24-hour $PM_{2.5}$ concentrations above 95% on a frequency distribution curve of $PM_{2.5}$ 24-hour values.

For each air quality monitoring site, EPA developed a pollution trajectory plot (or "pollution rose") to understand the prevailing wind direction and wind speed on the days with highest fine particle concentrations. EPA developed a pollution rose for Delaware, Chester, and New Castle Counties, and pollution roses for two monitors in Philadelphia County. From those pollution roses, EPA concluded that the wind direction was generally from the southwest, i.e. New Castle County on the highest $PM_{2.5}$ days and therefore sources in New Castle County were major contributors.

However, what EPA failed to mention was that wind direction from New Castle County on high PM days ***does not mean*** sources in New Castle County are the only contributors (or even minor contributors) to downwind Counties. Delaware looked at the ten-highest PM days for 2004, 2005 and 2006 using HYSPLIT 24-hour back trajectories for the Philadelphia County, Broad St. and Lycoming monitors. The dates were also high concentration days in New Castle County. The trajectories are represented in the figures at the end of this attachment, and show that over half of them don't even pass through New Castle County. Even the back trajectories that do pass through New Castle can also be traced to any number of sources far upwind of New Castle County, i.e. sources from as far away as North Carolina to Indiana.

These trajectories do not correspond well with EPA's pollution roses. We do not understand how EPA can conclude that on high PM days New Castle County is a major contributor, yet on these same high days HYSPLIT back trajectories do not point to Delaware.

Factor 7: Geography/Topography.

The geography/topography analysis looks at physical features of the land that might have an effect on the air shed and, therefore, on the distribution of $PM_{2.5}$ over the Philadelphia-Wilmington area. The Philadelphia-Wilmington area does not have any geographical or topographical barriers significantly limiting air-pollution transport within its air shed. Both Delaware and the EPA agree that this factor does not play a significant role in the decision-making process.

Factor 8: Jurisdictional Boundaries (e.g., counties, air districts, Reservations, etc.).

The analysis of jurisdictional boundaries looks at the planning and organizational structure of an area to determine if the implementation of controls in a potential nonattainment area can be carried out in a cohesive manner.

The EPA indicated that New Castle County historically has been part of the Philadelphia nonattainment area for ozone and $PM_{2.5,}$ and that Delaware, Pennsylvania, and New Jersey have a long history of working cooperatively with ozone and PM attainment planning. This statement by the EPA is not in the proper context of factor 9. While these states do work cooperatively together, no cooperative air planning effort to date has occurred as a result of being in a common nonattainment area. These states have historically worked together only as part of larger efforts, like MANE-VU and the OTC. Not a single control measure has been developed as a cooperative effort amongst these states outside of MANE-VU and OTC context.

In addition, no CSA scale efforts are necessary relative to planning for the 2006 $PM_{2.5}$ standard. This is because the New Castle County non-attainment problem is separate and distinct from the Philadelphia problem, and the only commonality is transport; and transport is regional, not local, in nature. Factor 8 supports New Castle County as a separate non-attainment area from the rest of the Philadelphia CSA; and the continuation of larger regional efforts to develop control strategies and address transport.

Factor 9: Level of Control of Emission Sources.

This factor looks at the extent to which emissions sources are controlled. Delaware believes that it has well controlled its sources in New Castle County; particularly the large SO_2 and NOx emitting sources.

In its analysis the EPA indicated they are only considering controls in place and federally enforceable at the time of designation, i.e., by 2008. Delaware does not agree with this for the reasons discussed under factor 1 above. In addition, this EPA position makes even less sense in the context of factor 9. The purpose of this factor is to not evaluate the level of emissions (i.e., not to re-evaluate Factor 1), but instead to evaluate how well sources are controlled in the area. Significant emission control measures have been adopted, and approved into Delaware's SIP by the EPA. In addition these measures are being implemented; permits have been issued and construction has commenced, and in some cases been completed. This factor cannot be evaluated without considering SIP approved control measures.

As EPA points out in their analysis, the two most significant $PM_{2.5}$ and $PM_{2.5}$ precursor emission sources in New Castle County are the Premcor refinery and the Conectiv Edge Moor power plant.

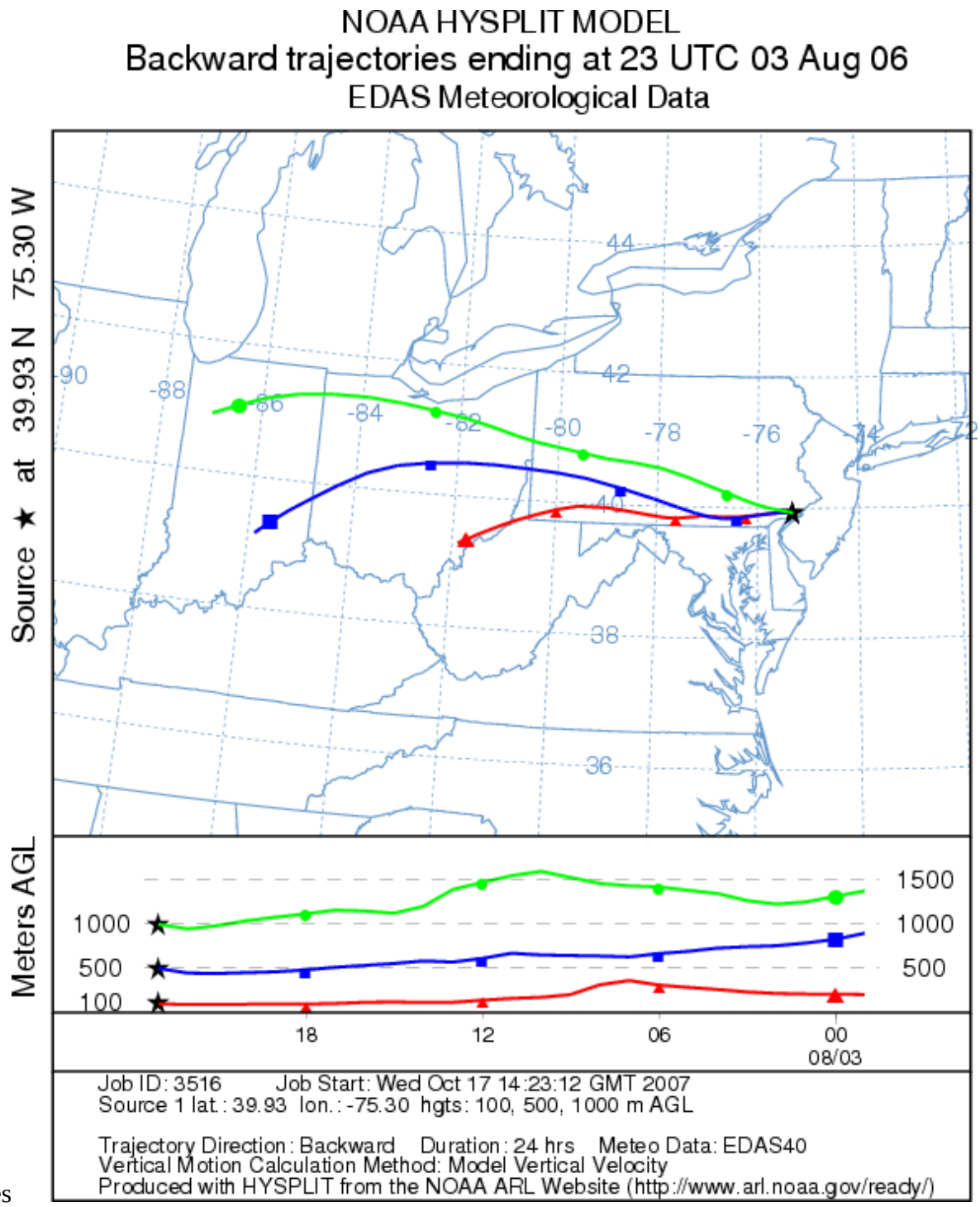
- In evaluating this factor EPA notes that Premcor has installed scrubbers on its largest SO_2 emitting sources; a fluid cracking unit and a fluid coker. However, EPA then seems to give much credence to the fact that even with these controls New Castle County emissions are highest in the CSA. This indicates the EPA has not evaluated this factor at all (i.e., level of control), but rather they have again evaluated factor 1 (i.e., emissions). Delaware believes proper evaluation of this factor demonstrates that these two large units at the Premcor refinery are very well controlled relative to SO_2 – best available control technology.

- In evaluating EGUs, the EPA collected data that shows emissions and controls (current and projected) for EGUs with SO_2 plus NOx emissions greater than 5000 tons. They obtained this data from the 2006 National Electric Energy Data System (NEEDS) database. EPA notes that with the exception of the Brunner Island facility in York County, which has a projected date of 2008 for a scrubber on one of its three units, none of the EGUs in the counties in the Philadelphia-Wilmington nonattainment area for the 1997 $PM_{2.5}$ NAAQS put controls in place between 2005 and 2008. Therefore, the level of control of EGUs is not a major factor in this analysis. Delaware believes this analysis makes no sense. EPA should not be looking at the NEEDS database to determine future controls; they should look to the state and SIP approved regulations! The Delaware units identified by EPA are Edge Moor Unit 3, 4, and 5. Under Delaware's SIP approved Reg. 1146, EGU Multi-Pollutant regulation, each of these units is subject to stringent NO_X and SO_2 emission limits in 2009 and 2012. Delaware believes that proper evaluation of this factor demonstrates that these units are well controlled relative to NO_X and SO_2 – Best Available Control Technology.

The EPA has requested additional information for EGUs that will be controlled post-2005. For New Castle County, DE the following EGU control requirements are not reflected in a 2005 NEI:

Unit	**Edge Moor Unit 3**		**Edge Moor Unit 4**		**Edge Moor Unit 5**	
Plant Name, City, and County,	**Conectiv Edge Moor, Wilmington Delaware**		**Conectiv Edge Moor, Wilmington Delaware**		**Conectiv Edge Moor, Wilmington Delaware**	
Emission Unit, fuel use, and megawatt capacity	Coal		Coal		Oil	
Controls Installed/ Controls not installed	Yes		Yes		Yes	
Type of emission control that has been or will be installed, date on which the control device will become operational, and the emission reduction efficiency of the control device	SO2: limited to 0.26 lb/MMBtu NOX: limited to 0.12 lb/MMBtu		SO2: limited to 0.26 lb/MMBtu NOX: limited to 0.12 lb/MMBtu		SO2: 0.5% Sulfur oil (max) NOX: limited to 0.12 lb/MMBtu	
The estimated pollutant emissions for each unit before and after implementation of emission controls		**2002**	**2012**	**2002**	**2012**	**2002**	**2012**
	SO2	3,344	560	5,051	970	2,133	977
	NOx	922	314	1,096	544	1,289	548
Control device operation federal enforceable date, and instrument by which federal enforceability will be ensured.		Approved in Delaware SIP on 09/29/2008		Approved in Delaware SIP on 09/29/2008		Approved in Delaware SIP on 09/29/2008	

In summary, by 2012, New Castle County will achieve a 75% reduction in SO_2 emissions, a 47% reduction in NOx emissions, and a 62% reduction in overall $PM_{2.5}$ and $PM_{2.5}$ precursor emissions, from a 2002 baseline. Other counties in the Philadelphia CSA have made only a fraction of these emission reductions. This, plus the individual unit discussion above demonstrates that the level of control of emission sources in New Castle County is greater than other areas in the CSA, and evaluation of this factor does not support including New Castle County within CSA non-attainment boundaries.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Backward trajectories ending at 23 UTC 03 Aug 06
EDAS Meteorological Data
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Meters AGL
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1000
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18
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06
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08/03
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Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)

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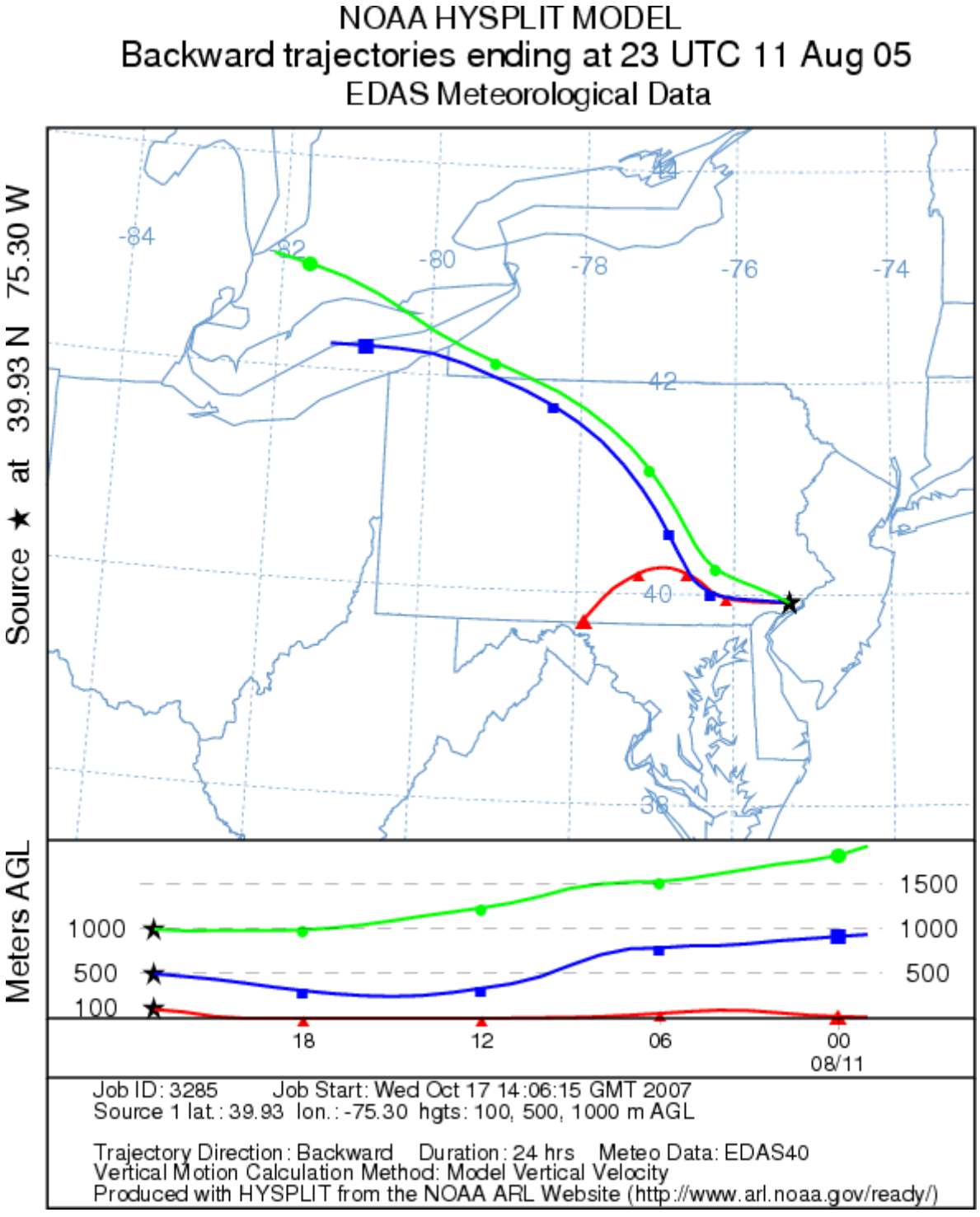
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Source ★ at 39.93 N 75.30 W
-84
-82
-80
-78
-76
-74
42
40
38
Meters AGL
1500
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500
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08/11
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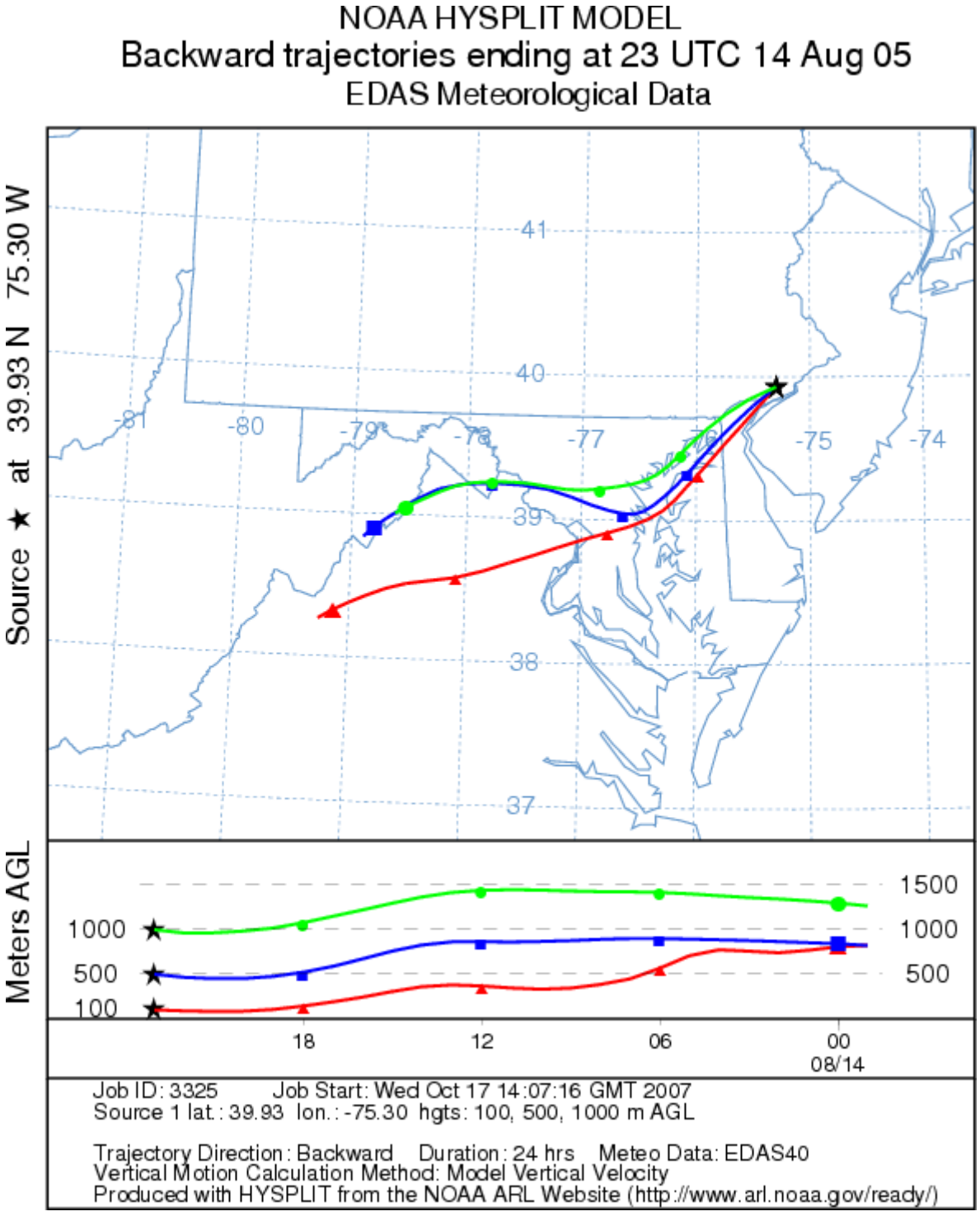
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)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41
40
39
38
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-80
-79
-78
-77
-76
-75
-74
Meters AGL
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1500
1000
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18
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08/14
Job ID: 3325 Job Start: Wed Oct 17 14:07:16 GMT 2007
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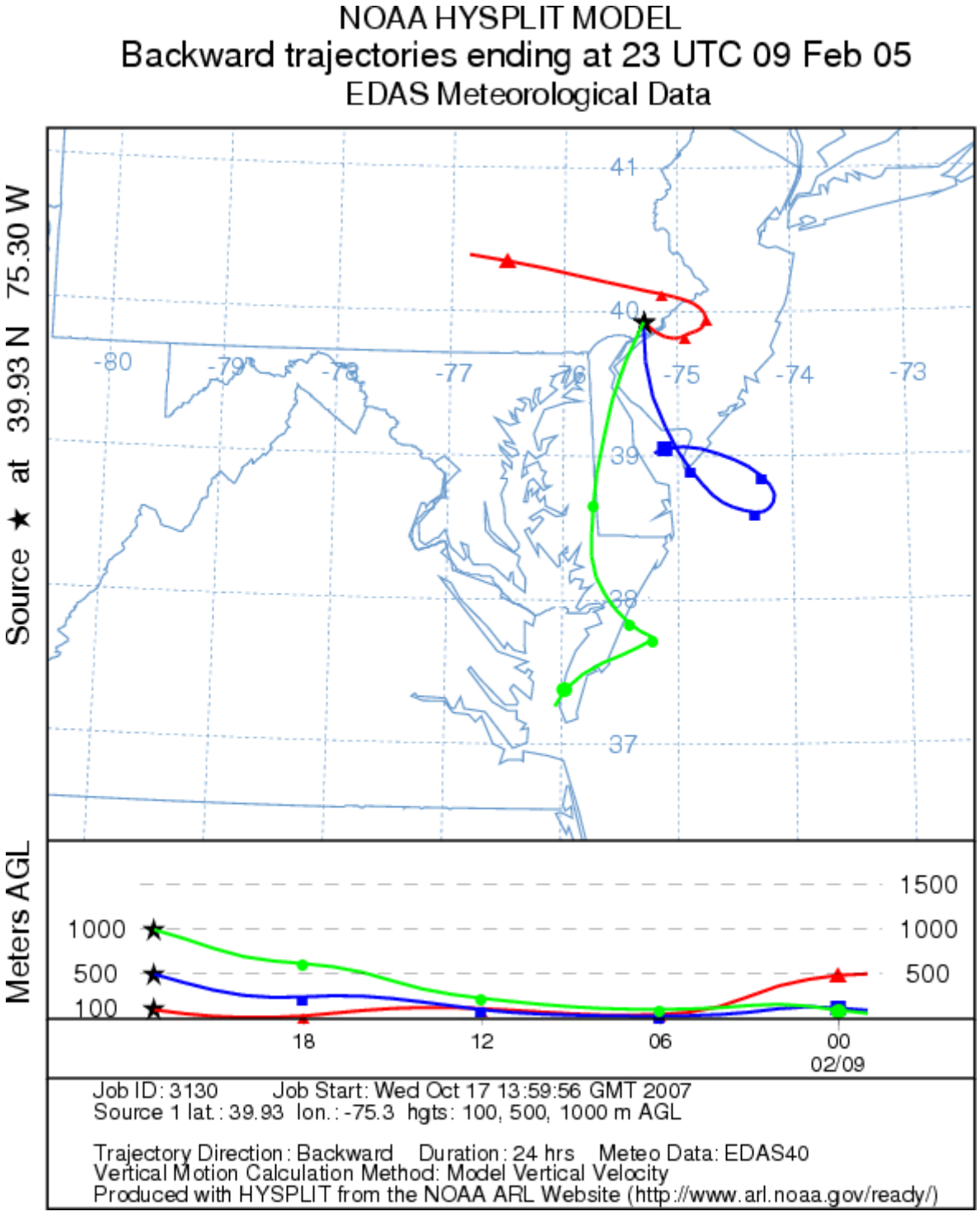
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)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Backward trajectories ending at 23 UTC 09 Feb 05
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41
40
39
38
37
-80
-79
-78
-77
-76
-75
-74
-73
Meters AGL
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02/09
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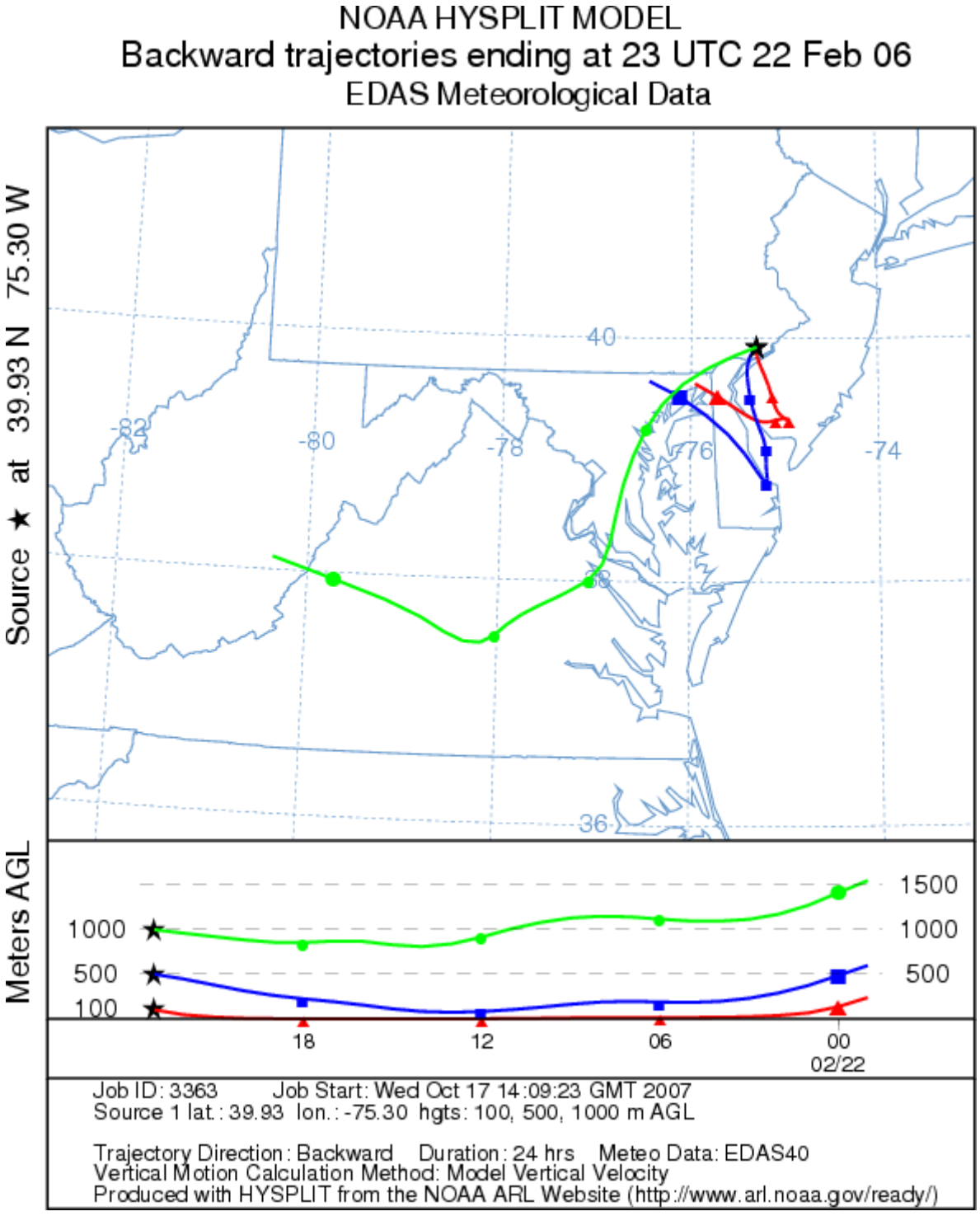
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Backward trajectories ending at 23 UTC 22 Feb 06
EDAS Meteorological Data
Source ★ at 39.93 N 75.30 W
40
-82
-80
-78
-76
-74
36
Meters AGL
1500
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1000
500
100
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02/22
Job ID: 3363 Job Start: Wed Oct 17 14:09:23 GMT 2007
Source 1 lat.: 39.93 lon.: -75.30 hgts: 100, 500, 1000 m AGL
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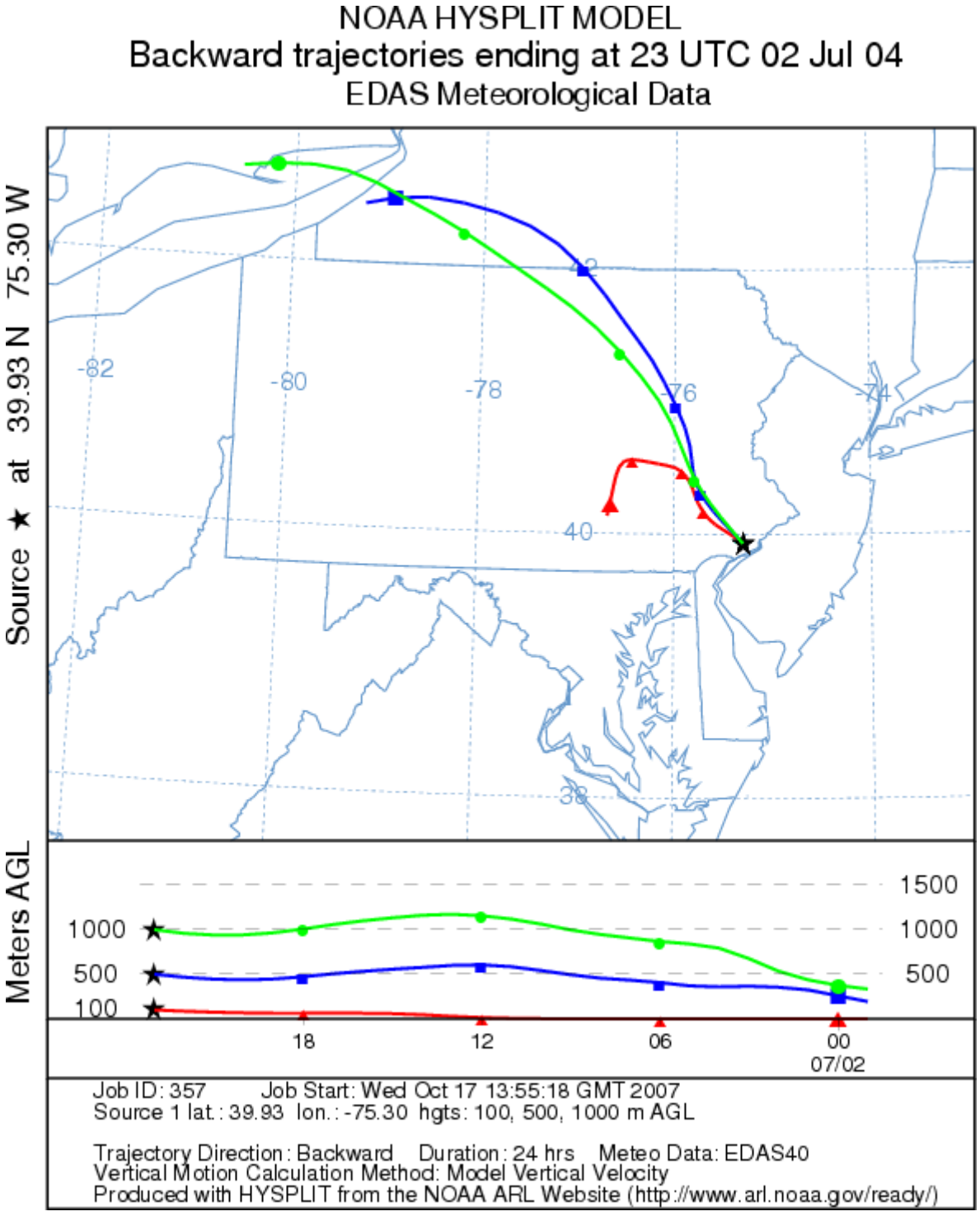
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Backward trajectories ending at 23 UTC 02 Jul 04
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-82
-80
-78
-76
-74
42
40
38
Meters AGL
1500
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1000
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07/02
Job ID: 357 Job Start: Wed Oct 17 13:55:18 GMT 2007
Source 1 lat.: 39.93 lon.: -75.30 hgts: 100, 500, 1000 m AGL
Trajectory Direction: Backward Duration: 24 hrs Meteo Data: EDAS40
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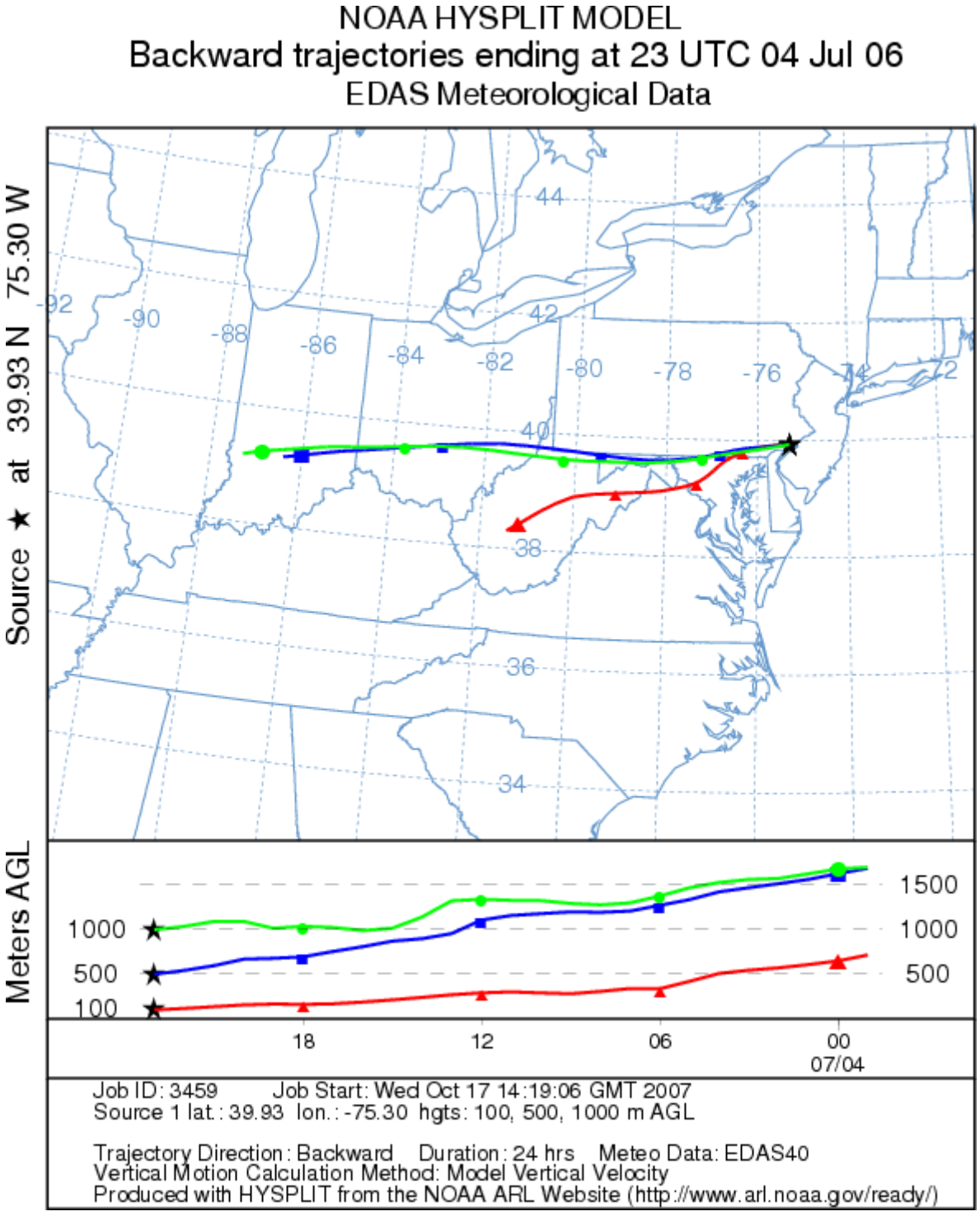
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Backward trajectories ending at 23 UTC 04 Jul 06
EDAS Meteorological Data
Source ★ at 39.93 N 75.30 W
Meters AGL
1000
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1500
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500
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Job ID: 3459 Job Start: Wed Oct 17 14:19:06 GMT 2007
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Trajectory Direction: Backward Duration: 24 hrs Meteo Data: EDAS40
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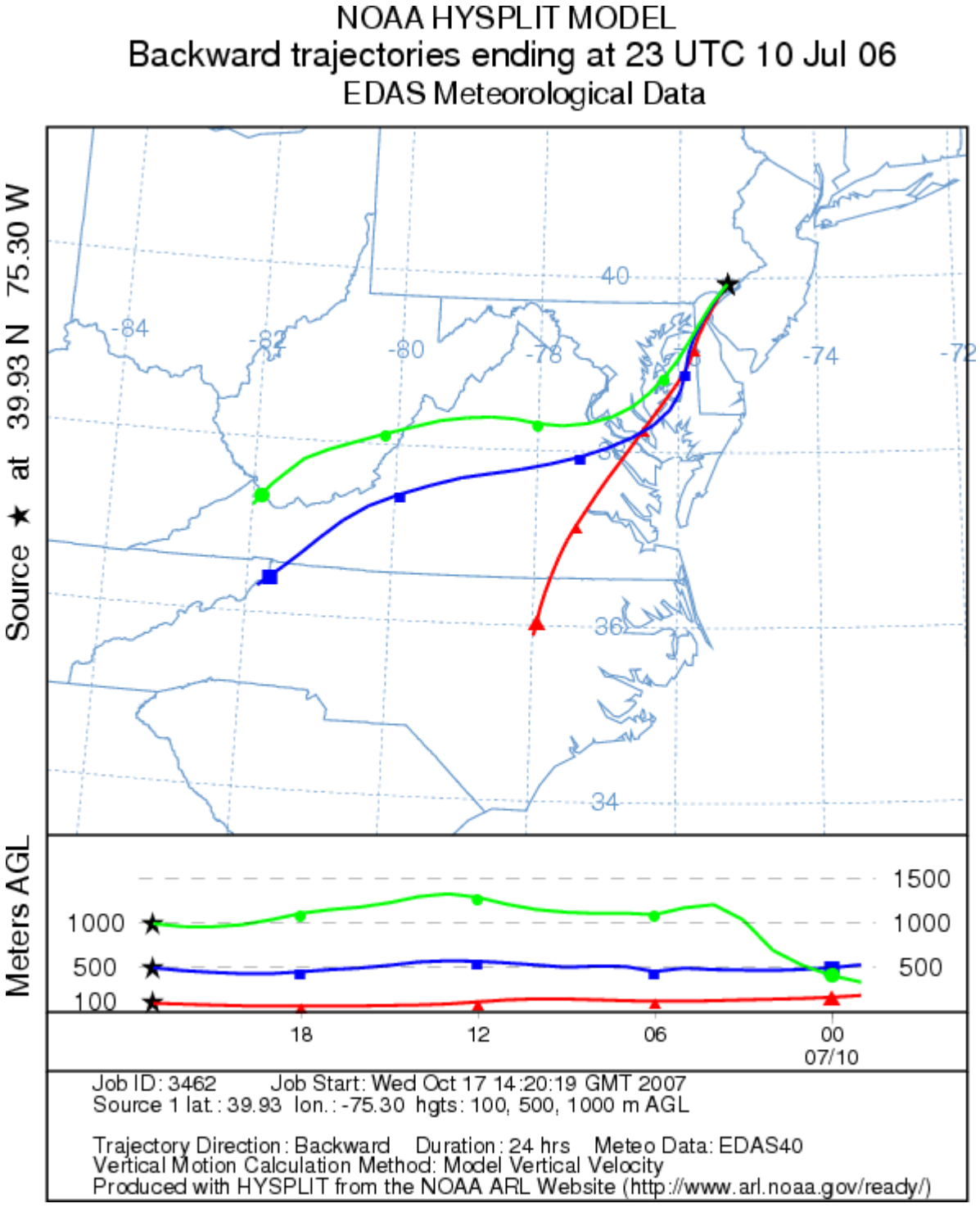
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Backward trajectories ending at 23 UTC 10 Jul 06
EDAS Meteorological Data
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Meters AGL
40
36
34
-84
-82
-80
-78
-74
-72
1500
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1000
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100
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07/10
Job ID: 3462 Job Start: Wed Oct 17 14:20:19 GMT 2007
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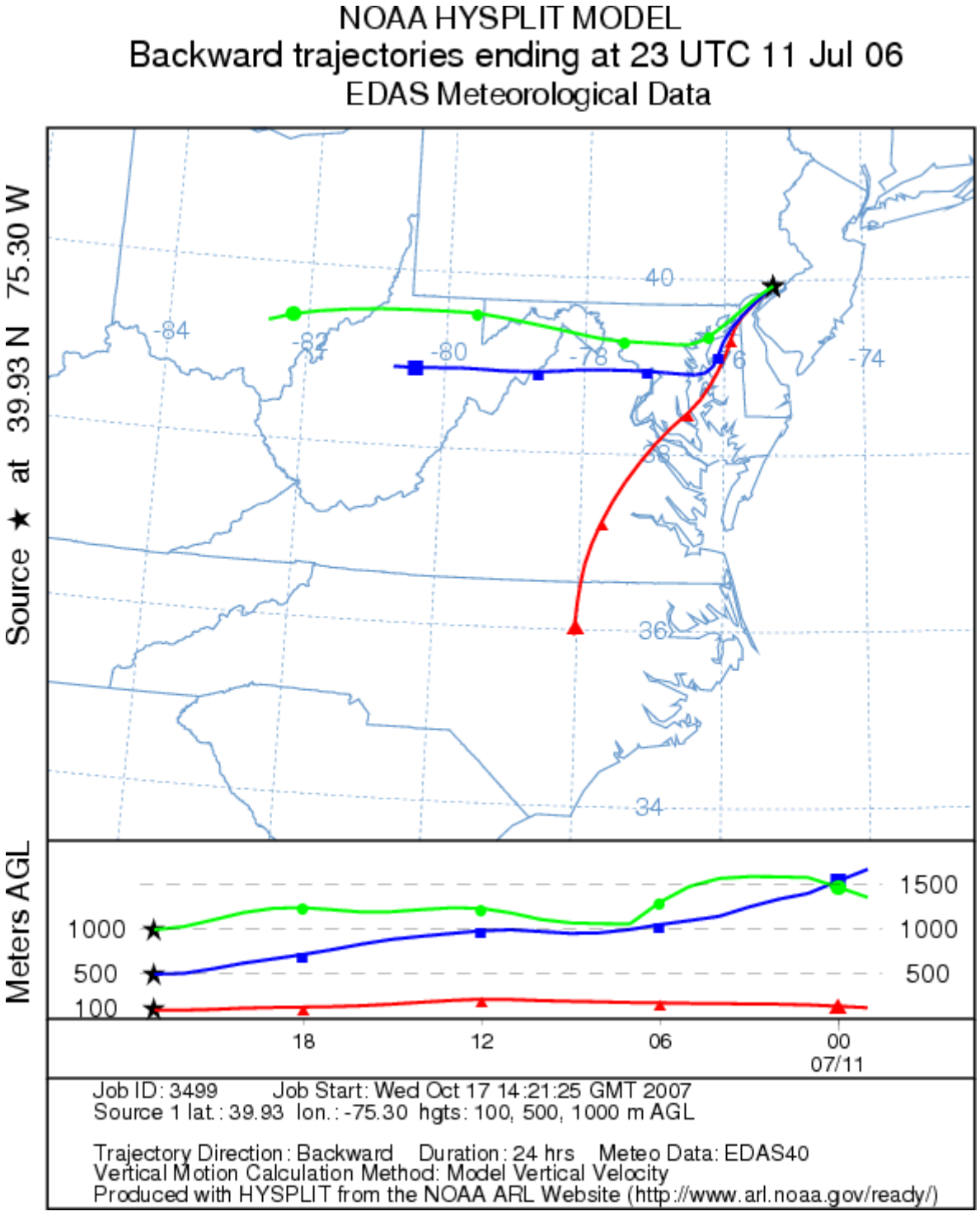
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EDAS Meteorological Data
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Meters AGL
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36
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-84
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-80
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Job ID: 3499 Job Start: Wed Oct 17 14:21:25 GMT 2007
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Vertical Motion Calculation Method: Model Vertical Velocity
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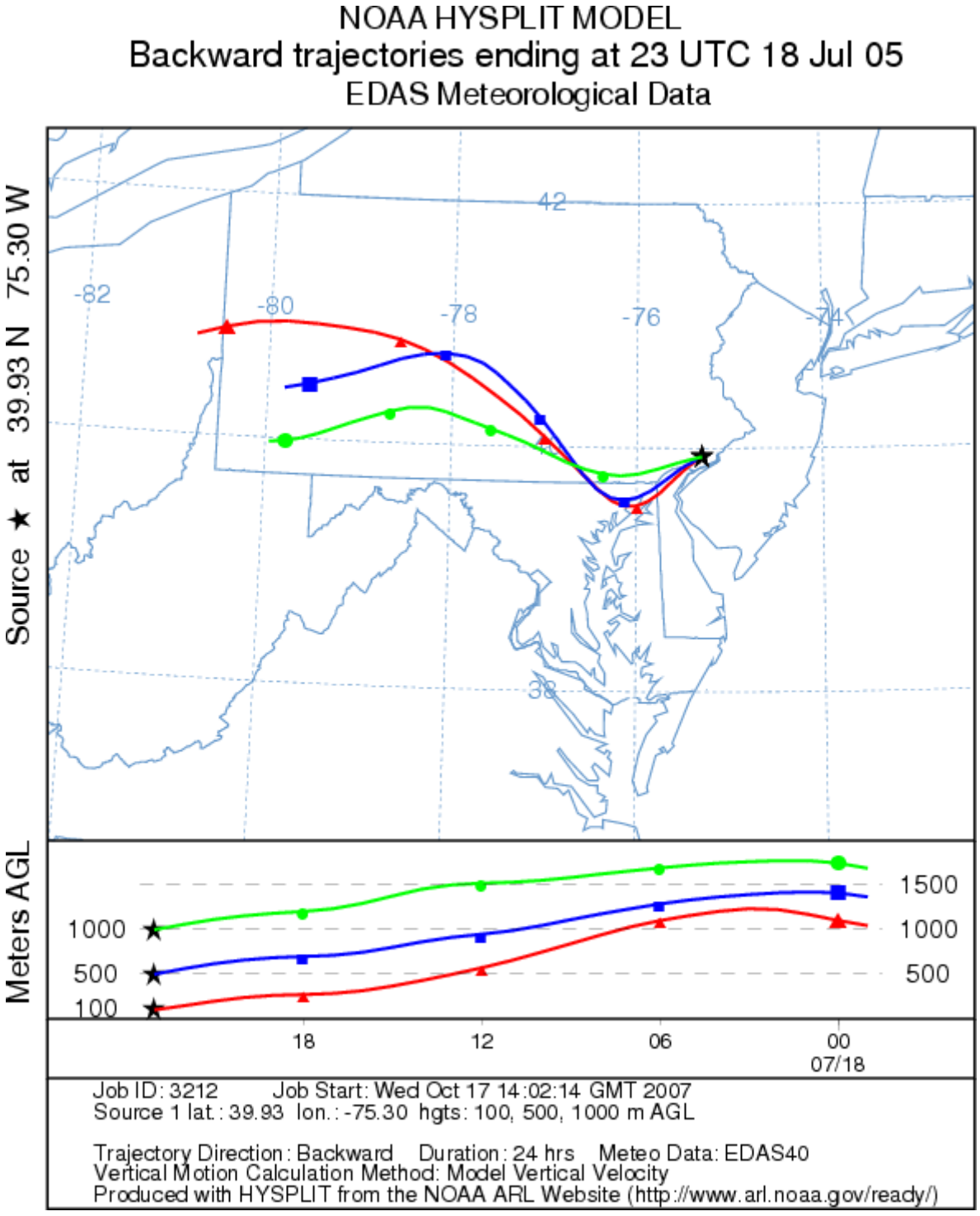
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Backward trajectories ending at 23 UTC 18 Jul 05
EDAS Meteorological Data
Source ★ at 39.93 N 75.30 W
Meters AGL
42
-82
-80
-78
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1500
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Job ID: 3212 Job Start: Wed Oct 17 14:02:14 GMT 2007
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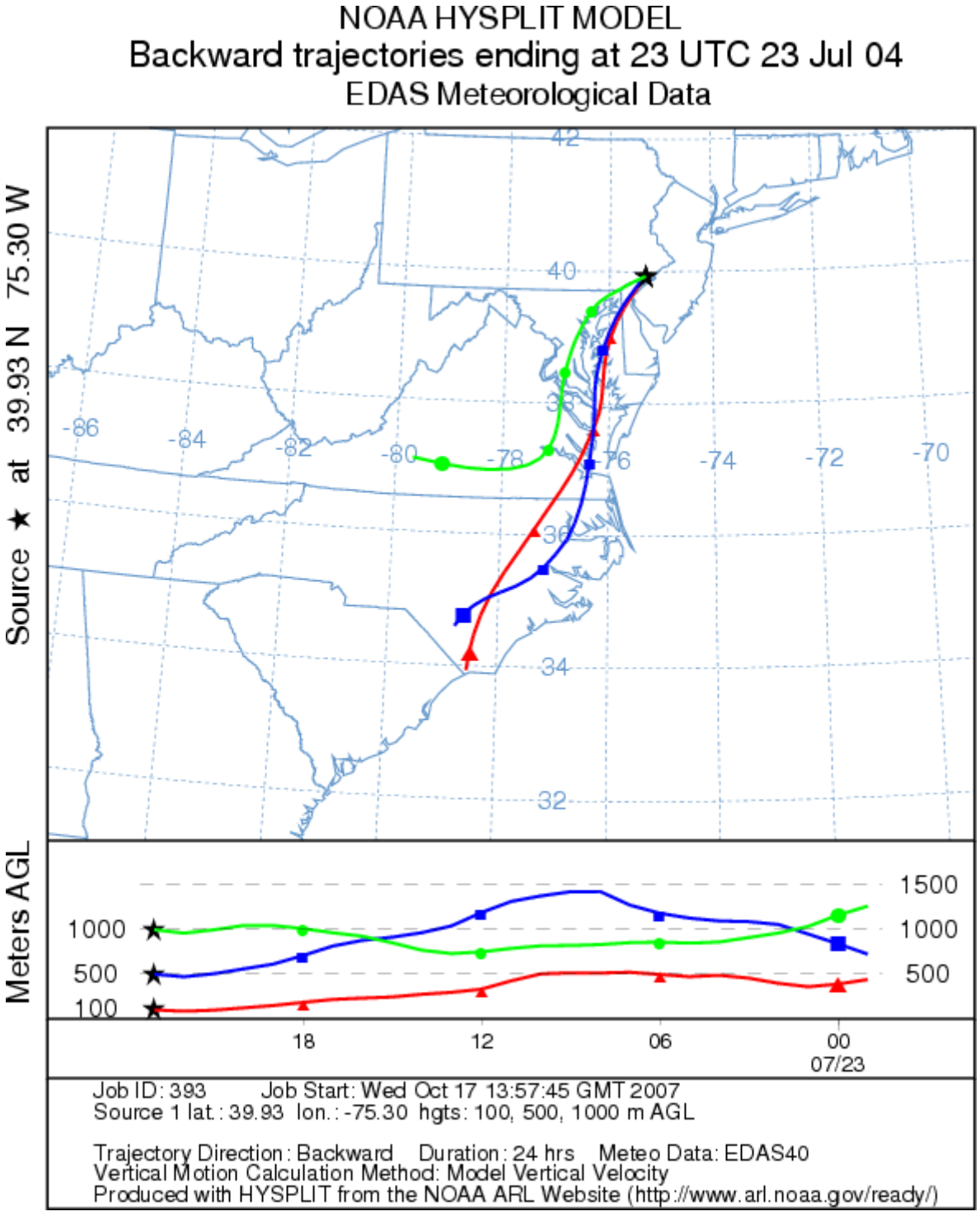
Trajectory Direction: Backward Duration: 24 hrs Meteo Data: EDAS40
Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)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Backward trajectories ending at 23 UTC 23 Jul 04
EDAS Meteorological Data
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42
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34
32
-86
-84
-82
-80
-78
-76
-74
-72
-70
Meters AGL
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18
12
06
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07/23
Job ID: 393 Job Start: Wed Oct 17 13:57:45 GMT 2007
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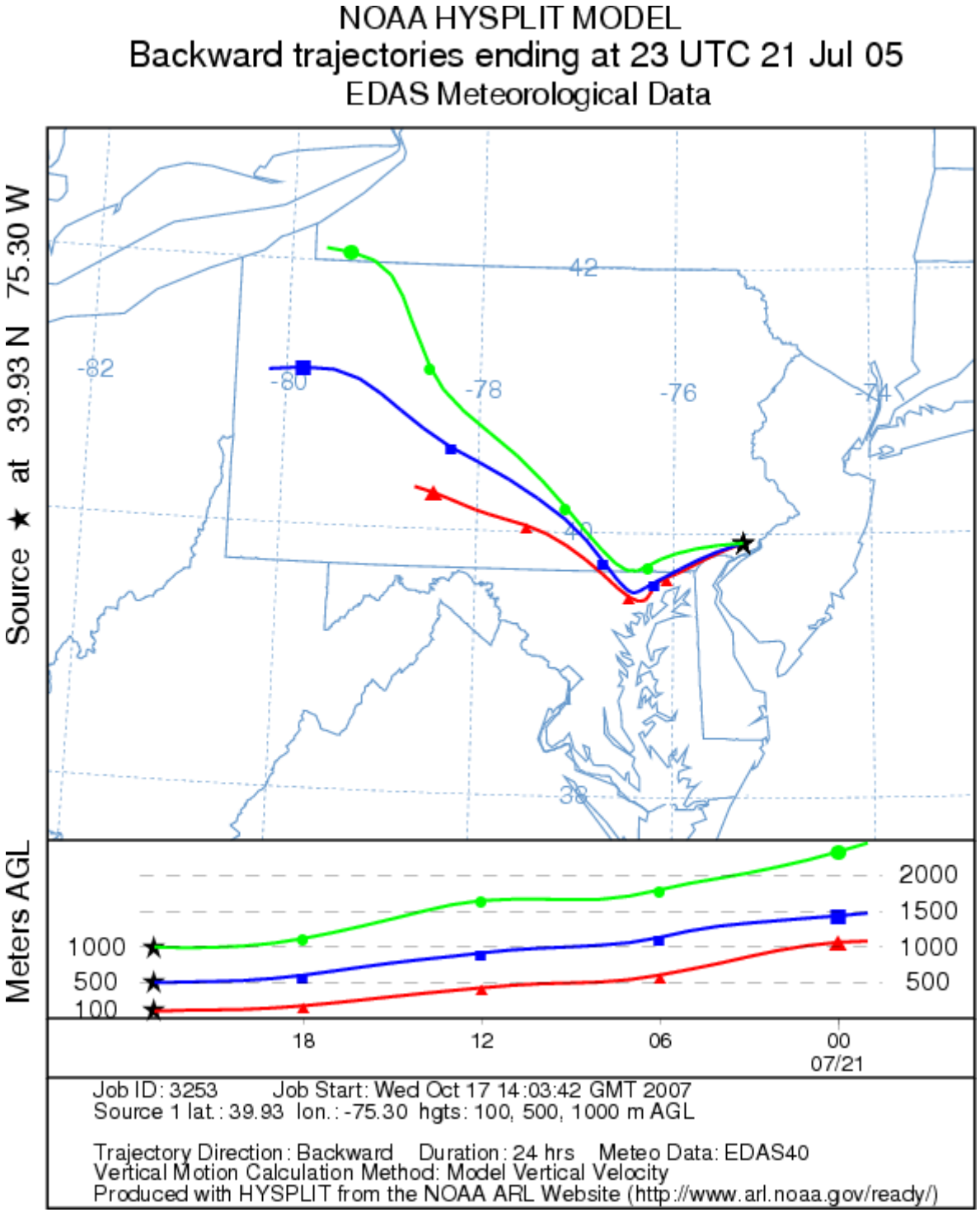
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Backward trajectories ending at 23 UTC 21 Jul 05
EDAS Meteorological Data
Source ★ at 39.93 N 75.30 W
-82
-80
-78
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-74
42
40
38
Meters AGL
2000
1500
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100
18
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07/21
Job ID: 3253 Job Start: Wed Oct 17 14:03:42 GMT 2007
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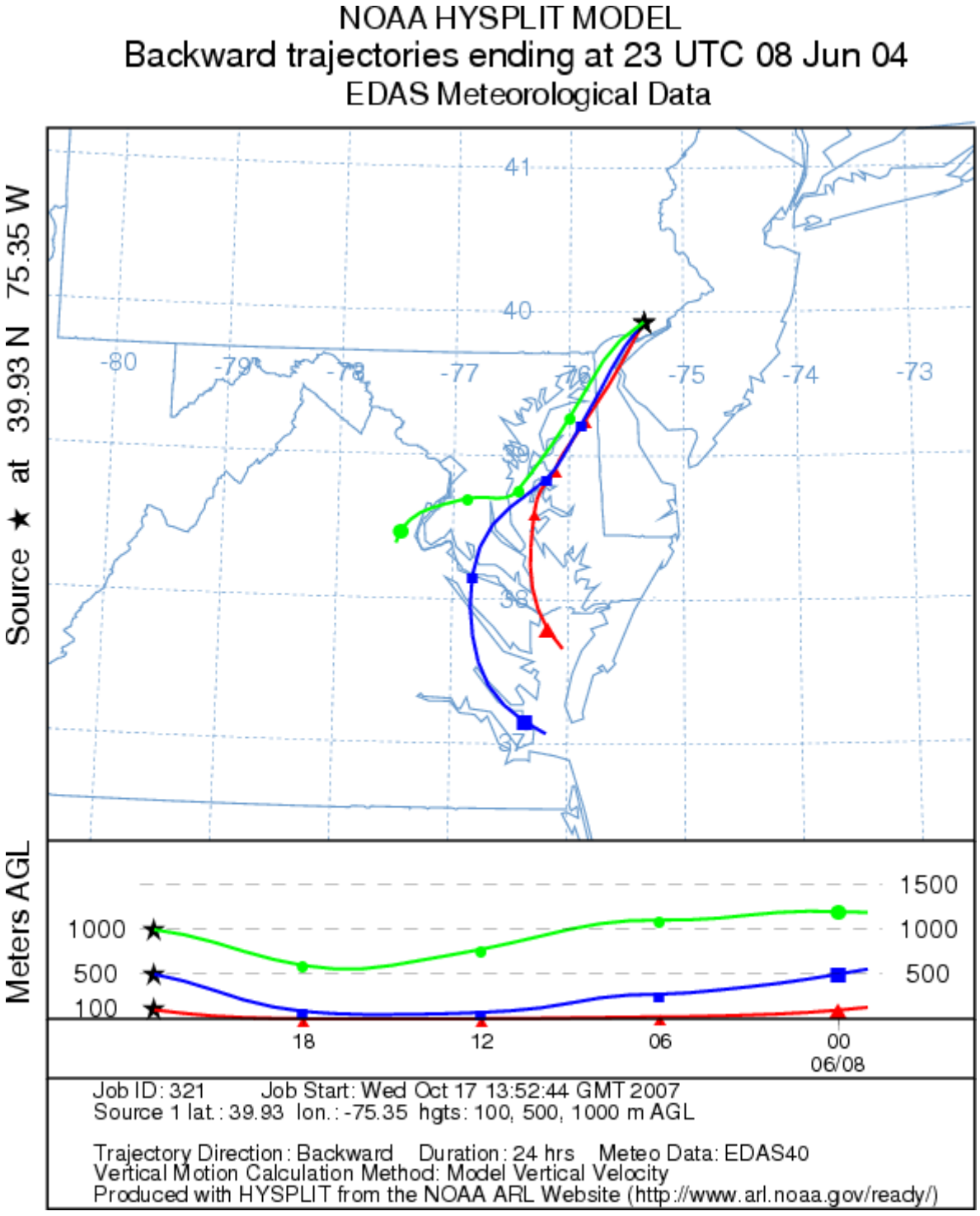
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Backward trajectories ending at 23 UTC 08 Jun 04
EDAS Meteorological Data
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41
40
-80
-79
-78
-77
-76
-75
-74
-73
Meters AGL
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06/08
Job ID: 321 Job Start: Wed Oct 17 13:52:44 GMT 2007
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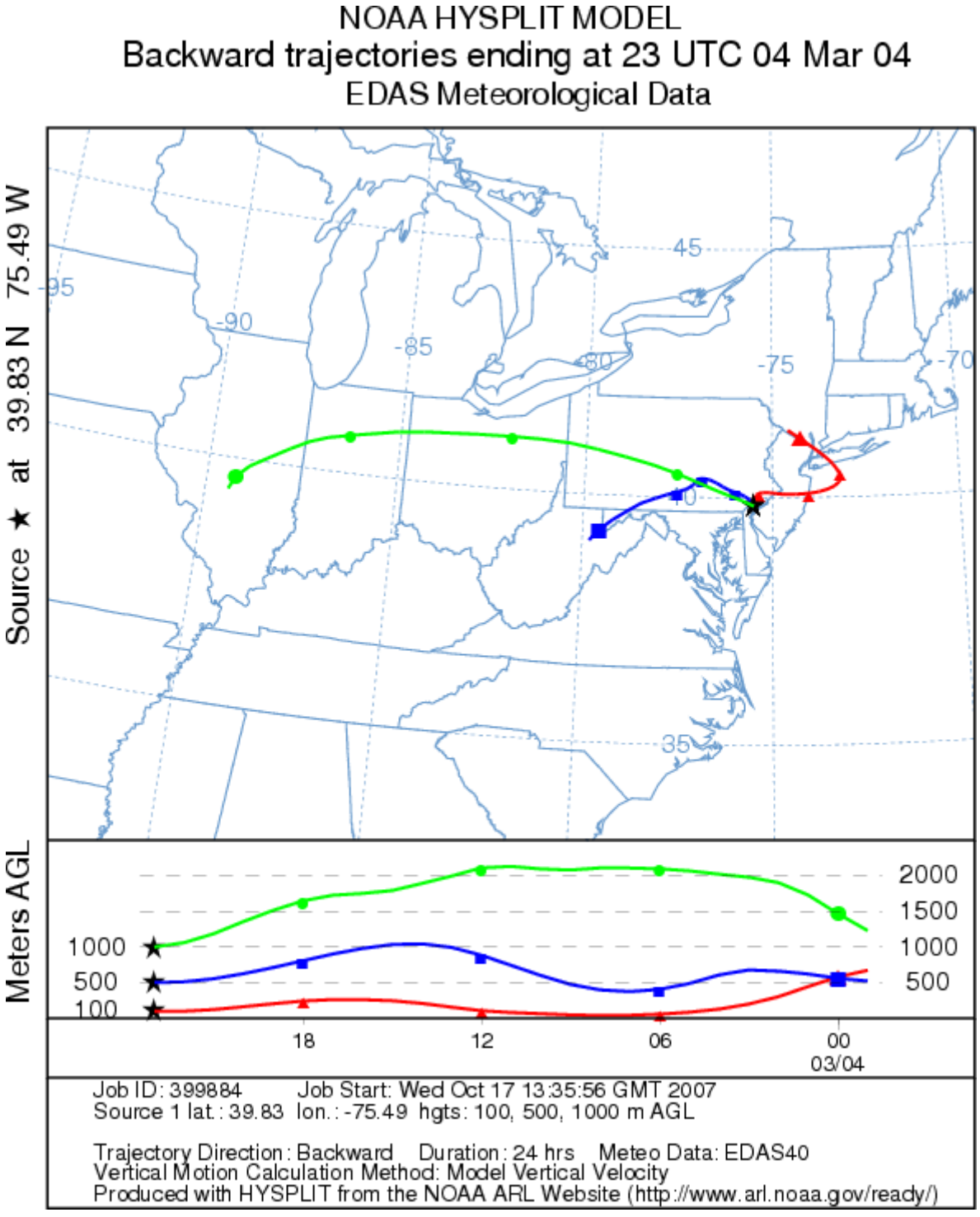
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Meters AGL
45
-95
-90
-85
-80
-75
-70
35
2000
1500
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03/04
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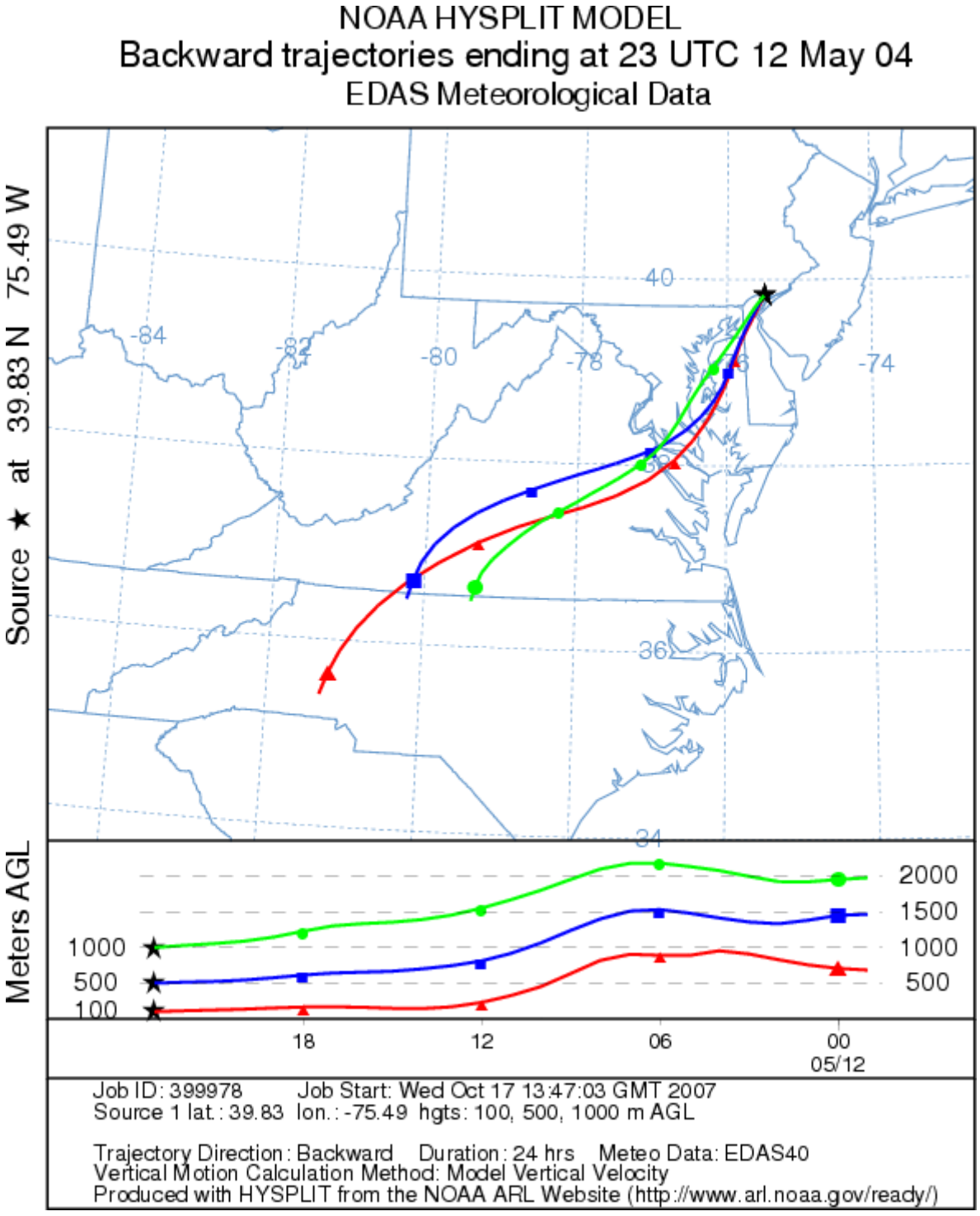
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05/12
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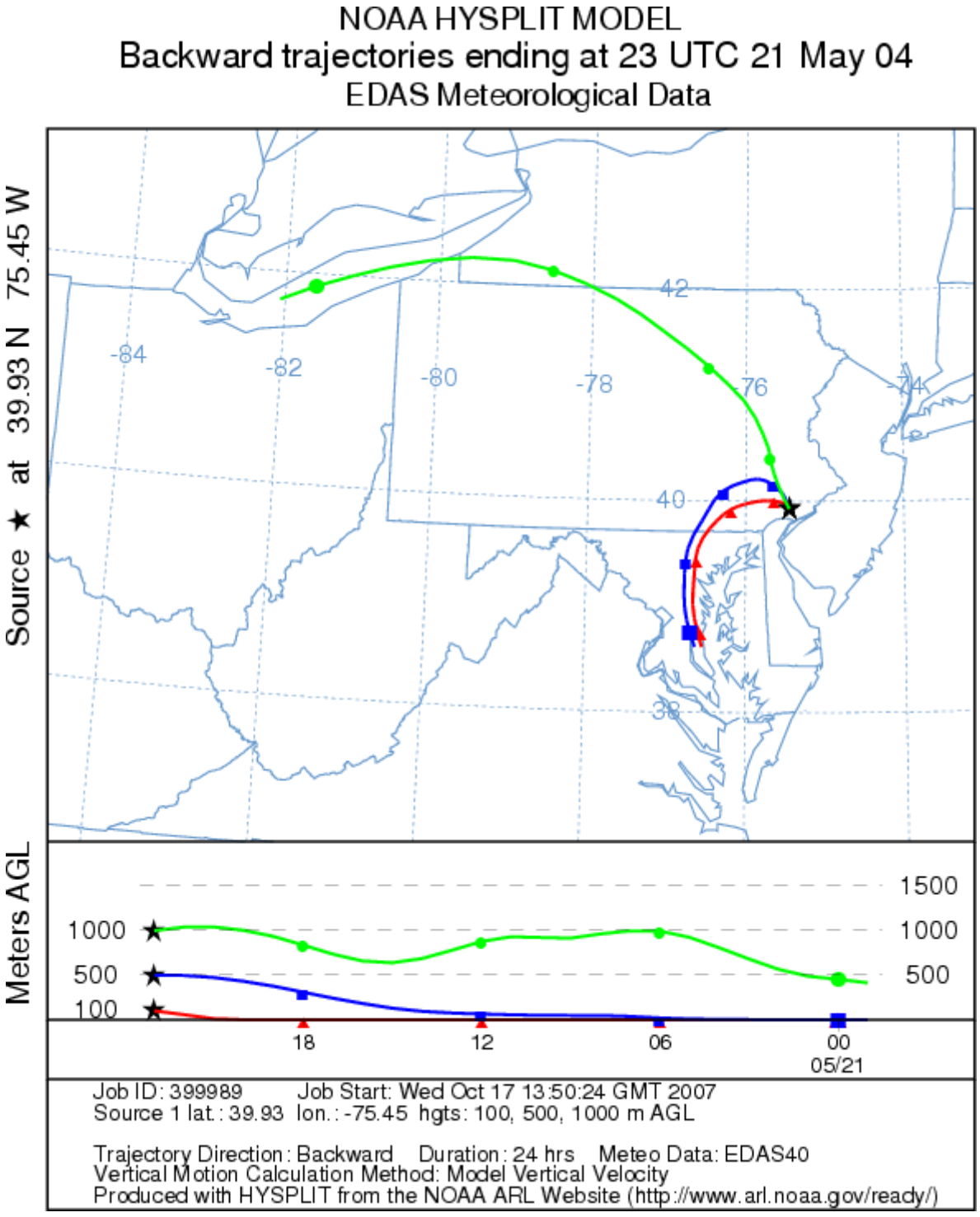
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-76
-74
42
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Meters AGL
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05/21
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Vertical Motion Calculation Method: Model Vertical Velocity
Produced with HYSPLIT from the NOAA ARL Website (http://www.arl.noaa.gov/ready/)