

Missouri Department of dnr.mo.gov

NATURAL RESOURCES

Eric R. Greitens, Governor

Carol S. Comer, Director

FEB 16 2018

Mr. Jim Gulliford
Regional Administrator
U.S. EPA, Region VII
11201 Renner Boulevard
Lenexa, KS 66219

Dear Mr. Gulliford:

The Missouri Department of Natural Resources' Air Pollution Control Program (air program) hereby submits the following:

Revision to Area Boundary Designation Recommendation for the 2015 Ozone Standard

Through this submittal, the air program is requesting that EPA consider these recommendations during the designation process expected to be completed by spring of 2018.

The air program is recommending area designations (e.g., nonattainment, attainment/unclassifiable) for the 2015 8-hour ozone standard. The recommendations are based on technical evaluations following EPA's February 2016 *Guidance on Area Designations for the 2015 Revised National Ambient Air Quality Standards*.

The Missouri Air Conservation Commission adopted these recommendations at the February 1, 2018, commission meeting. A public hearing for the proposed recommendations was held on December 7, 2017. A 30-day public comment period opened by November 6, 2017, and closed on December 14, 2017. During the public comment period, the air program received comments from EPA Region 7 and the Sierra Club. A summary of the comments received and our responses are attached.

In order to comply with Attachment A of the "Regional Consistency for the Administrative Requirements of State Implementation Plan Submittals and the Use of 'Letter Notices'" memo dated April 6, 2011, a searchable pdf version of this document will be emailed to the EPA Regional Office. Within three business days, this complete submittal package will be posted on our website at <http://dnr.mo.gov/env/apcp/naaqsboundarydesignations.htm>.

Thank you for your attention to this matter. If you have any questions regarding this submittal, please contact Ms. Darcy Bybee with the Missouri Department of Natural Resources' Air



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Mr. Jim Gulliford
Page Two

Pollution Control Program at P.O. Box 176, Jefferson City, MO 65102 or by telephone at (573) 751-4817.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Original signed by Darcy A. Bybee

Darcy A. Bybee
Director

DAB:aac

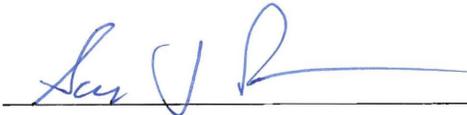
Enclosures:

Copy of recommendations and appendices
Copy of commission signature page certifying Missouri Air Conservation Commission adoption
Copy of public hearing notices
Copy of public hearing transcript introductory statement
Copy of recommendation for adoption and summary of the comments and responses

c: Missouri Air Conservation Commission
Project# 2015-O3-1A

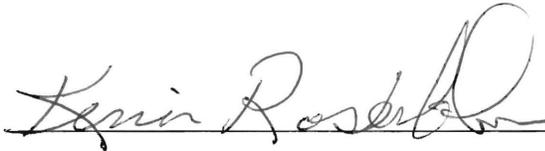
The Missouri Air Conservation Commission **ADOPTS** the following action on this 1st day of February, 2018:

Revision to Area Boundary Designation Recommendation for the 2015 Ozone Standard

 _____, Chairman

 _____, Vice Chairman

 _____, Member

 _____, Member

_____, Member

_____, Member

_____, Member

Revision to Area Boundary Designation Recommendation for the 2015 Ozone Standard

**Prepared for the
Missouri Air Conservation Commission**



Adoption: February 1st, 2018

**Missouri Department of Natural Resources
Division of Environmental Quality
Air Pollution Control Program
Jefferson City, Missouri**

Project # 2015-O3-1A

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1 Purpose

The purpose of this document is to revise Missouri's boundary designation recommendation for the 2015 8-hour ozone National Ambient Air Quality Standard (NAAQS). This revision takes into account more recent ambient air quality data while re-examining the five-factor analysis.

On September 30, 2016, the Missouri Department of Natural Resources' Air Pollution Control Program (air program) submitted to the Environmental Protection Agency (EPA) Missouri's boundary designation recommendations for the 2015 ozone NAAQS. Our recommendation included a nonattainment designation for the St. Louis area and unclassifiable/attainment designations for the rest of Missouri's counties. These recommendations were based on air quality monitoring data from 2013 to 2015 and the five-factor analysis stipulated in EPA's February 2016 document, "Guidance on the Area Designations for the 2015 Ozone NAAQS."

The air program is providing the following revised analysis to EPA to consider prior to finalizing the designations for the 2015 8-hour ozone standard. This analysis re-considered the five-factor analysis based on ambient air quality data collected from the years 2015-2017. This recommendation document addresses all counties in Missouri. Each county is recommended to be designated as either nonattainment or unclassifiable/attainment.

2 Summary of Recommendation

The air program is recommending a nonattainment designation for the Counties of St. Charles and St. Louis, and the City of St. Louis and an unclassifiable/attainment designation for all other Missouri counties.

The technical support for these recommendations is based on data collected in 2015-2017. The data shows there is only one monitor in Missouri, the West Alton monitor located in St. Charles County, currently in violation of the 2015 8-hour ozone NAAQS, with a design value of 72 parts per billion (ppb). No other monitors in the state violate the NAAQS.

Figure 1 depicts Missouri's proposed area boundary recommendations for the 2015 ozone standard. Table 1 contains the recommended designation classification for each county in Missouri.

Figure 1. Missouri 2015 8-hour Ozone NAAQS Boundary Recommendation Revision



Table 1. Missouri Revised Designation Recommendations for the 2015 Ozone NAAQS

County	Classification Recommendation
ADAIR	Unclassifiable/Attainment
ANDREW	Unclassifiable/Attainment
ATCHISON	Unclassifiable/Attainment
AUDRAIN	Unclassifiable/Attainment
BARRY	Unclassifiable/Attainment
BARTON	Unclassifiable/Attainment
BATES	Unclassifiable/Attainment
BENTON	Unclassifiable/Attainment
BOLLINGER	Unclassifiable/Attainment
BOONE	Unclassifiable/Attainment
BUCHANAN	Unclassifiable/Attainment
BUTLER	Unclassifiable/Attainment
CALDWELL	Unclassifiable/Attainment
CALLAWAY	Unclassifiable/Attainment
CAMDEN	Unclassifiable/Attainment
CAPE GIRARDEAU	Unclassifiable/Attainment
CARROLL	Unclassifiable/Attainment
CARTER	Unclassifiable/Attainment
CASS	Unclassifiable/Attainment
CEDAR	Unclassifiable/Attainment
CHARITON	Unclassifiable/Attainment
CHRISTIAN	Unclassifiable/Attainment
CLARK	Unclassifiable/Attainment
CLAY	Unclassifiable/Attainment
CLINTON	Unclassifiable/Attainment
COLE	Unclassifiable/Attainment
COOPER	Unclassifiable/Attainment
CRAWFORD	Unclassifiable/Attainment
DADE	Unclassifiable/Attainment
DALLAS	Unclassifiable/Attainment
DAVISS	Unclassifiable/Attainment
DeKALB	Unclassifiable/Attainment
DENT	Unclassifiable/Attainment
DOUGLAS	Unclassifiable/Attainment
DUNKLIN	Unclassifiable/Attainment
FRANKLIN	Unclassifiable/Attainment
GASCONADE	Unclassifiable/Attainment
GENTRY	Unclassifiable/Attainment
GREENE	Unclassifiable/Attainment
GRUNDY	Unclassifiable/Attainment
HARRISON	Unclassifiable/Attainment
HENRY	Unclassifiable/Attainment
HICKORY	Unclassifiable/Attainment
HOLT	Unclassifiable/Attainment
HOWARD	Unclassifiable/Attainment
HOWELL	Unclassifiable/Attainment
IRON	Unclassifiable/Attainment
JACKSON	Unclassifiable/Attainment
JASPER	Unclassifiable/Attainment
JEFFERSON	Unclassifiable/Attainment
JOHNSON	Unclassifiable/Attainment

County	Classification Recommendation
KNOX	Unclassifiable/Attainment
LACLEDE	Unclassifiable/Attainment
LAFAYETTE	Unclassifiable/Attainment
LAWRENCE	Unclassifiable/Attainment
LEWIS	Unclassifiable/Attainment
LINCOLN	Unclassifiable/Attainment
LINN	Unclassifiable/Attainment
LIVINGSTON	Unclassifiable/Attainment
McDONALD	Unclassifiable/Attainment
MACON	Unclassifiable/Attainment
MADISON	Unclassifiable/Attainment
MARIES	Unclassifiable/Attainment
MARION	Unclassifiable/Attainment
MERCER	Unclassifiable/Attainment
MILLER	Unclassifiable/Attainment
MISSISSIPPI	Unclassifiable/Attainment
MONITEAU	Unclassifiable/Attainment
MONROE	Unclassifiable/Attainment
MONTGOMERY	Unclassifiable/Attainment
MORGAN	Unclassifiable/Attainment
NEW MADRID	Unclassifiable/Attainment
NEWTON	Unclassifiable/Attainment
NODAWAY	Unclassifiable/Attainment
OREGON	Unclassifiable/Attainment
OSAGE	Unclassifiable/Attainment
OZARK	Unclassifiable/Attainment
PEMISCOT	Unclassifiable/Attainment
PERRY	Unclassifiable/Attainment
PETTIS	Unclassifiable/Attainment
PHELPS	Unclassifiable/Attainment
PIKE	Unclassifiable/Attainment
PLATTE	Unclassifiable/Attainment
POLK	Unclassifiable/Attainment
PULASKI	Unclassifiable/Attainment
PUTNAM	Unclassifiable/Attainment
RALLS	Unclassifiable/Attainment
RANDOLPH	Unclassifiable/Attainment
RAY	Unclassifiable/Attainment
REYNOLDS	Unclassifiable/Attainment
RIPLEY	Unclassifiable/Attainment
ST. CHARLES	Nonattainment
ST. CLAIR	Unclassifiable/Attainment
ST. FRANCOIS	Unclassifiable/Attainment
STE. GENEVIEVE	Unclassifiable/Attainment
ST. LOUIS COUNTY	Nonattainment
SALINE	Unclassifiable/Attainment
SCHUYLER	Unclassifiable/Attainment
SCOTLAND	Unclassifiable/Attainment
SCOTT	Unclassifiable/Attainment
SHANNON	Unclassifiable/Attainment
SHELBY	Unclassifiable/Attainment
STODDARD	Unclassifiable/Attainment

County	Classification Recommendation
STONE	Unclassifiable/Attainment
SULLIVAN	Unclassifiable/Attainment
TANEY	Unclassifiable/Attainment
TEXAS	Unclassifiable/Attainment
VERNON	Unclassifiable/Attainment
WARREN	Unclassifiable/Attainment
WASHINGTON	Unclassifiable/Attainment
WAYNE	Unclassifiable/Attainment
WEBSTER	Unclassifiable/Attainment
WORTH	Unclassifiable/Attainment
ST. LOUIS CITY	Nonattainment

3 Background

On October 1, 2015, EPA revised the NAAQS for primary and secondary ground-level ozone to 70 ppb based on an 8-hour averaging period [80 FR 65292]. The form of the standard is based on the average of the last three (3) years' 4th highest maximum daily 8-hour average concentrations.

Whenever a NAAQS is revised, the designation process is the first step in addressing the new standard. Section 107(d)(1) of the Clean Air Act (CAA) allows each state to recommend unclassifiable/attainment and nonattainment areas within one year after a NAAQS is established. EPA can then accept the recommendations or make modifications. Section 107(d)(1)(A) of the CAA defines a nonattainment area as any area that does not meet or that contributes to nearby areas not meeting the ambient air quality standard. All other areas should be classified as unclassifiable/attainment.

On September 30, 2016, the air program submitted area boundary recommendations to EPA. In order to meet the one-year timeframe for submitting state recommendations, the air program based its analysis on quality assured and certified ambient air monitoring data from 2013-2015. Since EPA was expected to issue final designations by October 1, 2017, EPA would have had an additional year of ozone data to review, and EPA was expected to base final designations on quality-assured monitoring data from 2014-2016. Looking at the ambient data for 2016, EPA would have seen three violating monitors in Missouri: one in St. Louis County and two in St. Charles County.

However, on June 28, 2017, EPA announced that it was using its authority under the CAA to extend by one year the deadline for promulgating initial area designations for the ozone NAAQS [82 FR 29246]. EPA stated that there was insufficient information to complete the designations by October 1, 2017. Therefore, the deadline for EPA to promulgate initial designations for the 2015 ozone NAAQS was extended until October 1, 2018. This prompted the air program to reevaluate Missouri's recommendations based on more recent data, including the additional violating monitors seen in the 2016 and 2017 ozone seasons. The 2017 ozone season data indicated there was only the one violating monitor in St. Charles County.

Subsequently, on August 10, 2017, EPA reversed itself and announced that it was withdrawing the one-year extension of the deadline for promulgating initial area designations for the ozone NAAQS. This reinstated the October 1, 2017 deadline for promulgating designations provided in the CAA.

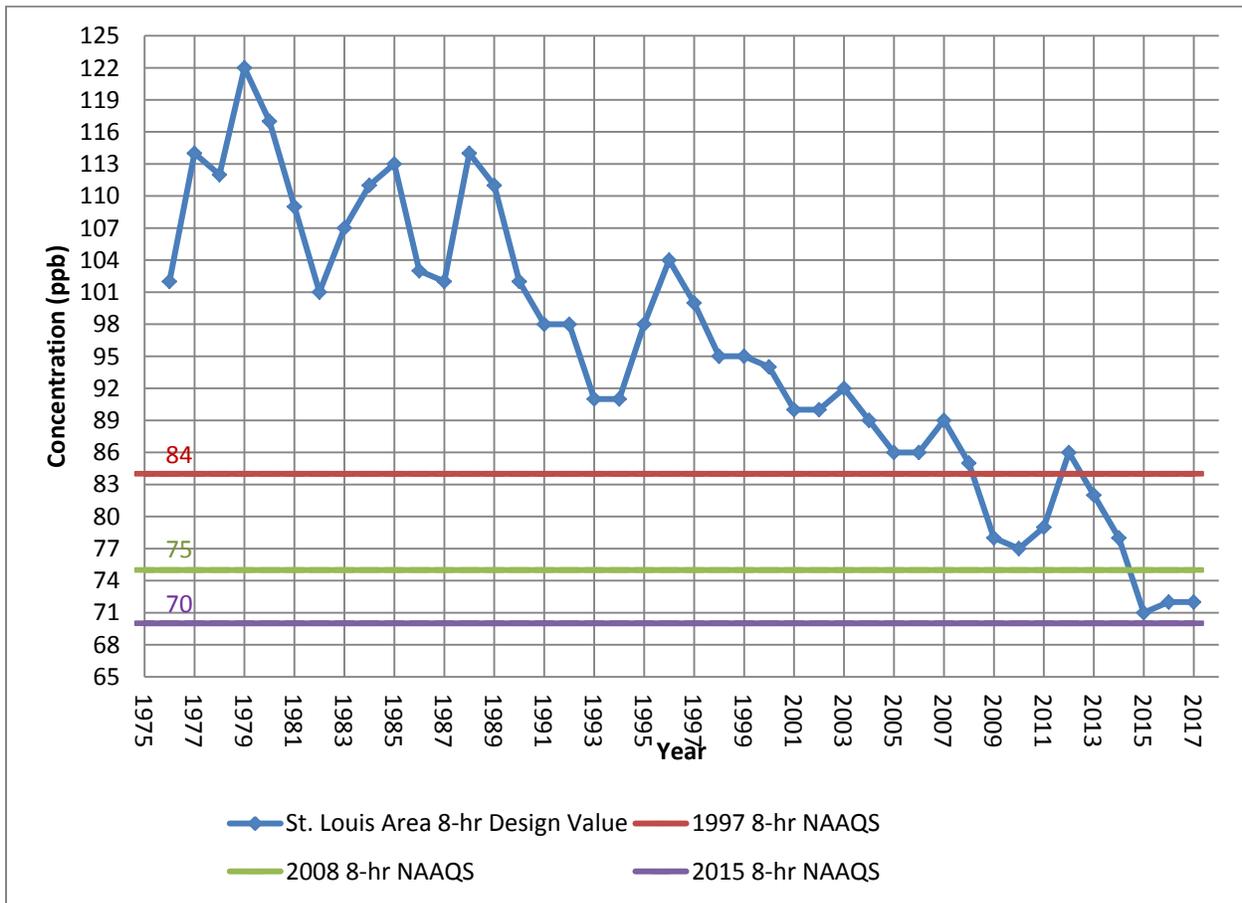
After EPA withdrew the extension, it became unclear when EPA would issue the 120-day letters to specify the final area designations. In light of these events, on September 22, 2017, the air program

submitted a letter to EPA requesting that the EPA not act on Missouri's 2016 submission because Missouri would be revising its area designation recommendations based on updated information.

For perspective, the St. Louis nonattainment area has historically included the counties of St. Louis, St. Charles, Jefferson, and Franklin and St. Louis City for 1979 1-hour, 1997 8-hour, and 2008 8-hour ozone NAAQS. Based on 2005-2007 data, violations of the 2008 standard were seen at monitors in the counties of St. Louis, St. Charles, Jefferson, and the City of St. Louis, in addition to monitors across the state. Since then, the air program has made considerable progress in attaining and maintaining the three ozone NAAQS for these counties. In fact, the St. Louis area was able to meet the 2008 ozone standard of 75 ppb as specified in EPA's June 27, 2016 "Determination of Attainment" [81 FR 41444].

Figure 2 shows the St. Louis area's 8-hour ozone design value trend from 1976 to 2017. The figure shows the improvement in St. Louis area's air quality going from 102 ppb design value in 1976 to 72 ppb in 2017. This downward trend is expected to continue with new federal onroad and nonroad source controls that target NO_x emissions from motor vehicles and the Cross-State Air Pollution Rule (CSAPR) that targets NO_x emissions from large electric generating units (EGU). These and other federal rules will continue to help the ozone design value to trend downward in the St. Louis area.

Figure 2: St. Louis Area 8-hour Ozone Design Values Ending Year Trend



4 Criteria for Designation

The air program’s revised recommendations are based on EPA’s February 25, 2016, guidance document titled “*Guidance on Area Designations for the 2015 Revised Ozone National Ambient Air Quality Standards.*” This guidance was written to assist states and tribes recommend area boundary designations under the 2015 8-hour ozone standard. In the guidance, EPA emphasizes that it does not intend for the Metropolitan Statistical Area (MSA) to serve as the presumptive boundary for 8-hour ozone nonattainment areas. Area-specific analyses may support nonattainment boundaries that are smaller or larger than the MSA. The EPA guidance document recommends that states base their area boundary recommendations on an evaluation of five factors:

1. Air Quality Data,
2. Emissions and Emission-Related Data,
 - Population and Degree of Urbanization
 - Traffic and Commuting Patterns
3. Meteorological Data,
4. Geography/Topography, and

5. Jurisdictional Boundaries.

The guidance also indicates that the first step in selecting new area designations is to identify air quality monitoring sites that showed a violation of the 2015 ozone NAAQS. The air program collected new data from these sites during the 2015-2017 ozone seasons using the monitors identified in Table 2. These monitors are maintained by the air program and utilize the Federal Reference Method (FRM) or the Federal Equivalent Method (FEM) to assure that the monitors, equipment and procedures operate in accordance with 40 CFR Part 58. Only FRM or FEM monitors can be used to determine compliance with 2015 NAAQS.

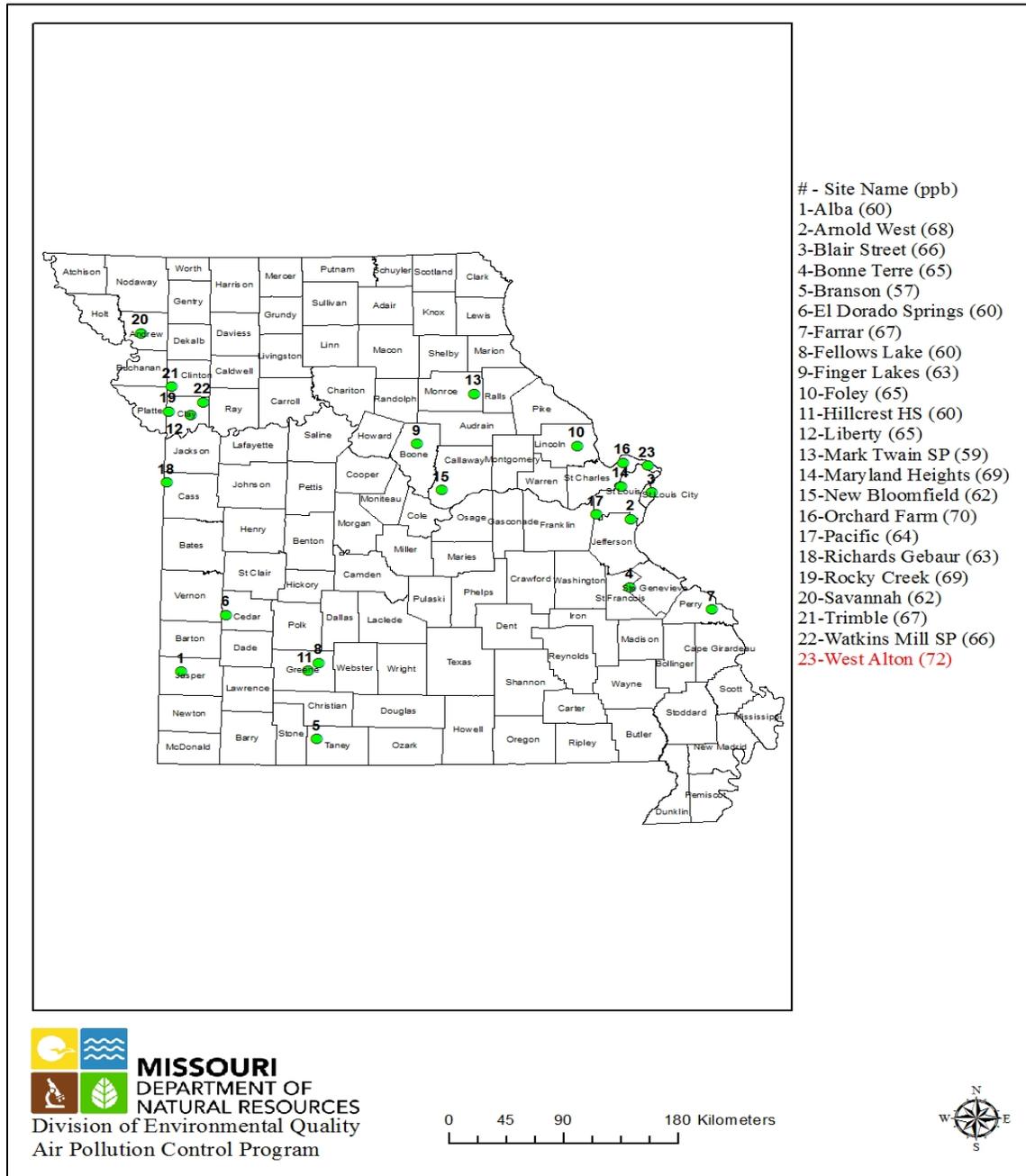
Once the monitoring data from the 2015-2017 ozone seasons was collected, it was compared to the new NAAQS. Data from the 2017 ozone season is preliminary. Monitoring data for all of the state’s ozone monitoring sites for 2014-2016 and 2015-2017 are shown in Table 2. All air program-maintained ozone monitors are graphically presented in Figure 3.

Table 2. 2014-2016 & 2015-2017 Missouri Ozone Monitors and Design Values

Monitor Name	Monitor Identifier	County	2014-2016 Design Value (ppb)	2015-2017 Design Value (ppb)*
Alba	29-097-0004	Jasper	61	60
Arnold West	29-099-0019	Jefferson	70	68
Blair Street	29-510-0085	St. Louis City	65	66
Bonne Terre	29-186-0005	Ste. Genevieve	66	65
Branson	29-213-0004	Taney	57	57
El Dorado Springs	29-039-0001	Cedar	61	60
Farrar	29-157-0001	Perry	67	67
Fellows Lake	29-077-0042	Greene	60	60
Finger Lakes	29-019-0011	Boone	64	63
Foley	29-113-0003	Lincoln	65	65
Hillcrest High School	29-077-0036	Greene	59	60
Liberty	29-047-0005	Clay	64	65
Mark Twain State Park	29-137-0001	Monroe	59	59
Maryland Heights	29-189-0014	St. Louis	71	69
New Bloomfield	29-027-0002	Callaway	64	62
Orchard Farm School	29-183-1004	St. Charles	71	70
Pacific	29-189-0005	St. Louis	65	64
Richards Gebaur South	29-037-0003	Cass	63	63
Rocky Creek	29-047-0006	Clay	67	69
Savannah	29-003-0001	Andrew	63	62
Trimble	29-049-0001	Clinton	67	67
Watkins Mill State Park	29-047-0003	Clay	65	66
West Alton	29-183-1002	St. Charles	72	72

* Includes 2017 preliminary data.

Figure 3. Missouri Ozone Monitors and 2015-2017 Preliminary Design Values



5 Technical Analysis: St. Louis MSA

To determine the nonattainment area boundary for the 2015 ozone standard, the air program used the St. Louis MSA to determine trends, make county comparisons, and to evaluate technical data. Counties not in the St. Louis MSA were analyzed based solely on ambient air quality data since no other areas of the state showed violations of the 2015 standard. The air program did not consider counties in adjoining states.

5.1 Air Quality Data

Air quality data is the primary factor in identifying an area as attaining or not attaining the applicable standard. The air quality data analysis is an examination of available ambient ozone air quality monitoring data, including the annual design value calculated for each area, to determine if the collective area violates the standard based on a 3-year period. In this instance, the air program is basing boundary recommendations on quality assured 2015-2016 and preliminary 2017 air quality data.

A violation is based on the average of the last three (3) years' 4th highest maximum daily 8-hour average concentrations. The violation occurs when the three year average concentration is equal or greater than 71 ppb. Data from the 2015-2017 monitoring period shows that only the West Alton monitor, located in St. Charles County, is in violation of the 2015 8-hour ozone NAAQS with a concentration of 72 ppb, as shown in Table 3. Therefore, St. Charles County is recommended for nonattainment status under the "does not meet the standard" provision of CAA Section 107(d)(1)(A). Figure 4 shows the locations of the West Alton monitor and the other monitors in the St. Louis MSA.

Table 3. Ozone Monitors and 2015-2017 Preliminary Design Values within and near St. Louis MSA

Monitor Name	Monitor Identifier	County Name	2015-2017 Design Value (ppb)*
Arnold West	29-099-0019	Jefferson	68
Blair Street	29-510-0085	St. Louis City	66
Bonne Terre	29-186-0005	Ste. Genevieve	65
Farrar	29-157-0001	Perry	67
Foley	29-113-0003	Lincoln	65
Maryland Heights	29-189-0014	St. Louis	69
Orchard Farm School	29-183-1004	St. Charles	70
Pacific	29-189-0005	St. Louis	64
West Alton	29-183-1002	St. Charles	72

*Includes 2017 preliminary data.

Figure 4. St. Louis MSA & Surrounding Counties' Ozone Monitoring Sites and their 2015-2017 Preliminary Design Values

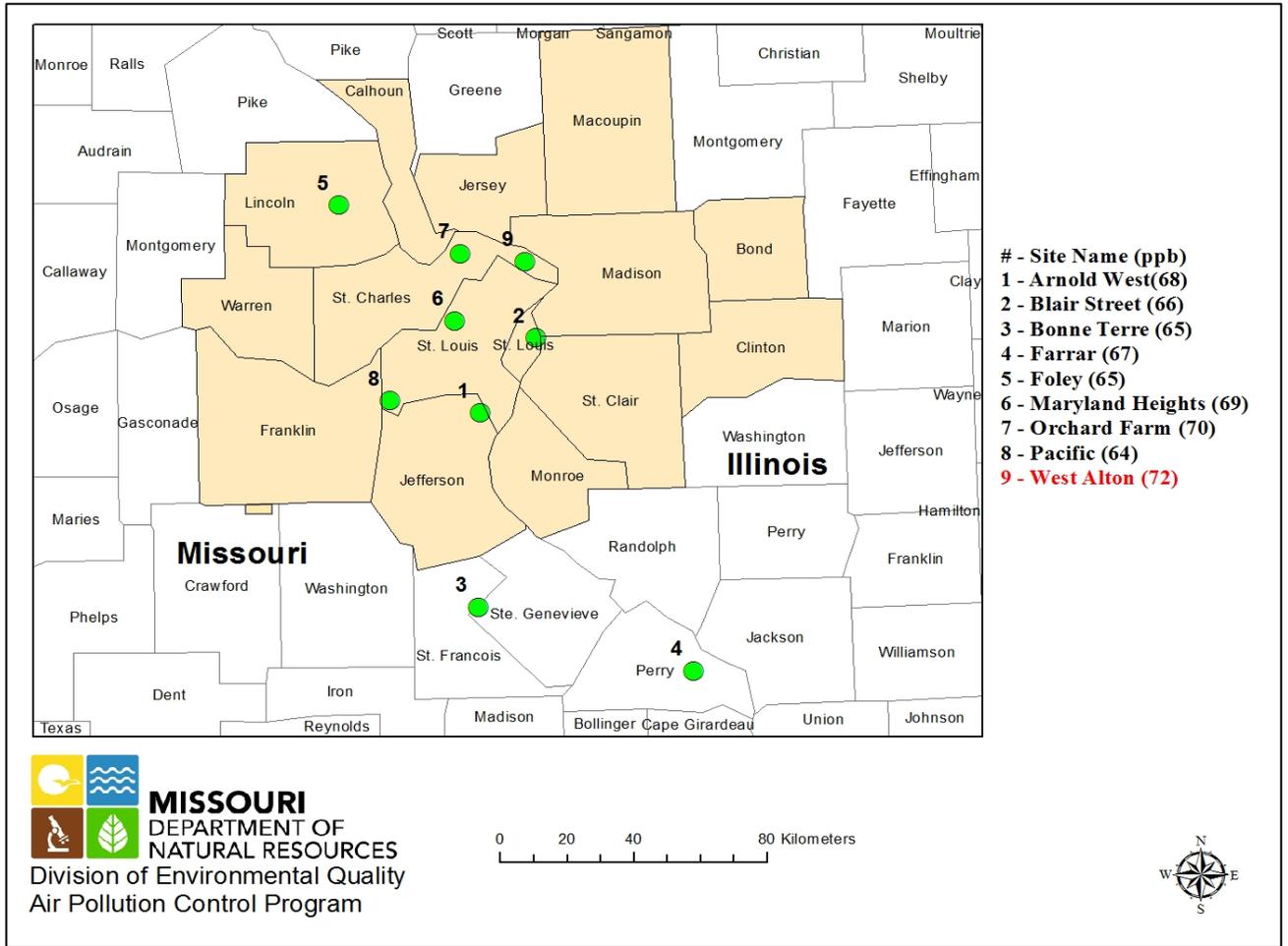


Table 4 shows individual year monitoring data for monitors around the St. Louis MSA. The table shows that data from 2016 are higher than data from 2015 and 2017. This is mainly attributable to the 2016 ozone season meteorology, which was more favorable to ozone formation than 2015 and 2017 ozone seasons' meteorology. According to monthly climate statistics for Lambert Airport in St. Louis for the ozone season (April-Sept) in 2015-2017, 2016 ozone season meteorology was most favorable for ozone formation due to high temperature. The 2015 ozone season meteorology was least favorable for ozone formation due to wet conditions and average temperatures that were still above the 30-year average but were the lowest for the period. The 2017 ozone season meteorology was moderately favorable for ozone formation due to dry conditions, below the 30-year average, and temperatures above the 30-year average, but not as high as 2016.

Although all of the monitors show an increase in monitored concentrations in 2016, the monitors closest to larger NOx emission sources located in Franklin and Jefferson Counties, as seen in Figure 7 and 8, show a decrease in monitored concentrations from 2015 to 2017. Arnold West in Jefferson County decreases from 69 ppb in 2015 to 66 ppb in 2017. Pacific in St. Louis County decreases from 65 ppb in 2015 to 62 ppb in 2017. This decrease in ozone concentrations at the monitors farther away from the violating monitor further supports the air program's revised boundary recommendation, which concentrates on the Counties of St. Charles and St. Louis, and the City of St. Louis.

Table 4. Ozone Monitors and 2015-2017 Monitoring Data within and near St. Louis MSA

Monitor Name	Monitor Identifier	County Name	2015 (ppb)	2016 (ppb)	2017* (ppb)
Arnold West	29-099-0019	Jefferson	69	70	66
Blair Street	29-510-0085	St. Louis City	63	68	68
Bonne Terre	29-186-0005	Ste. Genevieve	63	67	65
Farrar	29-157-0001	Perry	67	69	67
Foley	29-113-0003	Lincoln	65	65	66
Maryland Heights	29-189-0014	St. Louis	69	73	67
Orchard Farm School	29-183-1004	St. Charles	66	76	68
Pacific	29-189-0005	St. Louis	65	67	62
West Alton	29-183-1002	St. Charles	70	75	72

* Preliminary data

5.2 Emissions and Emissions-Related Data

The air program evaluated emissions of ozone precursors, oxides of nitrogen (NO_x) and volatile organic compound (VOC), for each county in the St. Louis MSA and surrounding counties. Emissions and emissions-related data can provide information on areas contributing significantly to violating monitors. Projected population growth, mobile source data, and travel patterns were correlated to precursor emissions and thereby ozone levels. The tables below detail recent and expected trends in these categories.

The emission inventories referenced in this section were generated for submission to EPA for the 2014 National Emissions Inventory (NEI). Mobile source emissions in Missouri were calculated by the Missouri Department of Natural Resources. MOVES2014 was used to estimate emissions for the onroad and nonroad mobile source categories. County-specific data obtained from the Missouri Department of Transportation for vehicle miles travelled (VMT) was converted into model input. Additional data were developed from 2014 inspection and maintenance program compliance rates in the St. Louis MSA. Age distributions for light duty passenger vehicles were developed from a dataset of registered vehicles statewide as of 2014. This 2014 inventory was also submitted to EPA as part of Missouri's 2008 Ozone Redesignation Request and Maintenance Plan, submitted to EPA on September 12, 2016. For more information, see the section focused on the 2008 Standard at <http://dnr.mo.gov/env/apcp/ozone.htm>.

The air program evaluated the population and vehicle use characteristics and trends as indicators of probable location and magnitude of non-point source emissions. These include ozone-precursor emissions from on and off road vehicles and engines, consumer products and services, and residential fuel combustion. Urbanization was used to identify areas with anthropogenic emission sources that emit ozone precursors.

The air program evaluated commuting patterns of residents in the area, as well as total VMT for each county. In combination with population and population density, this information helps identify the probable location of non-point source emissions. A county with high VMT and/or a high number of commuters is generally an integral part of an urban area and indicates the presence of motor vehicle emissions that may contribute to ozone formation.

Table 5 summarizes emissions by county, along with population, employment, and VMT data. These data provide perspective on the largest counties by number of people, emissions contribution, and travel and commuting patterns. The top counties in this evaluation are St. Louis County, St. Charles County and St. Louis City. All other counties in the St. Louis MSA have less emissions, population, employment, and VMT than the top three. As shown in the table, 80.5% of population, 90.4% of employees and 77.0% of VMT in the MSA are in St. Louis County, St. Charles and St. Louis City. Franklin, Jefferson, Lincoln and Warren counties comprise 19.5% of the population, 9.6% of employees and 23.0% of VMT of the MSA. In addition, St. Louis County, St. Charles County and St. Louis City have the majority of emissions related activities. For example, these three areas emitted 78.2% VOC and 68.1% NO_x emissions of the MSA in 2014. Franklin, Jefferson, Lincoln, and Warren counties emitted 21.8% VOC and 31.9% NO_x emissions in 2014. Most of the NO_x emissions from these counties came from EGUs and large point sources.

Table 5. St. Louis MSA Emissions and Emissions-Related Data by County for 2014

County	2014 Total VOC (TPD)	2014 Total Nox (TPD)	2014 Population	2014 Employment	2014 Million VMT per year	MSA VOC %	MSA NOx %	Pop. Percent % (MSA)	Employment % (MSA)	VMT % (MSA)
St. Louis	64.36	87.90	1,001,876	605,721	11,274.9	46.5%	40.0%	47.5%	56.4%	52.0%
St. Louis City	19.72	19.98	317,419	233,310	1,837.9	14.2%	9.1%	15.0%	21.7%	8.5%
St. Charles	24.24	41.64	379,493	130,895	3,581.9	17.5%	19.0%	18.0%	12.2%	16.5%
Jefferson	12.78	31.81	222,716	48,319	2,238.5	9.2%	14.5%	10.5%	4.5%	10.3%
Franklin	10.80	30.40	102,084	36,371	1,532.0	7.8%	13.8%	4.8%	3.4%	7.1%
Lincoln	3.69	4.79	54,249	11,342	572.9	2.7%	2.2%	2.6%	1.1%	2.6%
Warren	2.94	3.10	33,253	7,114	634.7	2.1%	1.4%	1.6%	0.7%	2.9%
MSA TOTAL (MO)	138.53	219.62	2,111,090	1,073,072	21,673					

Table 6 gives additional details on the expected population growth through the year 2030. Lincoln, Warren and St. Charles counties are expected to have the highest population growth from 2010 to 2030. Population growth may indicate increase in emissions, especially from mobile sources. However, according to recent future mobile source emission projections for 2023 from EPA’s 2011v6.3 modeling platform, mobile NOx and VOC emissions are decreasing area-wide. For example, 2023 projected NOx emissions from Franklin County and Jefferson County are decreasing by 76% and 78%, respectively. This is due to several factors including fleet turnover and new mobile sources rules that will be enacted by EPA. EPA’s 2011v6.3 modeling platform was used to support analyses of transport of ozone related to the 2008 Ozone NAAQS. For more information about the modeling platform see https://www.epa.gov/sites/production/files/2017-11/documents/2011v6.3_2023en_update_emismod_tsd_oct2017.pdf.

Table 6. Population Growth Data

County	2000	2010	2020	2030	10-20 Growth %	10-30 Growth %
ST. LOUIS	1,016,300	987,799	967,196	956,817	-2.09%	-3.14%
ST. LOUIS CITY	348,189	350,800	350,385	349,004	-0.12%	-0.51%
ST. CHARLES	283,893	364,607	439,068	499,126	20.42%	36.89%
JEFFERSON	198,099	222,183	244,003	260,276	9.82%	17.14%
FRANKLIN	93,807	102,419	110,704	117,122	8.09%	14.36%
LINCOLN	38,944	56,010	74,529	91,294	33.06%	63.00%
WARREN	24,525	32,377	40,174	46,241	24.08%	42.82%

Table 7 provides information about people commuting from their county of residence to their county of work across the St. Louis MSA. This information is useful in determining connectivity between counties. Examining commuting patterns helps to identify where mobile source emissions are likely the highest. Since the violating monitor is located in St. Charles County, employees commuting to St. Charles from nearby counties will show which county is contributing significantly to the violating monitor. As shown in the table, 68,025 employees from St. Charles County contribute the most to the violating monitor. Employees from St. Louis County are second in contributing to the violating monitor with 25,903 employees commuting to St. Charles. Jefferson and Franklin counties have a total of 6,252 employees commuting to St. Charles County. Therefore, employees commuting to their jobs from St. Louis County and St. Charles County have the most impact on the West Alton monitor.

Table 7. 2014 Place of Residence/Employment Matrix

Residence	Employment						
	Franklin	Jefferson	Lincoln	St. Charles	St. Louis	Warren	St. Louis City
<i>ST. LOUIS</i>	2,870	8,031	342	25,903	293,306	386	89,054
<i>ST. CHARLES</i>	1,758	1,649	1,806	68,025	87,771	1,228	14,754
<i>ST. LOUIS CITY</i>	460	1,541	71	4,076	61,938	89	58,786
JEFFERSON	1,942	26,526	106	3,552	49,086	101	14,166
FRANKLIN	20,359	1,429	156	2,700	14,002	450	2,850
LINCOLN	403	312	6,309	6,814	6,575	602	1,108
WARREN	972	185	516	6,313	3,841	2,814	795
Total MSA	28,764	39,673	9,306	117,383	516,519	5,670	181,513

Figure 5 is a graphical representation of the population density in and near the St. Louis MSA. Generally, areas with higher population density have more anthropogenic emissions from mobile and point sources, and from miscellaneous nonpoint sources like gas stations and residential solvent usage. The most densely populated areas are in St. Louis City, St. Louis County, and St. Charles County.

Figure 5. Population Density in the St. Louis MSA in 2012

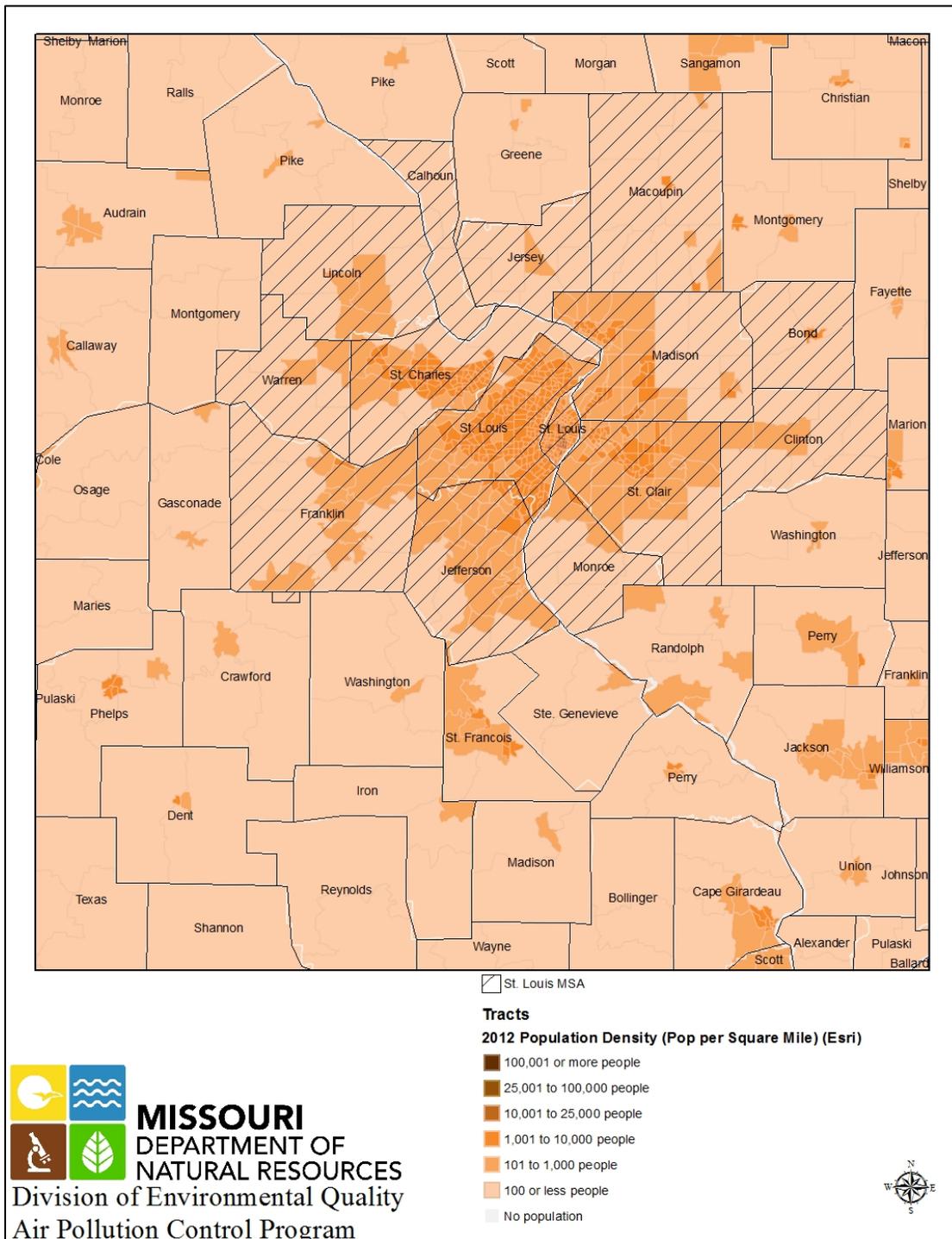


Figure 6 shows the urban nature of the St. Louis MSA. Counties that are mostly pink are the most developed. These urbanized areas correspond to the population densities shown in Figure 5. The most urbanized areas are St. Louis City, St. Louis County, and St. Charles County.

Figure 6. Urbanization in the St. Louis MSA in 2014

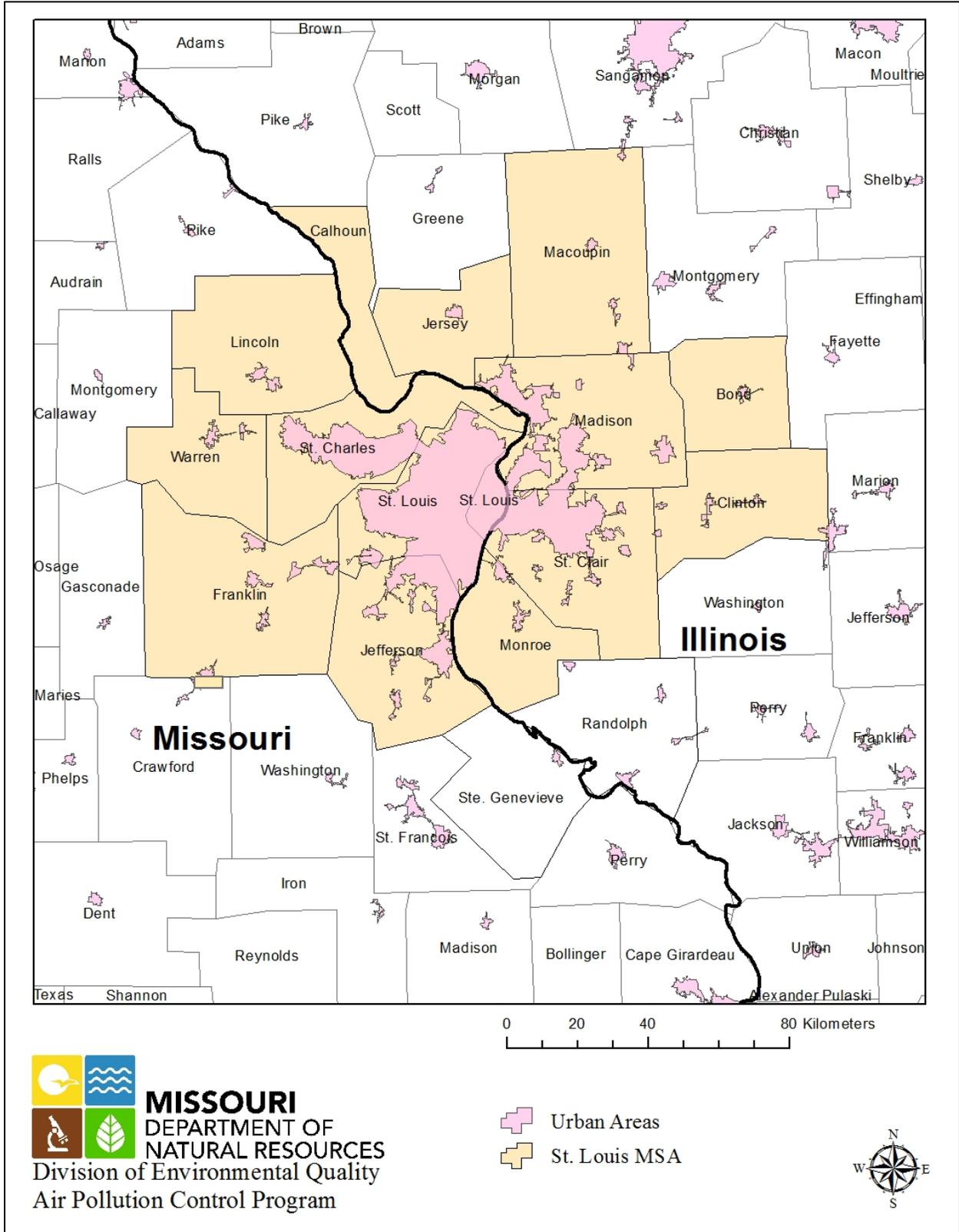


Figure 7 depicts the locations of point source emissions, including large permitted facilities such as EGUs and manufacturing plants. The mapped sources are sized and sorted by color to easily differentiate the sources' emissions levels. For example, the largest red and orange circles represent the largest sources such as EGUs, while the smaller circles represent the numerous smaller emission sources in the area. There are large clusters of point sources in St. Louis City and St. Louis County in Missouri and two other large clusters of point sources in Madison County and St. Clair County in Illinois. Those point sources have relatively low stack heights. Lower stack heights mean that the emitted pollutants are dispersed over a smaller area leading to higher concentrations around the area of influence. As the West Alton monitor is surrounded by these emission clusters, they are expected to have a greater impact on the violating monitor than sources in adjacent counties. The contributions from the large sources in Franklin and Jefferson counties are not as significant as the contributions from sources close to the violating monitor.

Figure 7. 2014 NO_x Emissions from Point Sources

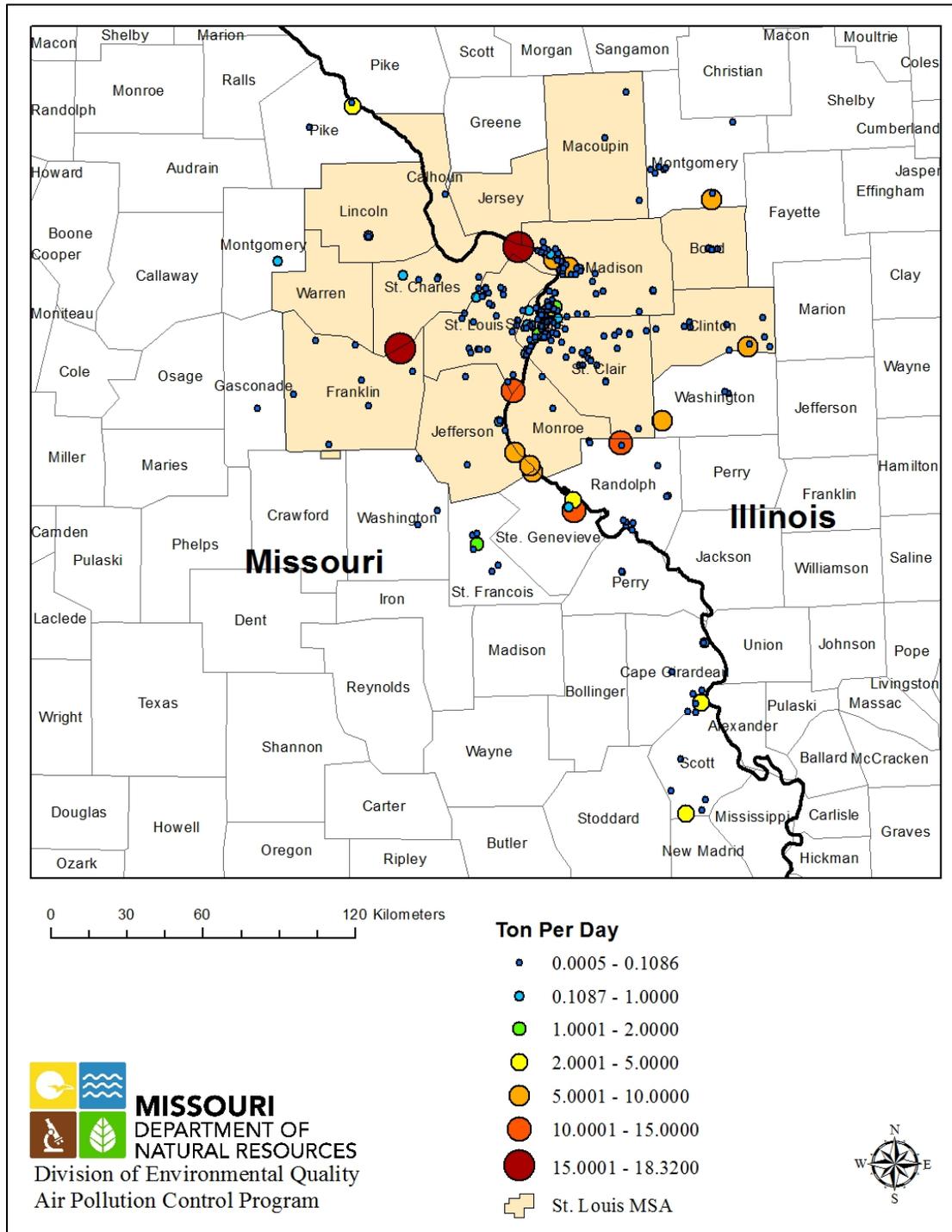
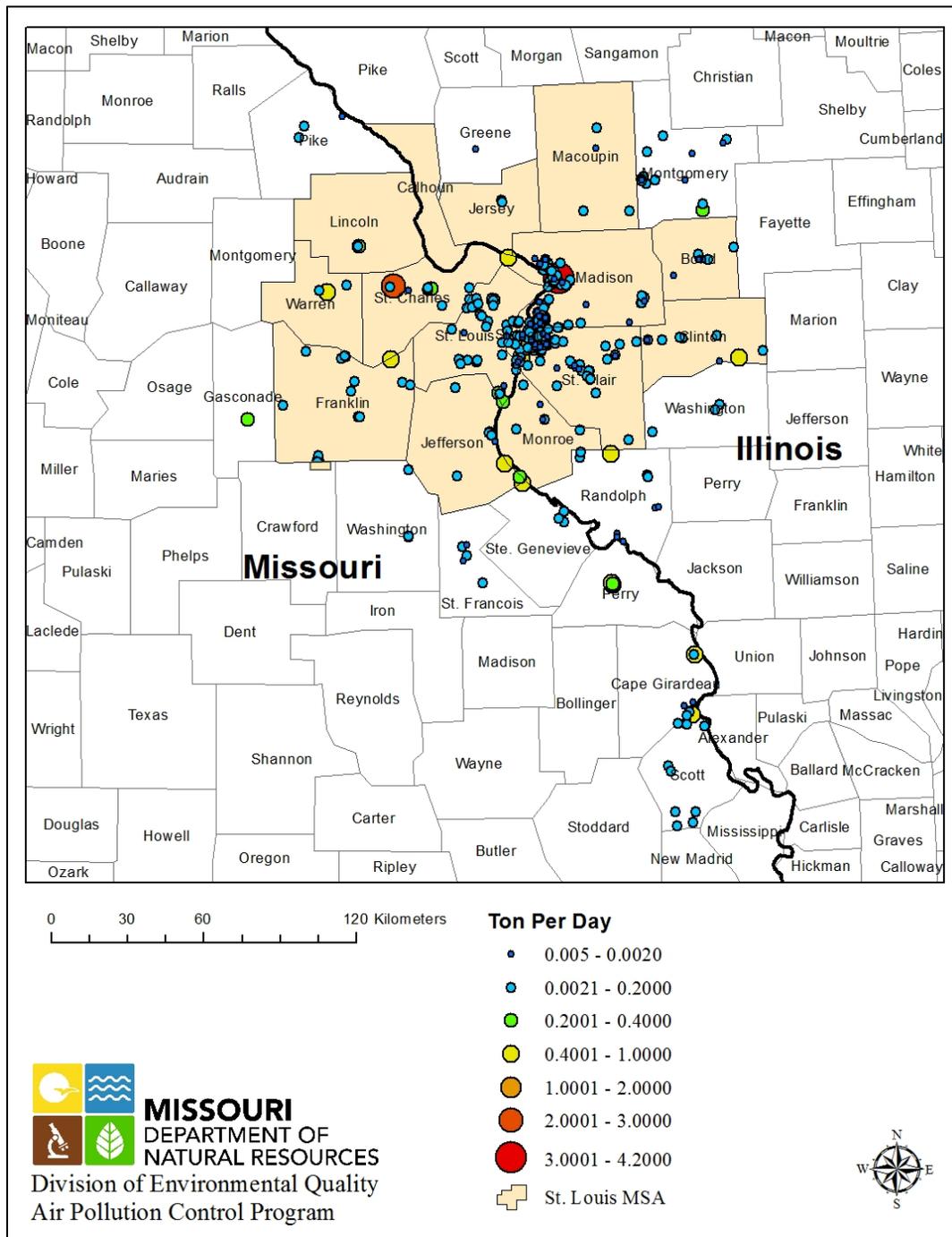


Figure 8 shows the many VOC point sources in the St. Louis MSA. The largest circles are major VOC emitters like automobile manufacturing plants and oil refineries, while the smaller circles are other permitted VOC sources. As with NO_x point sources, the VOC point sources that cluster in St. Louis City, St. Louis County, Madison County (IL) and St. Clair County (IL) have the largest effect on the West Alton monitor due to the proximity of the sources to the monitor.

Figure 8. 2014 VOC Emissions from Point Sources



5.3 Meteorological Analysis

Meteorological data analysis provides insight into the transport of emissions, especially when that transport affects downwind monitors. The air program examined the possible contribution of upwind emission sources to downwind monitors by comparing simple emissions and single-location wind velocity data.

The HYSPLIT (Hybrid Single-Particle Lagrangian Integrated Trajectory) modeling system produces trajectories indicating the path air parcels traveled over a given time and geography. The trajectories use meteorological data and mathematical equations to simulate atmospheric transport. The chosen model options do not explicitly include emissions or the chemical transformation of pollutants, so an examination of emission sources is needed in conjunction with HYSPLIT trajectory reviews. In this analysis, monitor locations on days where the maximum 8-hour ozone concentration exceeds the NAAQS (an exceedance) are used as the endpoint for HYSPLIT trajectories to determine possible source regions for contributing emissions.

All trajectories were generated following EPA’s Designation Guidance memorandum, including the use of EDAS 40 km meteorological data, using three heights (100 m, 500 m, and 1,000 m), and using an end time of 0000 Universal Coordinated Time (UTC) that corresponds to 7pm central daylight time. The end time around sunset is typically near the end of the 8-hour period of maximum ozone concentration. The trajectories go back in time for 24 hours because the areas considered for direct contribution to a violating monitor are typically within travel distances and times around one day given commonly observed wind speeds.

HYSPLIT trajectories were created for three monitors on the Missouri side of the St. Louis MSA (West Alton, Orchard Farm and Maryland Heights). These monitors are the endpoint for HYSPLIT trajectories on all days where the daily maximum 8-hour ozone concentration was 71 ppb or greater from 2015 to 2017 (38 dates). The dates examined through HYSPLIT trajectories are listed in Table 8. Plots of back trajectories for each date are in Appendix A.

Table 8. Monitor Exceedances Dates during 2015-2017 Modeled with HYSPLIT

Monitor Name	Exceedance Date	Highest 8-hour Ozone Monitor Value (ppb)
West Alton	24-Jul-2015	72
	05-Sep-2015	71
	13-Jun-2016	86
	22-Sep-2016	78
	23-Sep-2016	78
	04-Aug-2016	75
	23-May-2016	75
	09-Aug-2016	74
	18-Jun-2016	74
	09-Jun-2016	74
	10-Jun-2016	72
	24-Sep-2016	71
	10-Aug-2016	71
	15-May-2017	72
	02-Jun-2017	78
	03-Jun-2017	77
14-Sep-2017	73	
Orchard Farm	24-Jul-2015	78
	05-Sep-2015	72

Monitor Name	Exceedance Date	Highest 8-hour Ozone Monitor Value (ppb)
	23-Sep-2015	71
	04-Aug-2016	81
	21-Sep-2016	78
	23-Sep-2016	78
	18-Jun-2016	76
	23-May-2016	75
	22-Sep-2016	71
	10-Aug-2016	71
	02-Jun-2017	89
	03-Jun-2017	76
Maryland Heights	24-Jul-2015	74
	23-Sep-2015	71
	09-Aug-2016	80
	08-Jun-2016	78
	18-Jun-2016	77
	23-Jul-2016	73
	20-Jul-2016	71
	16-Jun-2016	71
	02-Jun-2017	83

Figures 9, 10, and 11 show three surface weather maps created for days with the highest ozone concentration recorded at the West Alton monitor during the 2015 through 2017 ozone seasons to illustrate the meteorological parameters that are conducive to high ozone concentration formation. The three days with their corresponding concentrations, as shown in Table 8, are June 13, 2016 (86 ppb), September 23, 2016 (78 ppb), and June 2, 2017 (78 ppb). These maps depict conditions observed at the end of the peak 8-hour ozone concentrations. There is a surface high pressure area east or south of St. Louis on each of these days, and low pressure to the northwest. The spacing of isobars of equal pressure, indicated by solid red lines, is large. This indicates that pressure differences are small and winds are light. The combination of light southerly flow from the St. Louis MSA toward the West Alton monitor is a typical meteorological setup for high ozone concentrations, along with sunny skies that typically accompany high pressure.

As shown in the plots, the 100-meter back trajectory path for dates with concentrations of 78 ppb and above is short indicating that the highest concentration readings at these monitors are mostly as a result of stagnant air in the area. Figure 11 also shows that St. Louis MSA experienced a “Stationary Front.” As a result, on June 2, 2017, West Alton, Orchard Farm and Maryland Heights monitors had concentrations of 78 ppb, 89 ppb, and 83 ppb, respectively. Only St. Louis City, St. Louis County, Madison County (IL) and St. Clair County (IL) appear to be in the path of the 100-meter back trajectory on these dates. In addition, all of the high concentration readings (> 74 ppb) at these monitors seem to occur when the back trajectory paths go through these areas. This indicates that ozone formation in these areas is mostly attributable to NO_x and VOC emissions from point sources and onroad mobile sources. The other

counties in the back trajectory paths will have little effect on ozone formation because they are a greater distance from the violating monitor and contribute few emissions.

Figure 9. Surface Weather Map for June 13, 2016

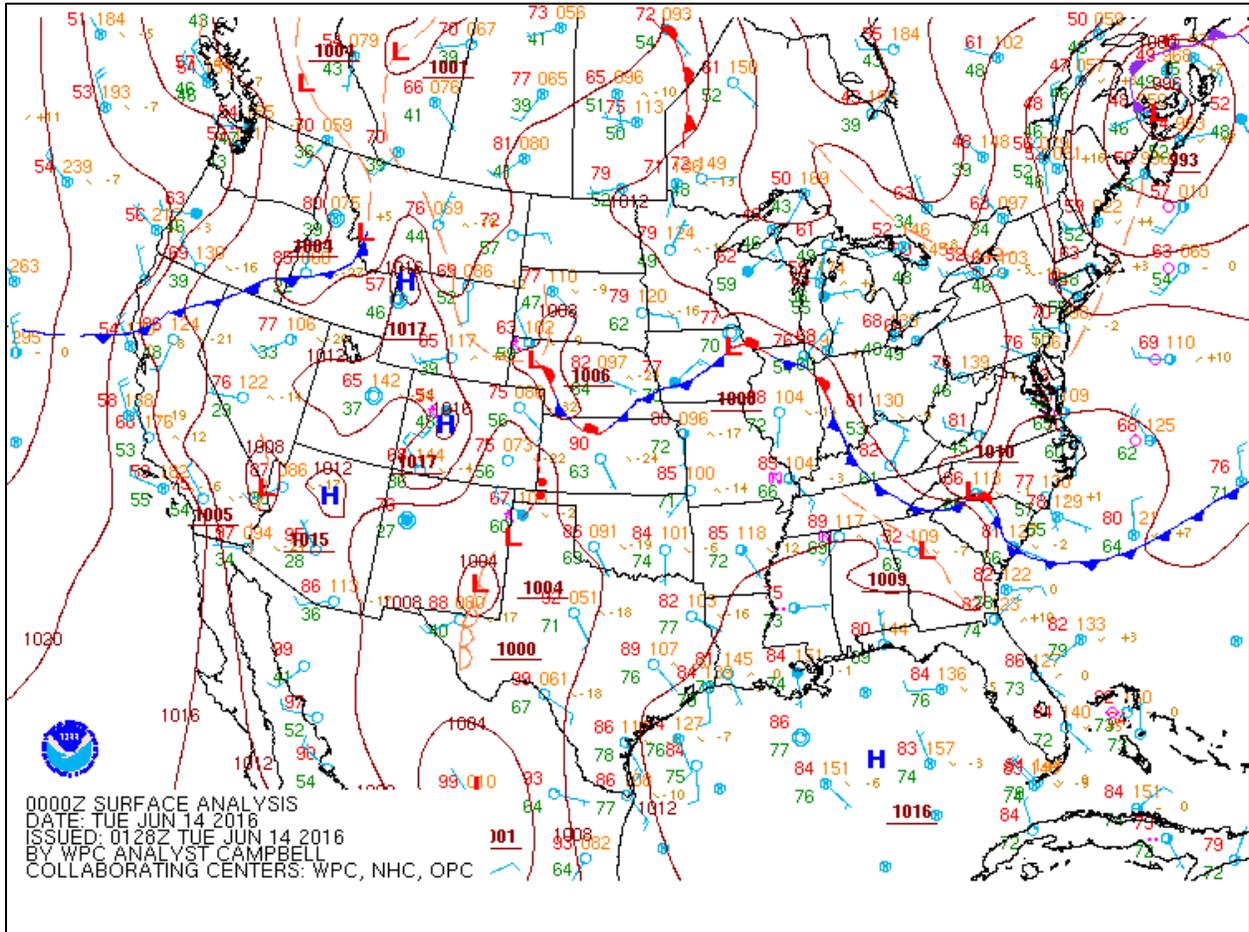
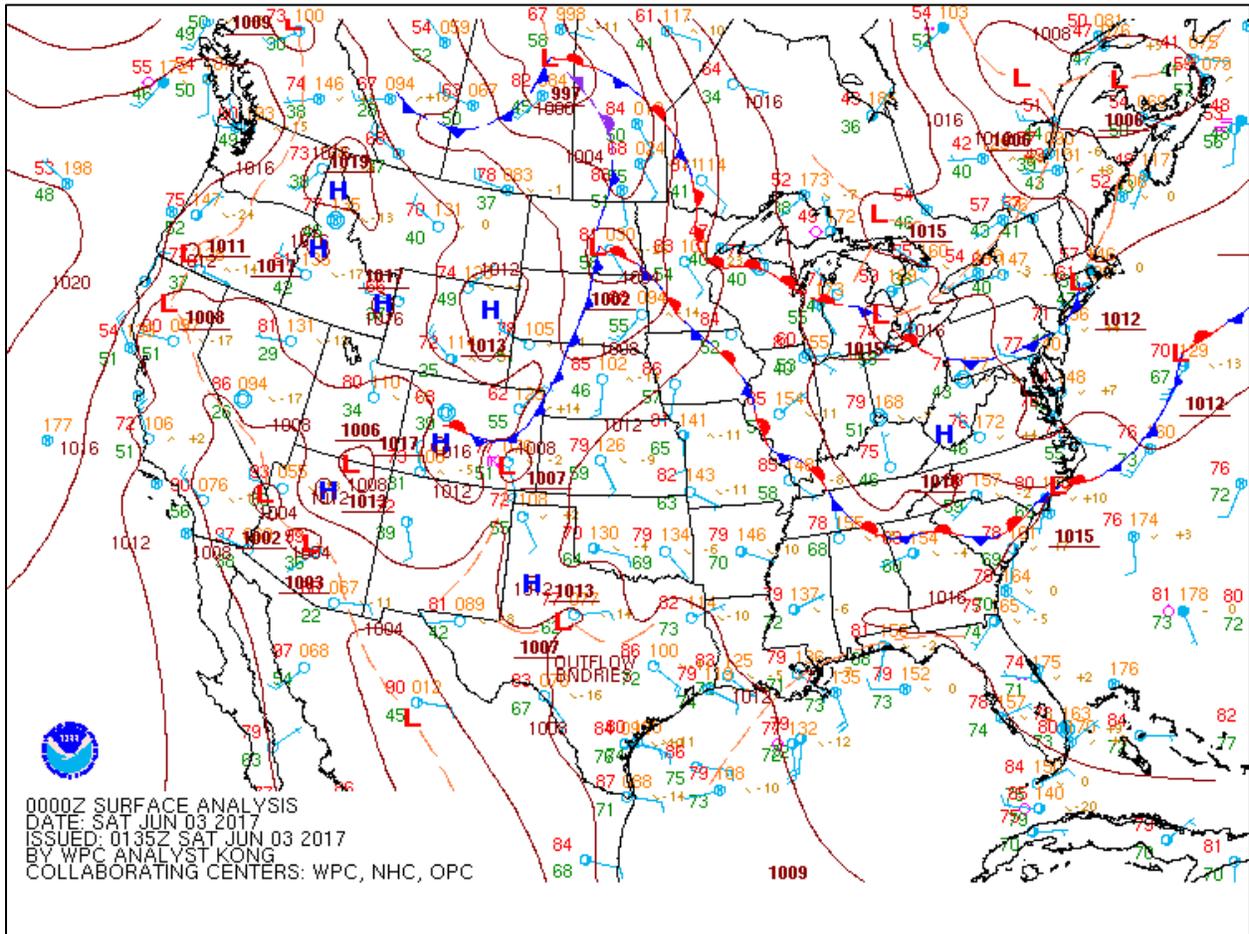
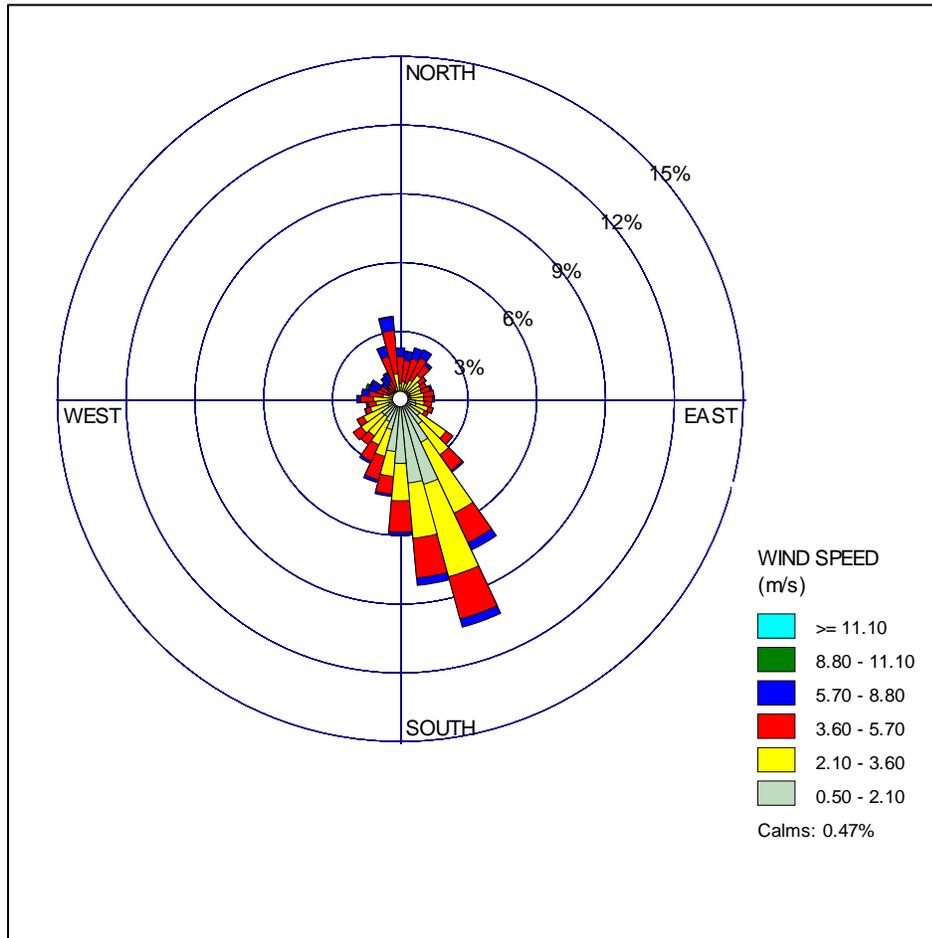


Figure 11. Surface Weather Map for June 2, 2017



Local surface weather data is collected by the National Weather Service (NWS) at many larger airports and is used for a variety of purposes, including source specific modeling. One of the airports in the St. Louis region, the Downtown St. Louis Airport (or Cahokia), was also evaluated to further support the trends detailed above. The wind rose included in Figure 12 details the frequency of winds from each direction and wind speed. The wind rose represents the 2015 ozone season, April 1, 2015 through October 31, 2015. This wind rose also indicates that St. Louis MSA experiences predominant winds from the south.

Figure 12. Downtown St. Louis Airport (Cahokia) Wind Rose: April 1, 2015 - October 31, 2015



5.4 Geography and Topography Considerations

The geography and topography analysis examines physical features of the land that could affect the formation and distribution of ozone. Mountains or other physical features may influence the fate and transport of emissions and ozone concentrations. Valley-type topographical features can cause local stagnation episodes where vertical temperature inversions effectively “trap” air pollution. Under these conditions, emissions can accumulate leading to periods of elevated ozone concentrations. Inversions can be limited in their extent and only impact a small area. If exceedances are associated with temperature inversions, the affected areas may need to be separated from areas high enough in altitude to not experience such an event.

The St. Louis MSA is not adjacent to mountain ranges or topographic features that affect the large scale airflow patterns. Likewise, there are no valleys capable of trapping pollution for long periods due to steep terrain. St. Louis is located at the confluence of the Missouri and Mississippi rivers, and they are the most significant topographic feature of the area. The rivers have carved out a shallow and wide river valley over the years that channel winds along the valley at airport meteorological stations. These valley effects do not cause the trapping of pollutants and do not cause the long term buildup of pollutants seen in more extreme topographically influenced areas of the country.

The West Alton monitor, the design value monitor for the St. Louis MSA, is located in the Mississippi river valley. Monitors not located in the river valley include Arnold West, Maryland Heights, and Orchard Farm. These other locations have experienced single-day 8-hour ozone concentrations of 85 ppb, similar to the highest single day reading at West Alton of 88 ppb. If topography was a driving factor for ozone concentrations at West Alton, a pattern of either significantly higher concentrations or number of exceedance days would emerge. Given that winds in St. Louis can drive ozone concentrations of similar magnitude to monitors in or out of the river valley, prevailing winds are more of an influence on ozone than the topography of the St. Louis MSA.

5.5 Jurisdictional Boundaries

The air program has historically chosen county-level boundaries for ozone area designations because much of the information needed to make the designations, such as nonpoint and mobile sources, is tabulated by county. The air program will continue to use county boundaries to identify ozone nonattainment areas.

6 Recommendation for Nonattainment Counties

6.1 City of St. Louis

The following factor analysis supports a recommendation of nonattainment for the City of St. Louis:

- Air Quality Data: there are no violating monitors in the city.
- Emissions: the city has the third largest emissions for VOC (19.7 TPD) and fifth largest emissions for NO_x (19.9 TPD) in the area. Due to its proximity to the violating monitor, these emissions are most likely contributing to the violation more than other counties except for St. Louis County.
- Emissions-related data: St. Louis City has the third largest population in the area (317,419), and has the fourth largest VMT in the area (1.8 billion VMT per year).
- Meteorological Data: analysis of HYSPLIT trajectories demonstrates frequent contributions to the exceeding monitor.
- Jurisdictional Boundaries: St. Louis City is within the current 2008 ozone nonattainment area.

6.2 St. Louis County

The following factor analysis supports a recommendation of nonattainment for St. Louis County:

- Air Quality Data: there are no violating monitors in the county.
- Emissions: the county has the largest emissions for VOC (64.4 TPD) and NO_x (87.9 TPD) in the area. This county has more VOC emissions than the combined emissions of St. Charles, Jefferson and Franklin counties and St. Louis City. It is likely the largest contributor to the violating monitor since the predominant wind direction is from the south.
- Emissions-related data: the county has the largest population in the area (1,001,876), and the largest VMT in the area (11.3 billion VMT/year).
- Meteorological Data: analysis of HYSPLIT trajectories demonstrates frequent contribution to the exceeding monitor.
- Jurisdictional Boundaries: St. Louis County is within the current 2008 ozone nonattainment area.

6.3 St. Charles County

The following factor analysis supports a recommendation of nonattainment for St. Charles County:

- Air Quality Data: the violating monitor at West Alton is in St. Charles County.
- Emissions: the county has the second largest emissions for NO_x (41.6 TPD) and second largest for VOC (24.2 TPD) in the area.
- Emissions-related data: the county has the second largest population in the area (379,493), and has the second largest VMT in the area (3.6 billion VMT/year).
- Meteorological Data: analysis of HYSPLIT trajectories demonstrates frequent contribution to the exceeding monitor.
- Jurisdictional Boundaries: St. Charles County is within the current 2008 ozone nonattainment area.

7 Recommendations for Unclassifiable/Attainment Counties

Section 107(d)(1)(A) of the CAA defines a nonattainment area as any area that does not meet or that contributes to nearby areas not meeting the ambient air quality standard. Once EPA has determined the boundaries of the nonattainment area, all other areas of the state will be designated. In accordance with EPA guidance, all areas without monitors and those with monitors indicating no violations (and that do not contribute to nearby violations) are to be designated as unclassifiable/attainment. The air program is recommending an unclassifiable/attainment designation for all Missouri counties not included in the proposed nonattainment area discussed in Section 6.

7.1 Franklin County

The following factor analysis supports a recommendation of unclassifiable/attainment for Franklin County:

- Air Quality Data: there are no monitors in the county.
- Emissions: the county has combined NO_x and VOC emissions less than 45 tons per day.
- Emissions-related data: the county is mostly rural and has a population of 102,084, which is less than half of the population of St. Charles and St. Louis City. The county has the fifth largest

VMT in the area (1.5 billion VMT per year), which is less than half of the VMT of St. Charles County. Commuting data shows that only 2,700 people in the county travel into St. Charles County for work. This shows that the county is not highly connected to the county with the violating monitor via commuters. Population growth in Franklin County is projected at 14% between 2010 and 2030.

- Meteorological Data: analysis of HYSPLIT trajectories shows that air parcels go through the county on their way to the violating monitor but also pass over St. Charles and St. Louis County prior to reaching the monitor.
- Jurisdictional Boundaries: Franklin County is within the St. Louis MSA.

7.2 Jefferson County

The following factor analysis supports a recommendation of unclassifiable/attainment for Jefferson County:

- Air Quality Data: there are no violating monitors in the county.
- Emissions: the county has combined NO_x and VOC emissions less than 45 tons per day.
- Emissions-related data: the county is partially rural and has a population of 222,716, which is a little over half the population of St. Charles County. The county has the third largest VMT in the area (2.2 billion VMT per year). Commuting data shows that only 3,552 people in the county travel to St. Charles County for work. This shows that the county is not highly connected to the county with the violating monitor via commuters. Population growth in the county is projected at 17% between 2010 and 2030.
- Meteorological Data: analysis of HYSPLIT trajectories shows that air parcels go through the county on their way to the violating monitor but also pass over St. Louis County prior to reaching the monitor.
- Jurisdictional Boundaries: Jefferson County is within the St. Louis MSA.

7.3 Lincoln County

The following factor analysis supports a recommendation of unclassifiable/attainment for Lincoln County:

- Air Quality Data: there is a monitor in the county, but it is not violating the 2015 ozone standard.
- Emissions: the county has combined NO_x and VOC emissions under 9 tons per day which is less than one fourth of the emissions from the smallest emitting county recommended for nonattainment.
- Emissions-related data: the county population is under 55,000 which is approximately one half the population of the smallest population county recommended for nonattainment. VMT is near 0.5 billion per year which is about one third of the VMT from the county with lowest travel recommended for nonattainment. Commuting data shows that 6,814 people in the county travel to St. Charles County for work. This shows that the county is not highly connected to the county with the violating monitor via commuters.
- Meteorological Data: analysis of HYSPLIT trajectories does not support contribution to the exceeding monitor.
- Jurisdictional Boundaries: Lincoln County is adjacent to the St. Louis MSA.

7.4 Warren County

The following factor analysis supports a recommendation of unclassifiable/attainment for Warren County:

- Air Quality Data: there are no monitors in the county.
- Emissions: the county has combined NO_x and VOC emissions under 7 tons per day which is less than one sixth of the emissions from the smallest emitting county recommended for nonattainment.
- Emissions-related data: the county population is under 35,000 which is approximately one third of the population of the smallest population county recommended for nonattainment. VMT is near 0.6 billion per year which is less than one half the VMT from the county with the lowest travel recommended for nonattainment. Commuting data shows that 6,313 people in the county travel to St. Charles County for work. This shows that the county is not highly connected to the county with the violating monitor via commuters.
- Meteorological Data: analysis of HYSPLIT trajectories does not support contribution to the exceeding monitor.
- Jurisdictional Boundaries: Warren County is adjacent to the St. Louis MSA.

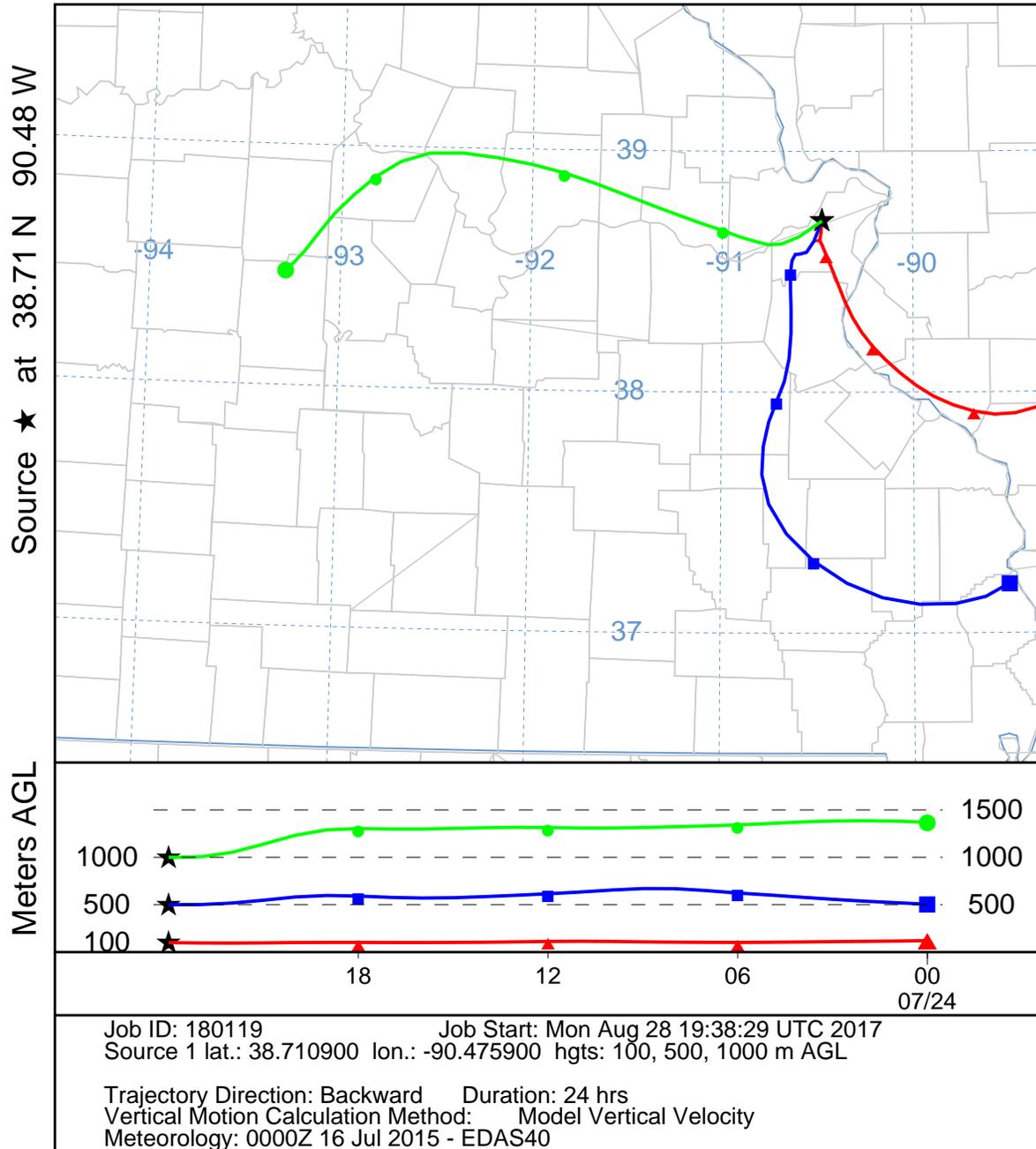
7.5 All other Counties of the State

There are no other counties in the St. Louis MSA or other areas of the state with violating monitors. An evaluation of the counties adjacent to the recommended nonattainment area indicates that these counties provide no significant contribution to the violating monitor. Therefore, since the remaining counties in Missouri do not have violating monitors and do not contribute significantly to the violating monitor, the air program recommends that these counties be designated unclassifiable/attainment.

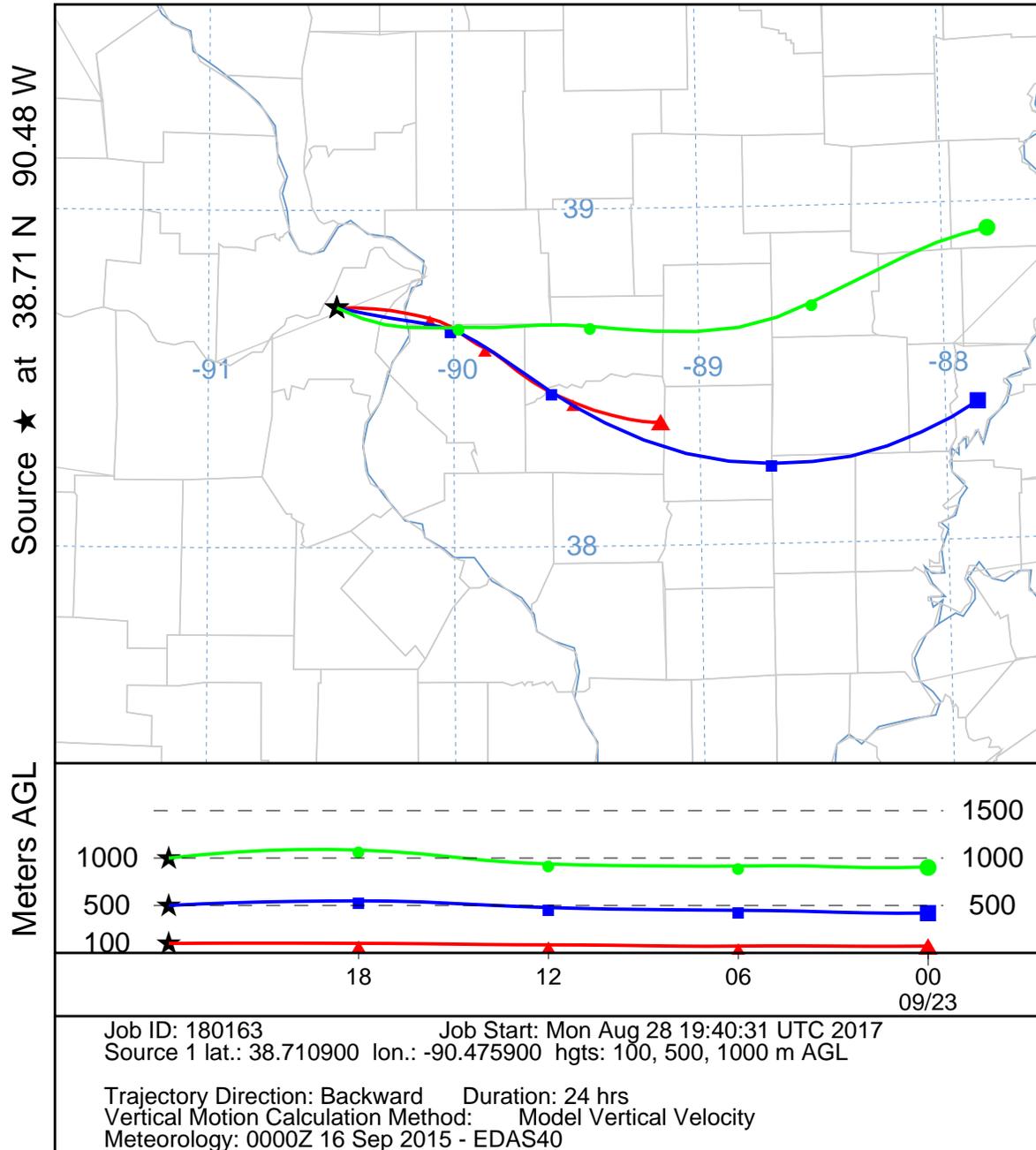
8 Conclusion

For the 2015 8-hour ozone boundary designation, the air program recommends a nonattainment designation for St. Louis and St. Charles counties and St. Louis City, and an unclassifiable/attainment designation for the rest of the counties of the state. The air program believes that the vast majority of contributions to the violation at the West Alton monitoring site come from St. Louis and St. Charles counties and St. Louis City given their proximity to the monitor, the amount of precursor emissions in the counties, and their large populations. While Franklin and Jefferson counties are part of the St. Louis MSA, their contributions to the violating monitor are not as significant when compared to the contributions of St. Louis and St. Charles counties and St. Louis City. Therefore, Franklin and Jefferson counties are not being recommended for inclusion in the nonattainment area.

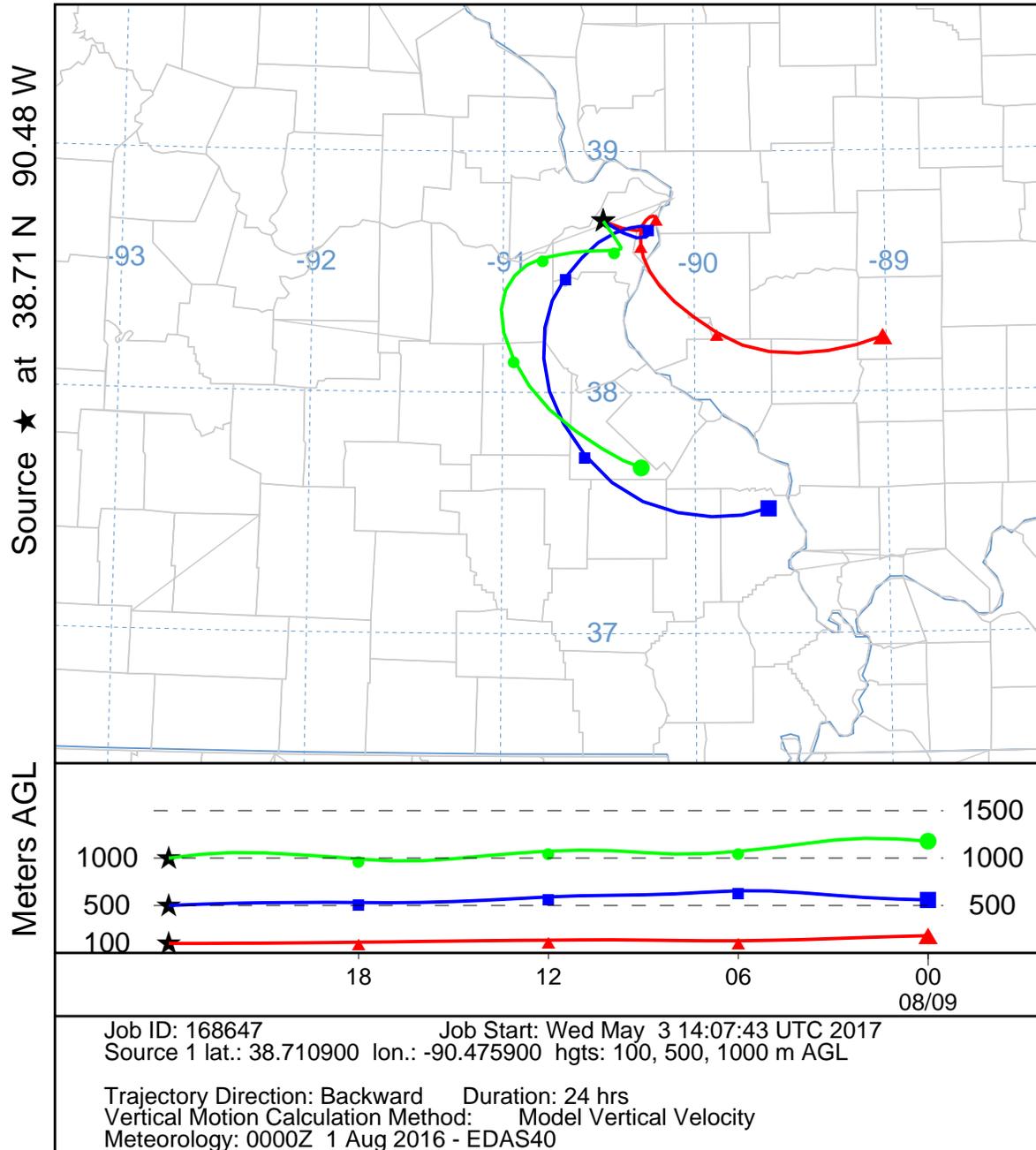
Maryland Heights (74 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 25 Jul 15
 EDAS Meteorological Data



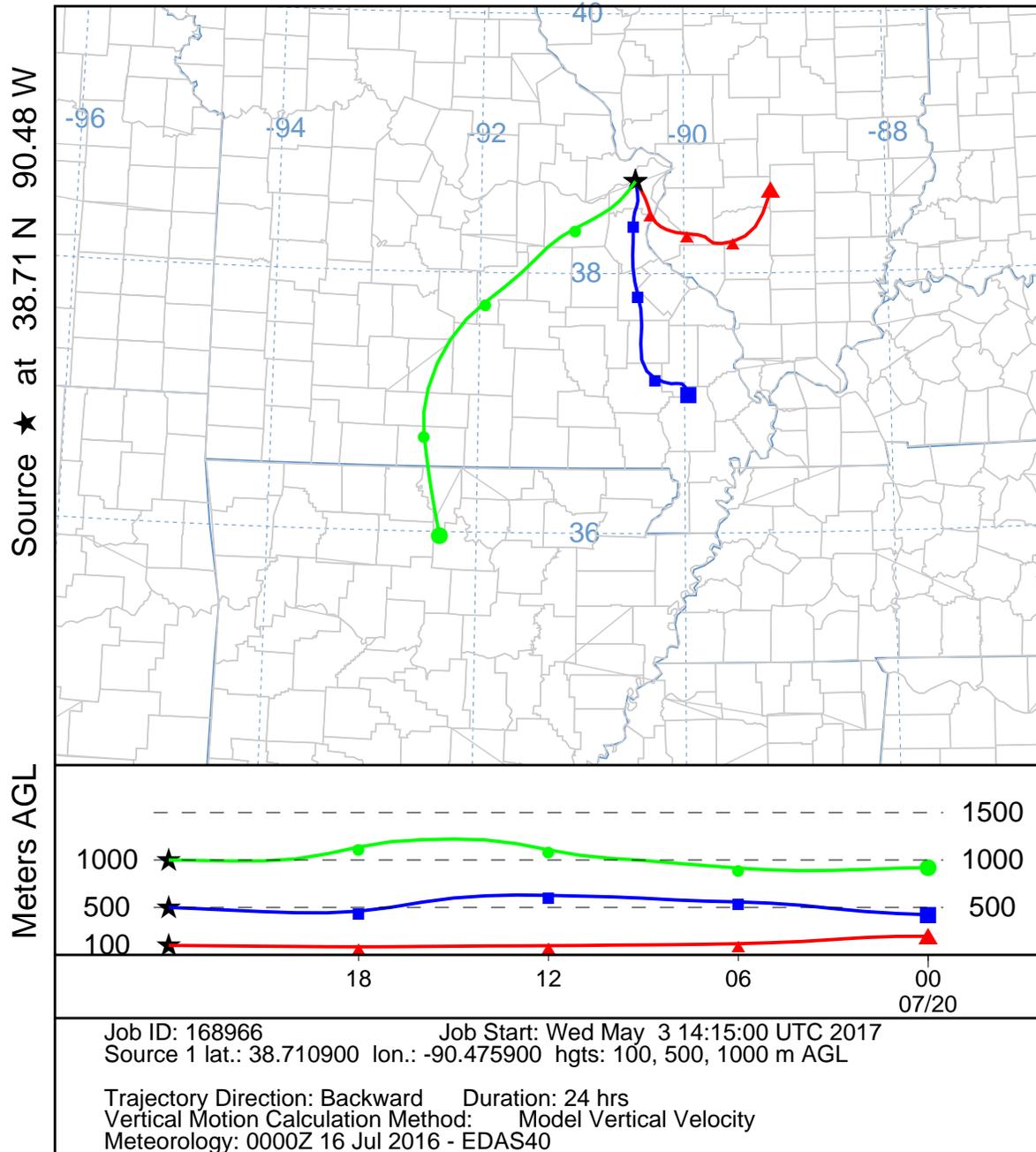
Maryland Heights (71 ppb)-NOAA HYSPLIT MODEL
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 EDAS Meteorological Data



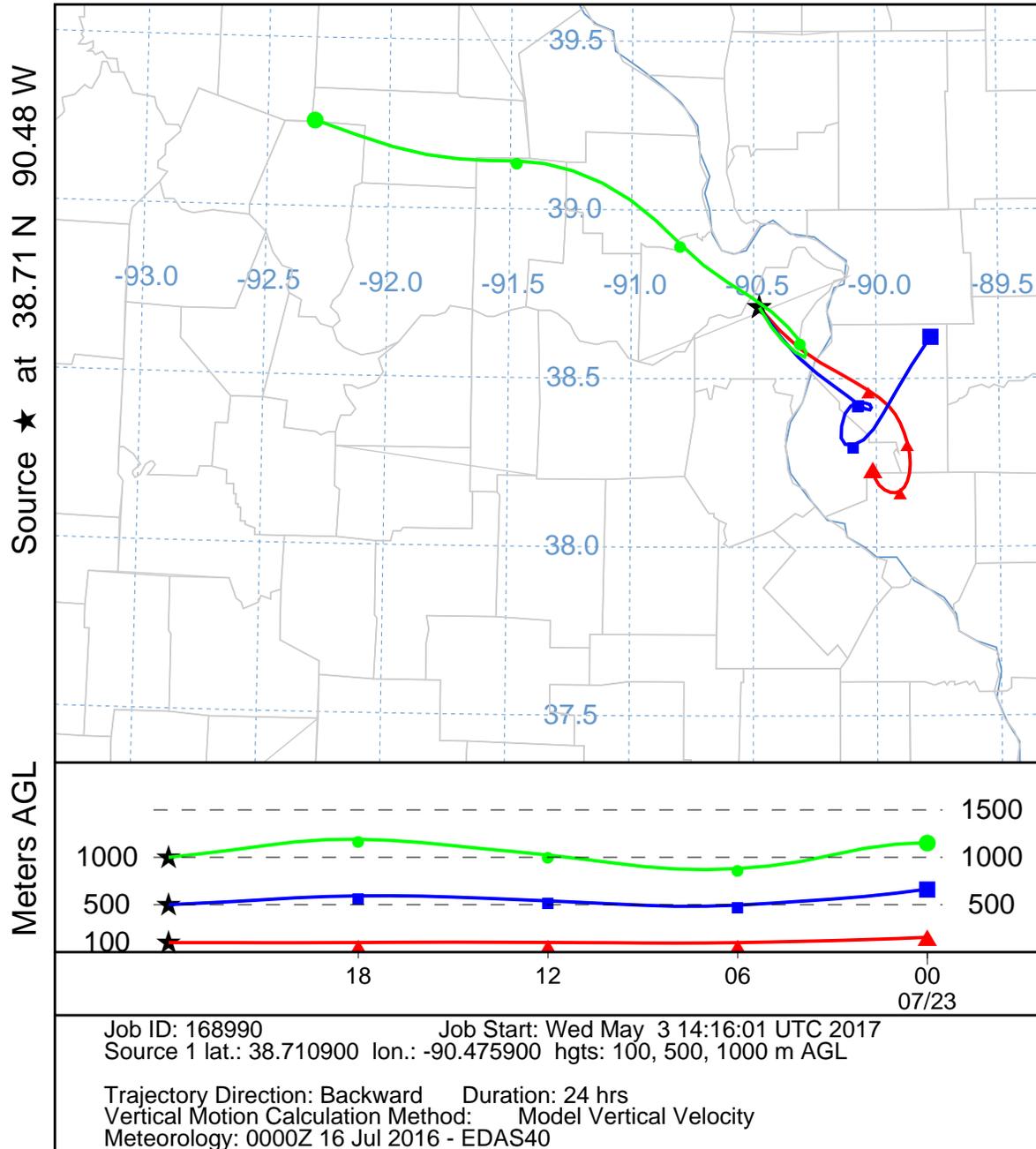
Maryland Heights (80 ppb)-NOAA HYSPLIT MODEL
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 EDAS Meteorological Data



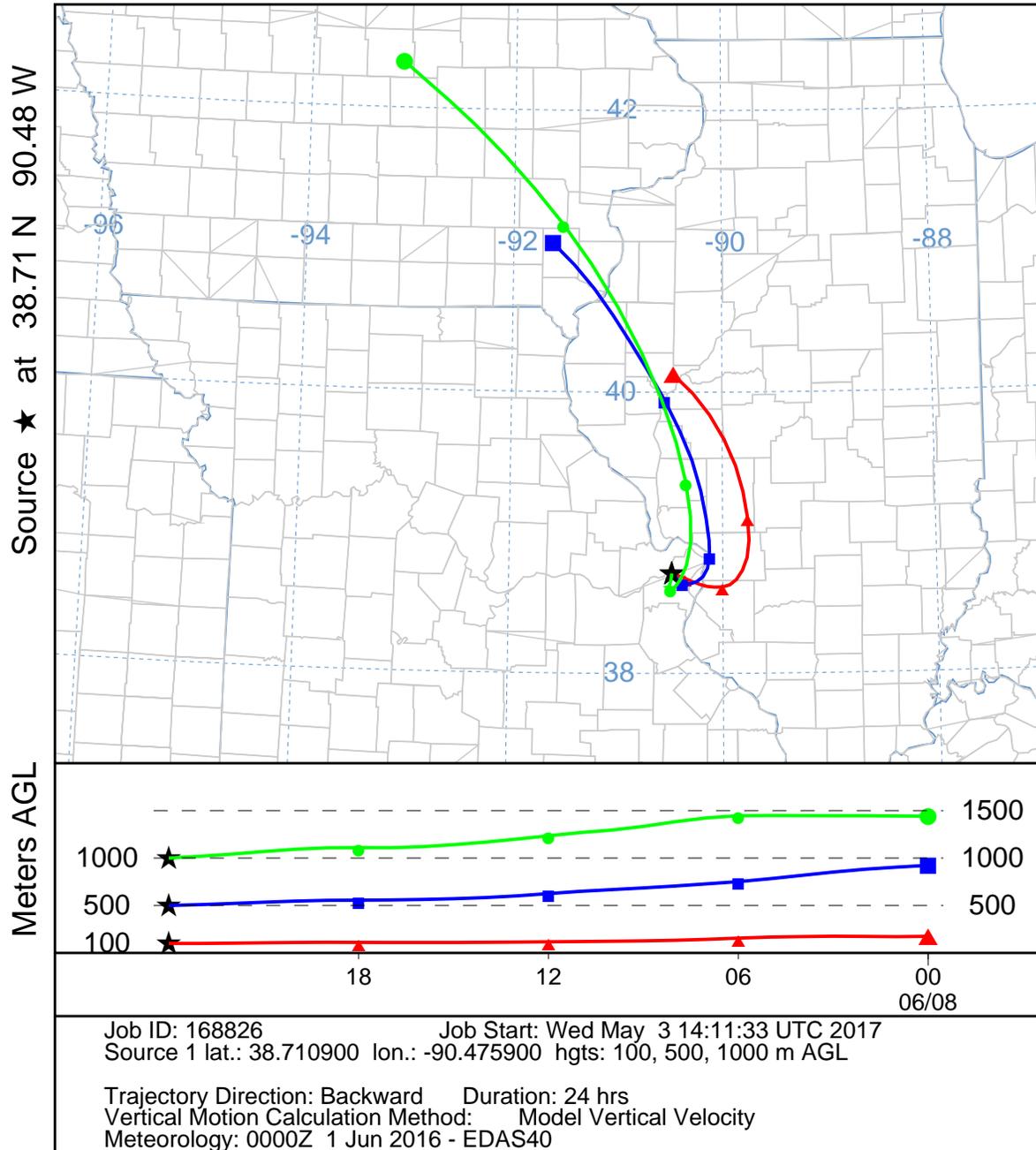
Maryland Heights (71 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 21 Jul 16
 EDAS Meteorological Data



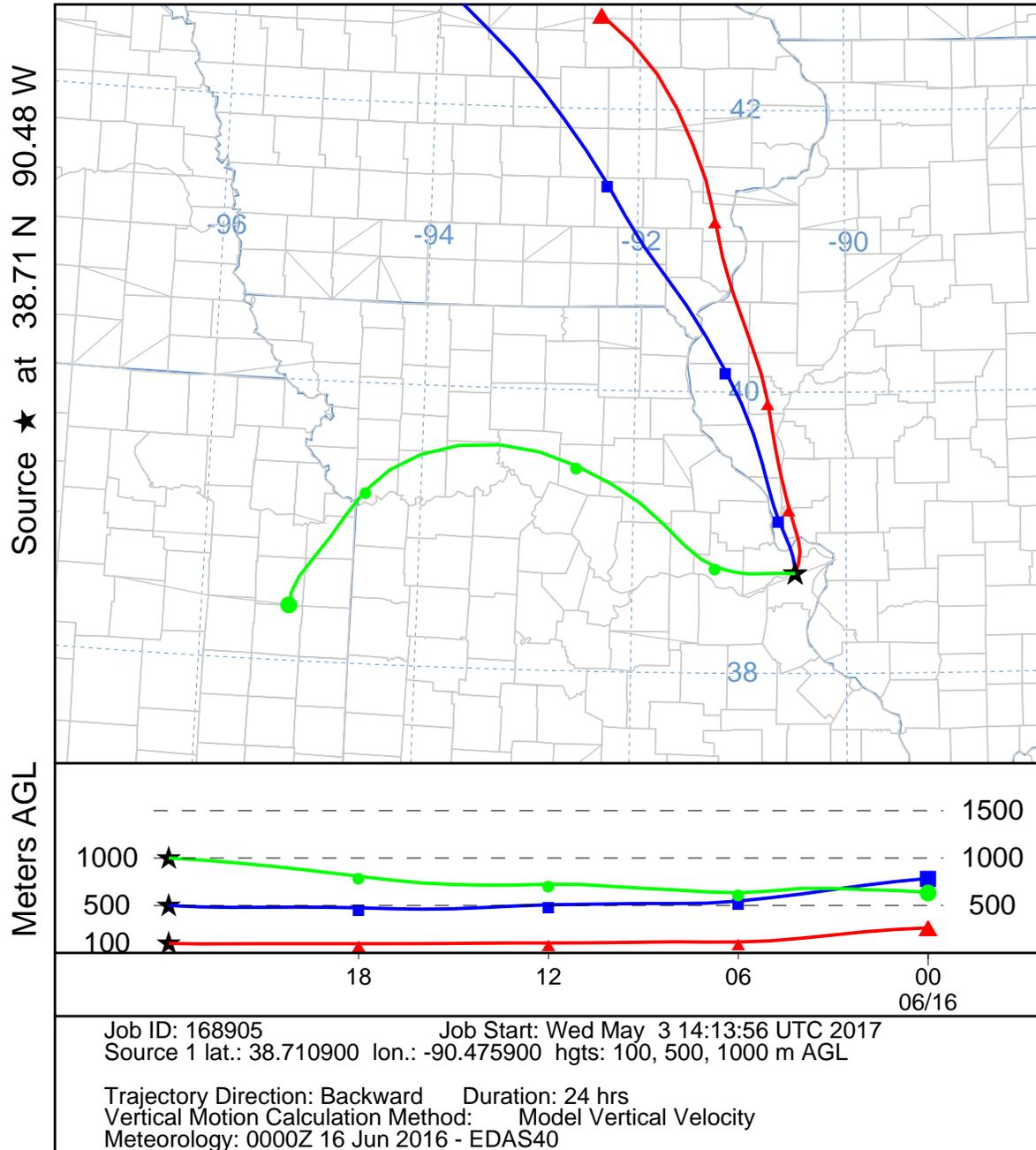
Maryland Heights (73 ppb)-NOAA HYSPLIT MODEL
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 EDAS Meteorological Data



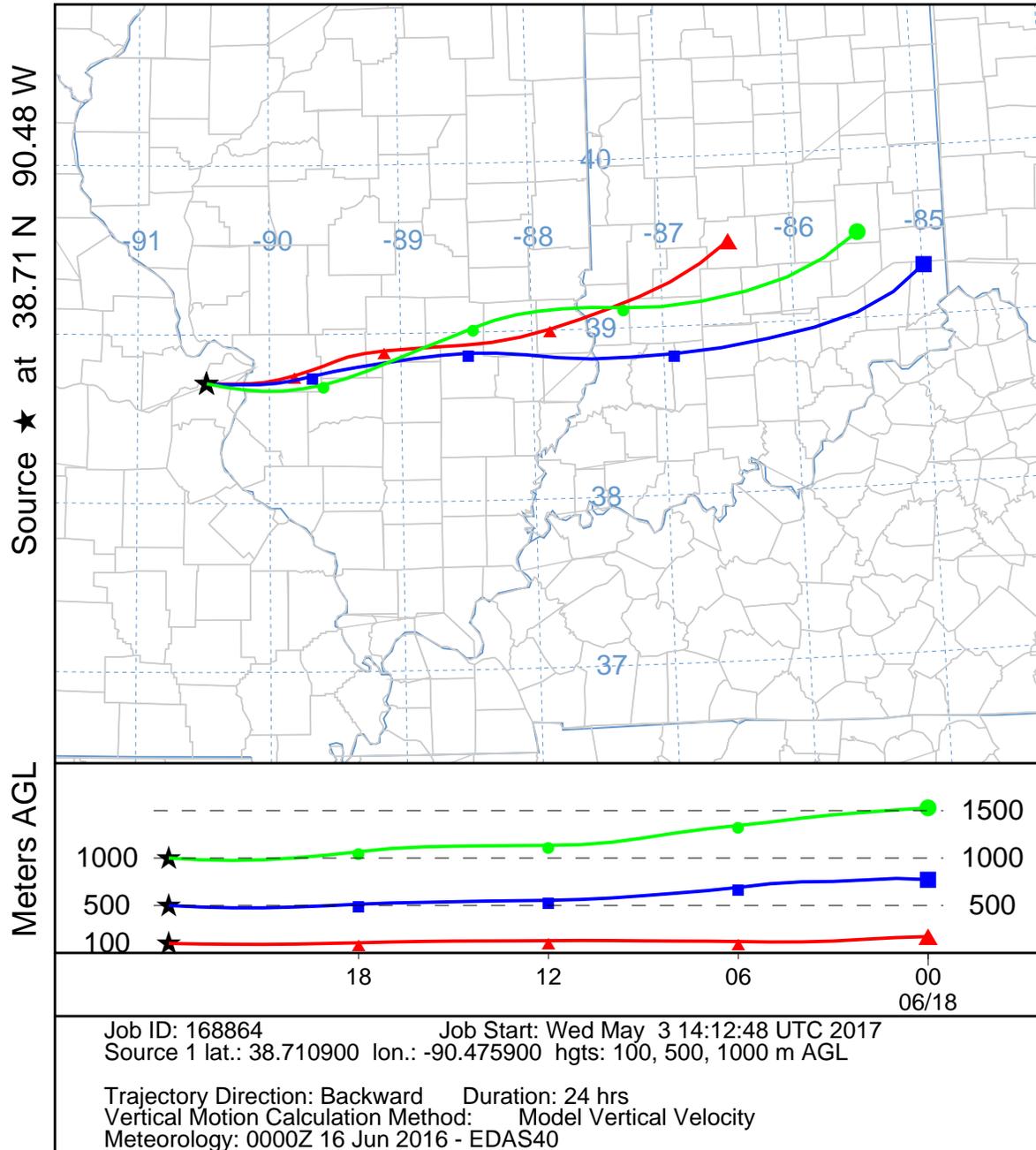
Maryland Heights (78 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 09 Jun 16
 EDAS Meteorological Data



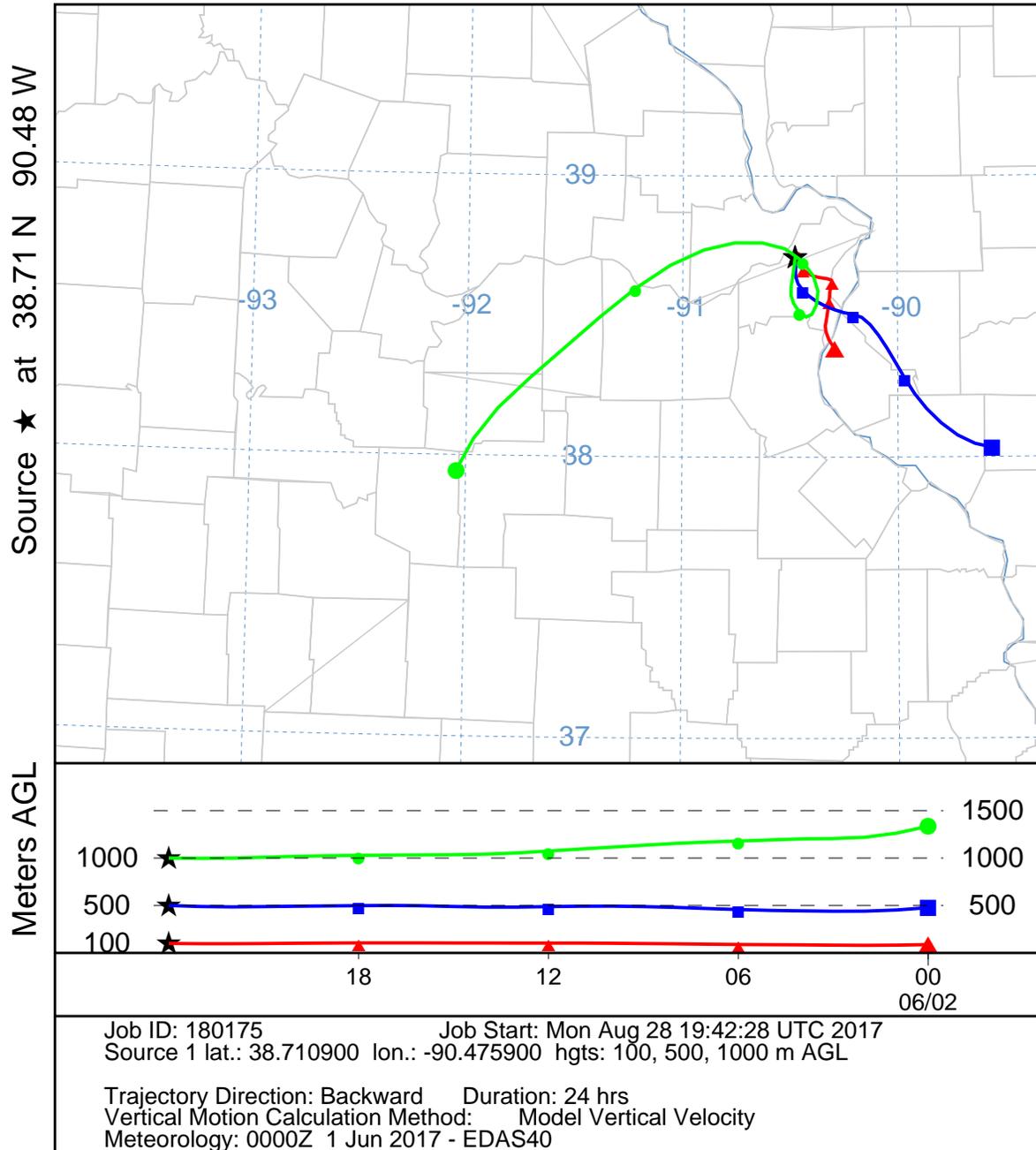
Maryland Heights (71 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 17 Jun 16
 EDAS Meteorological Data



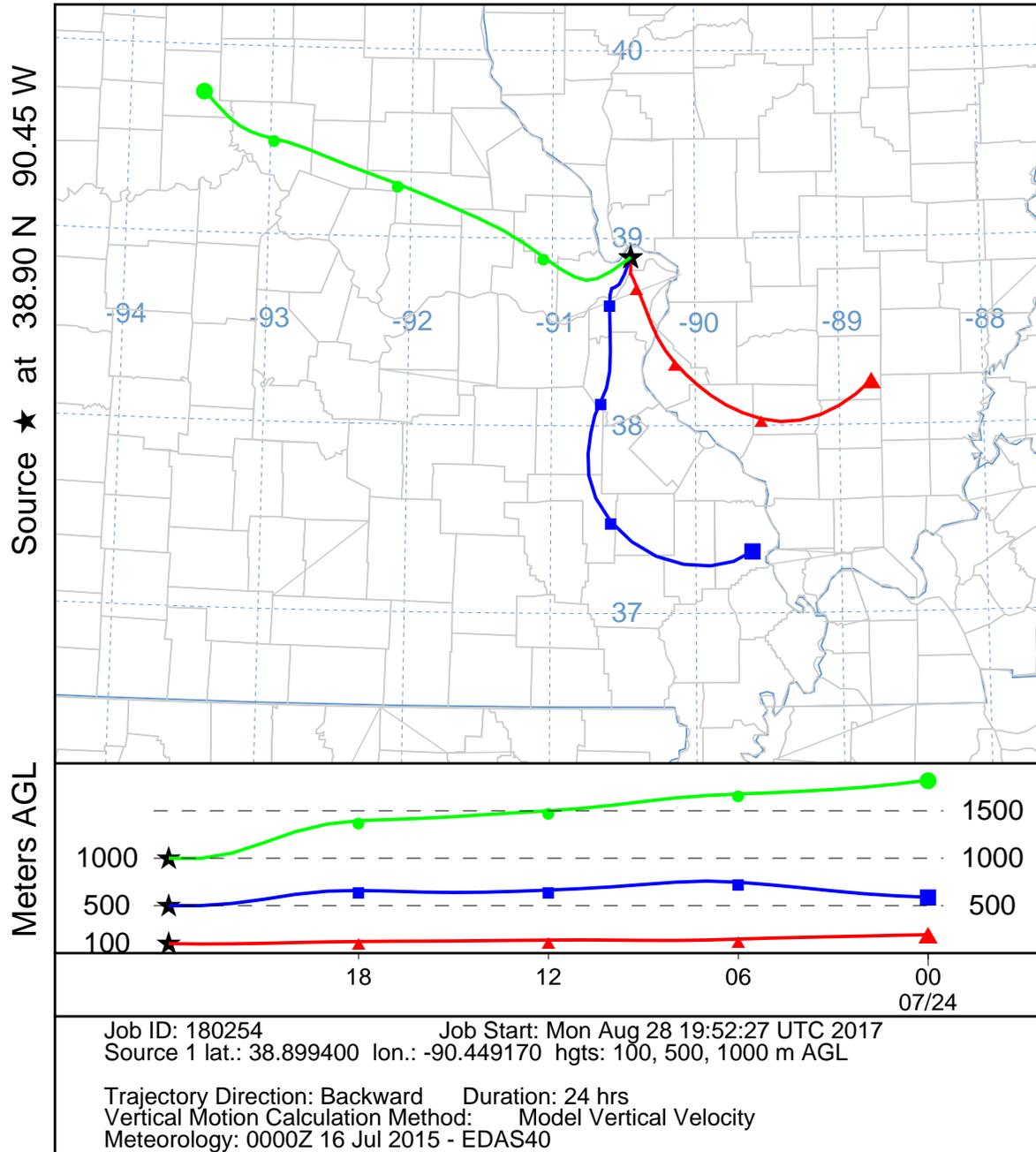
Maryland Heights (77 ppb)-NOAA HYSPLIT MODEL
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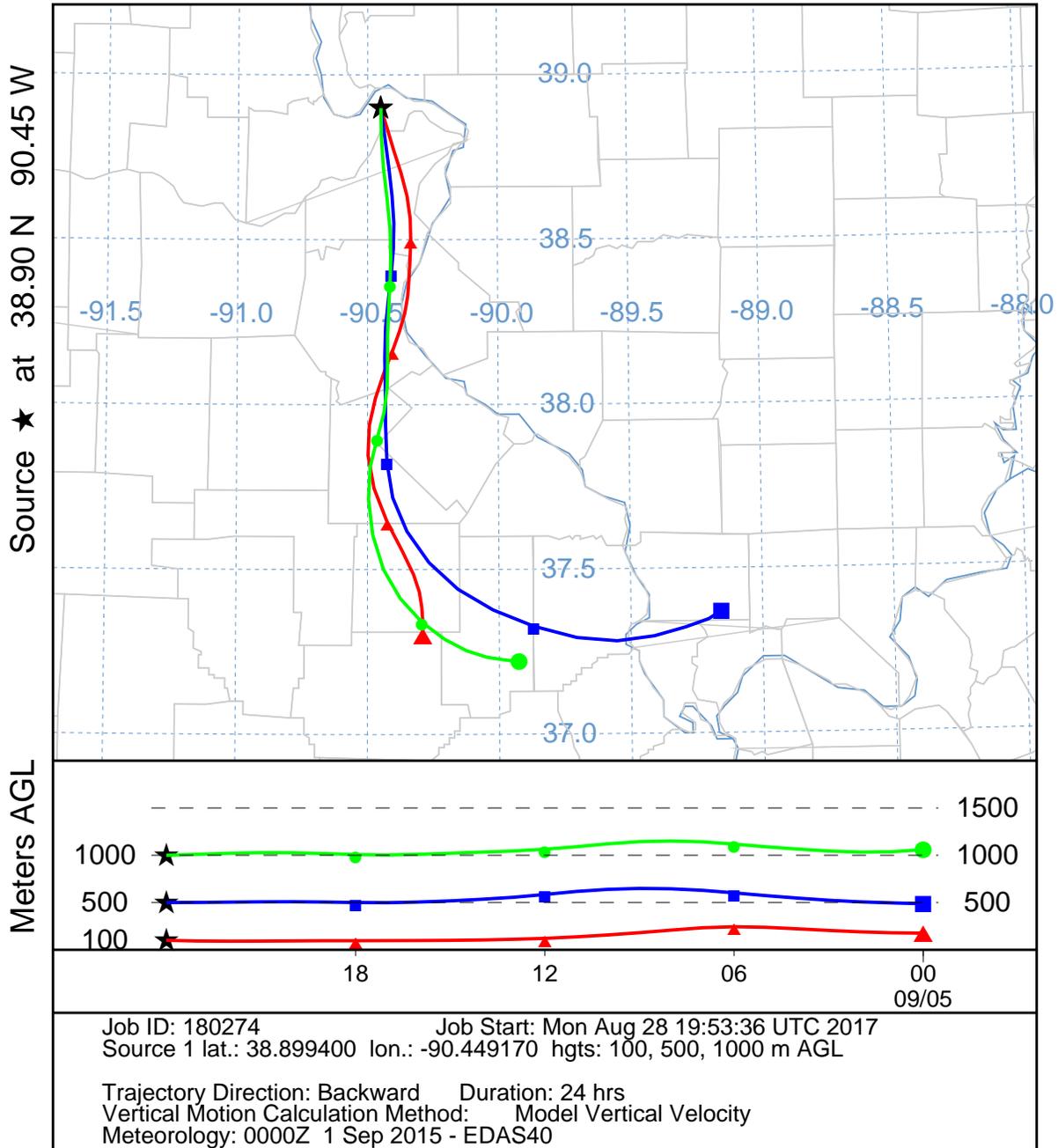
Maryland Heights (83 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 03 Jun 17
 EDAS Meteorological Data



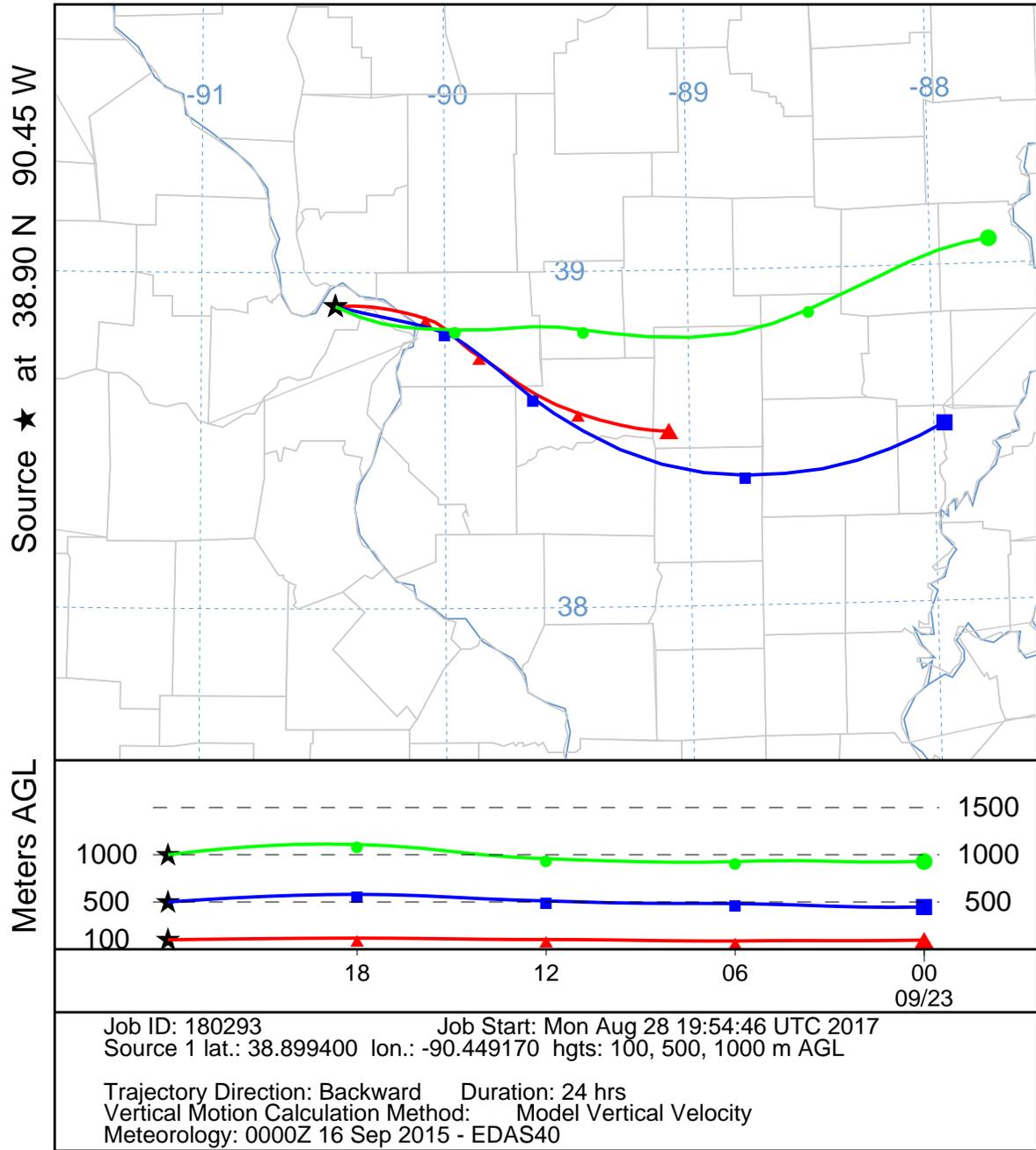
Orchard Farm (78 ppb)-NOAA HYSPLIT MODEL
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 EDAS Meteorological Data



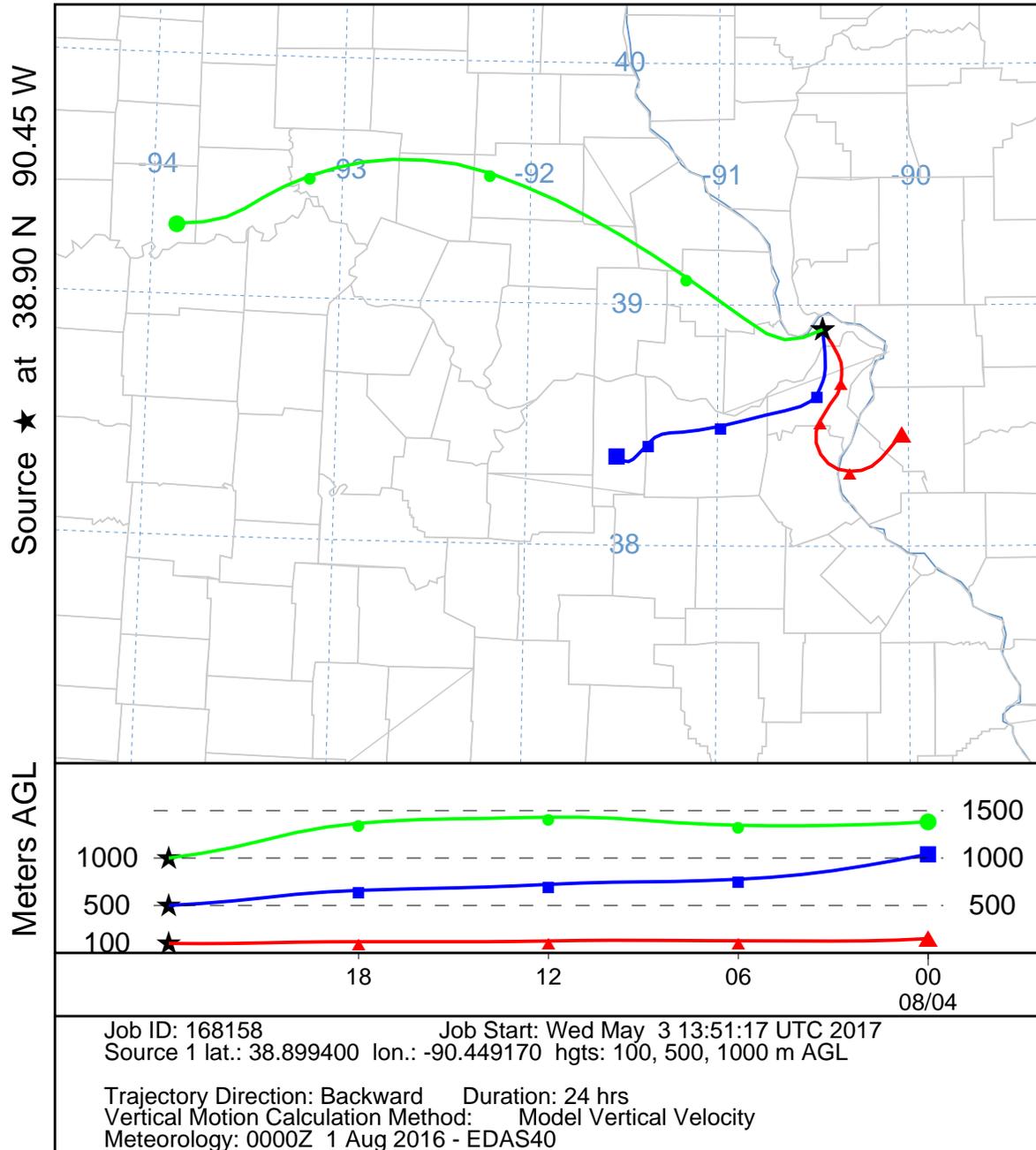
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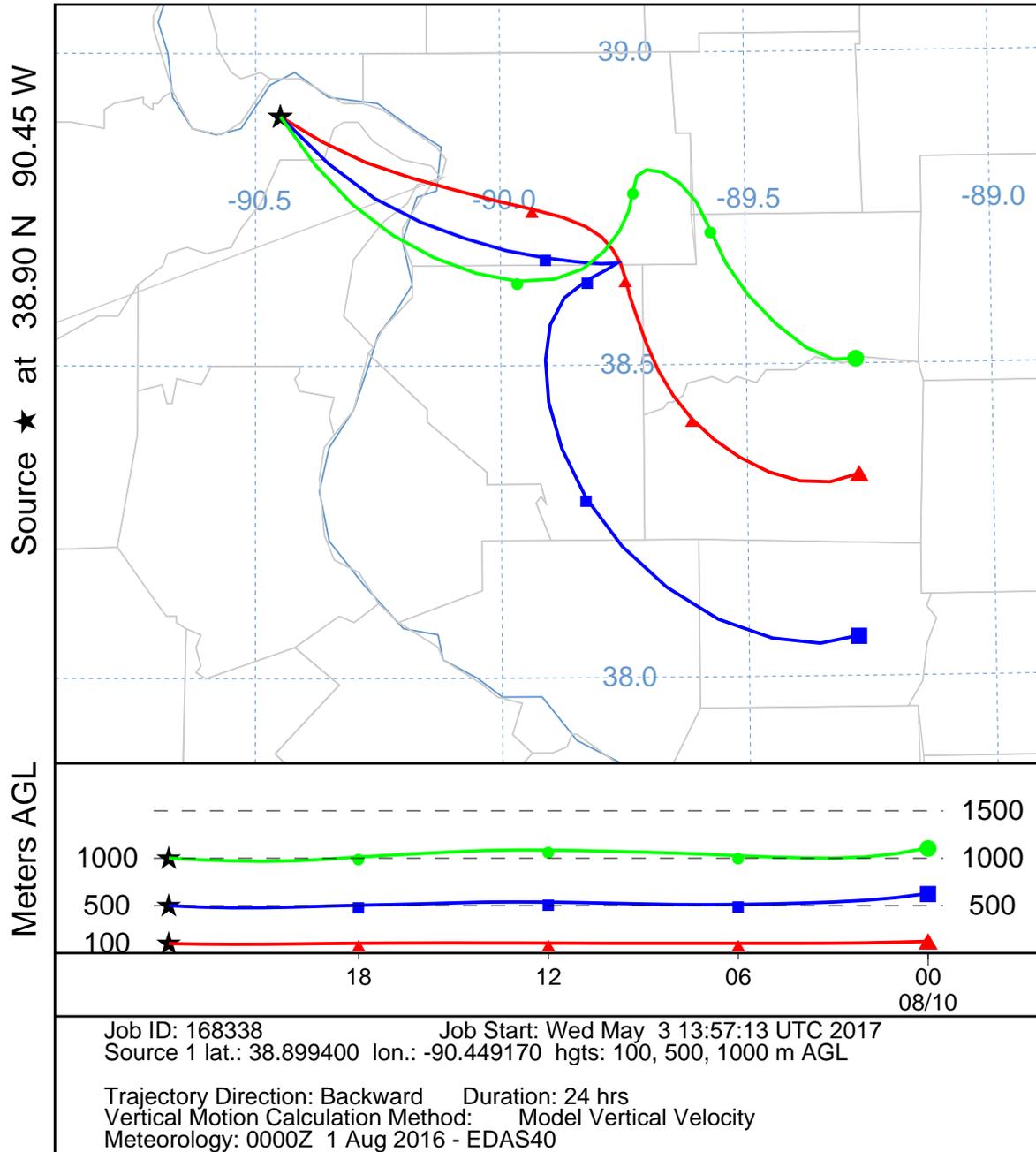
Orchard Farm (71 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 24 Sep 15
 EDAS Meteorological Data



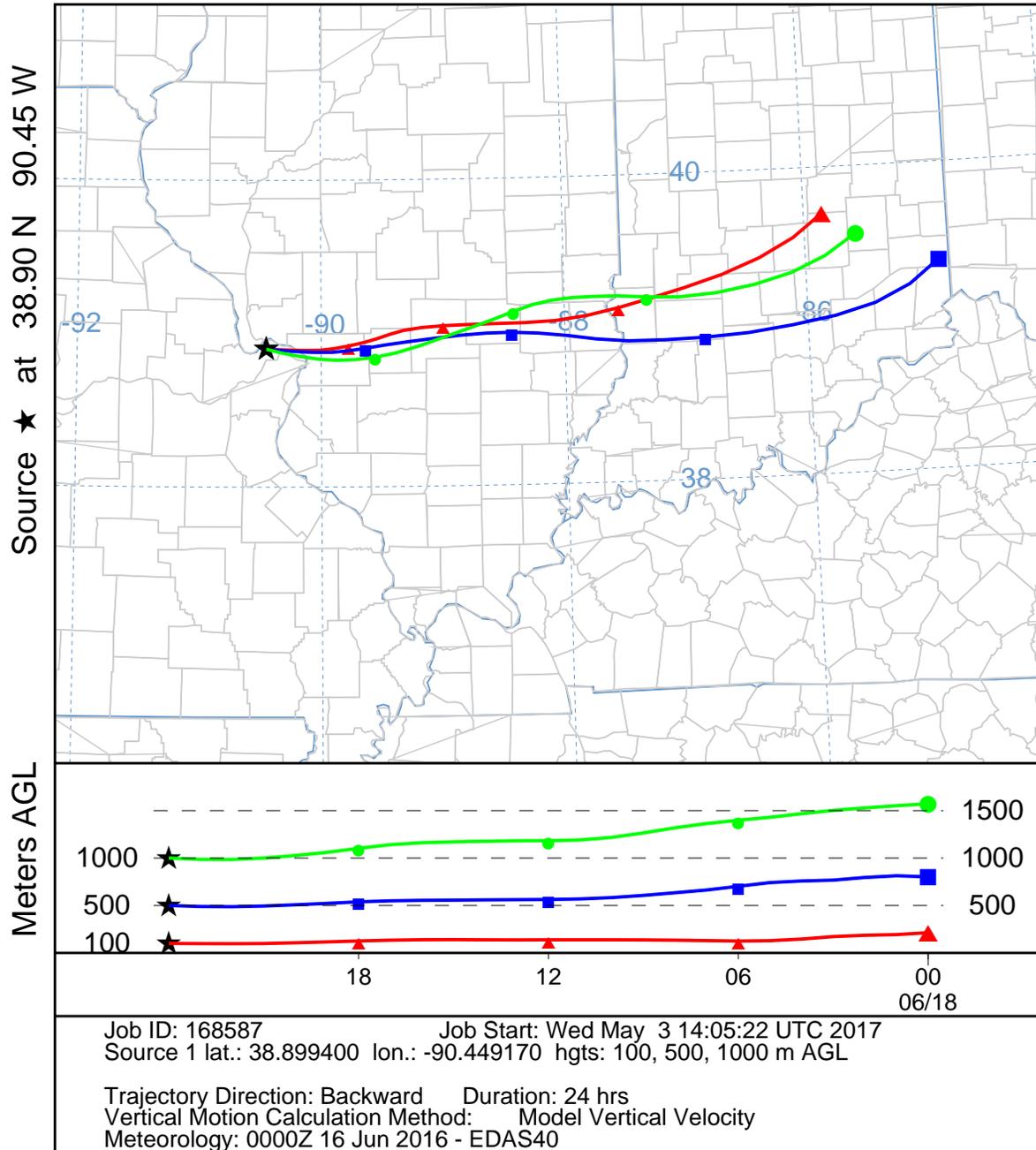
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 Backward trajectories ending at 0000 UTC 05 Aug 16
 EDAS Meteorological Data



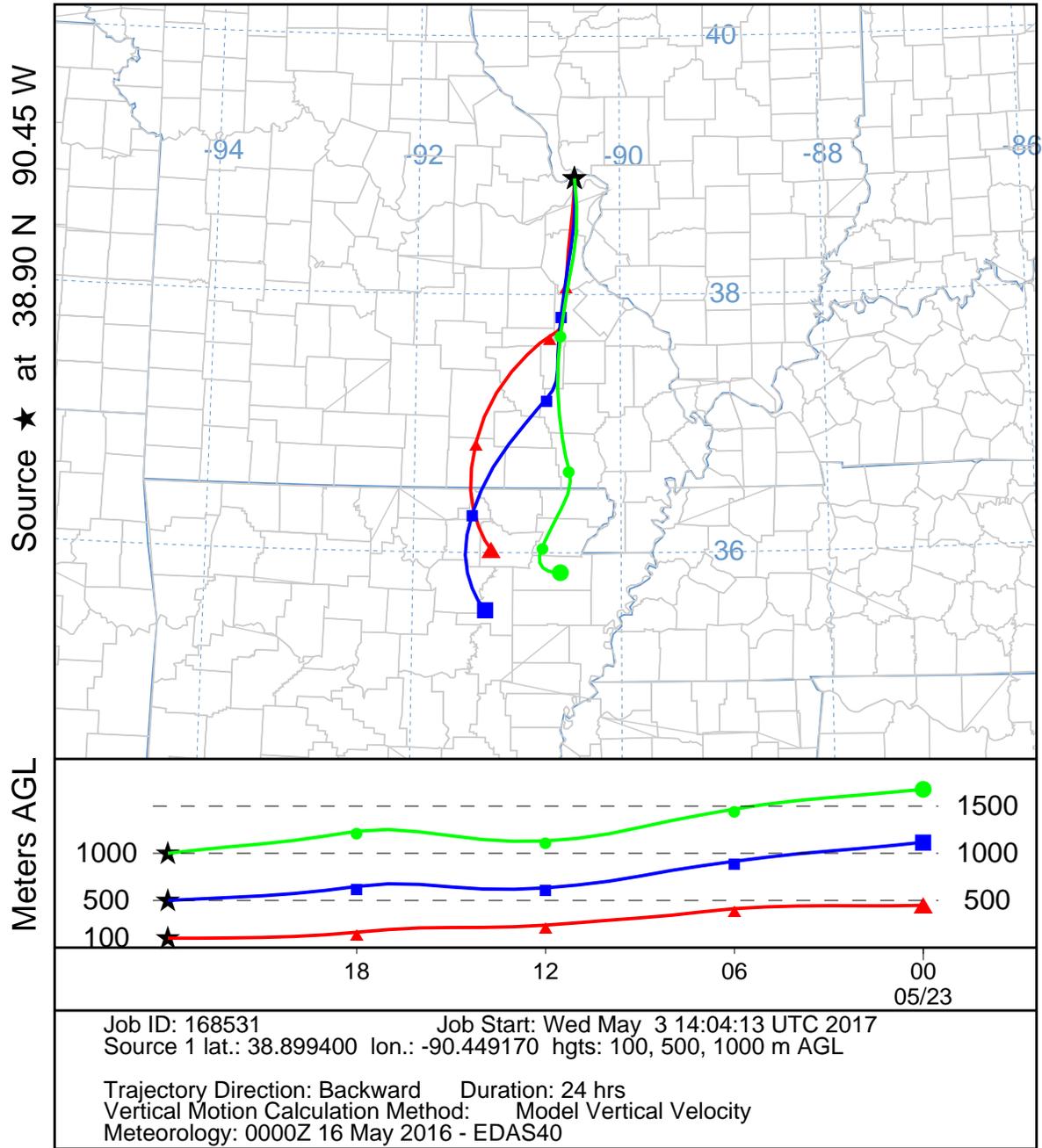
Orchard Farm (71 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 11 Aug 16
 EDAS Meteorological Data



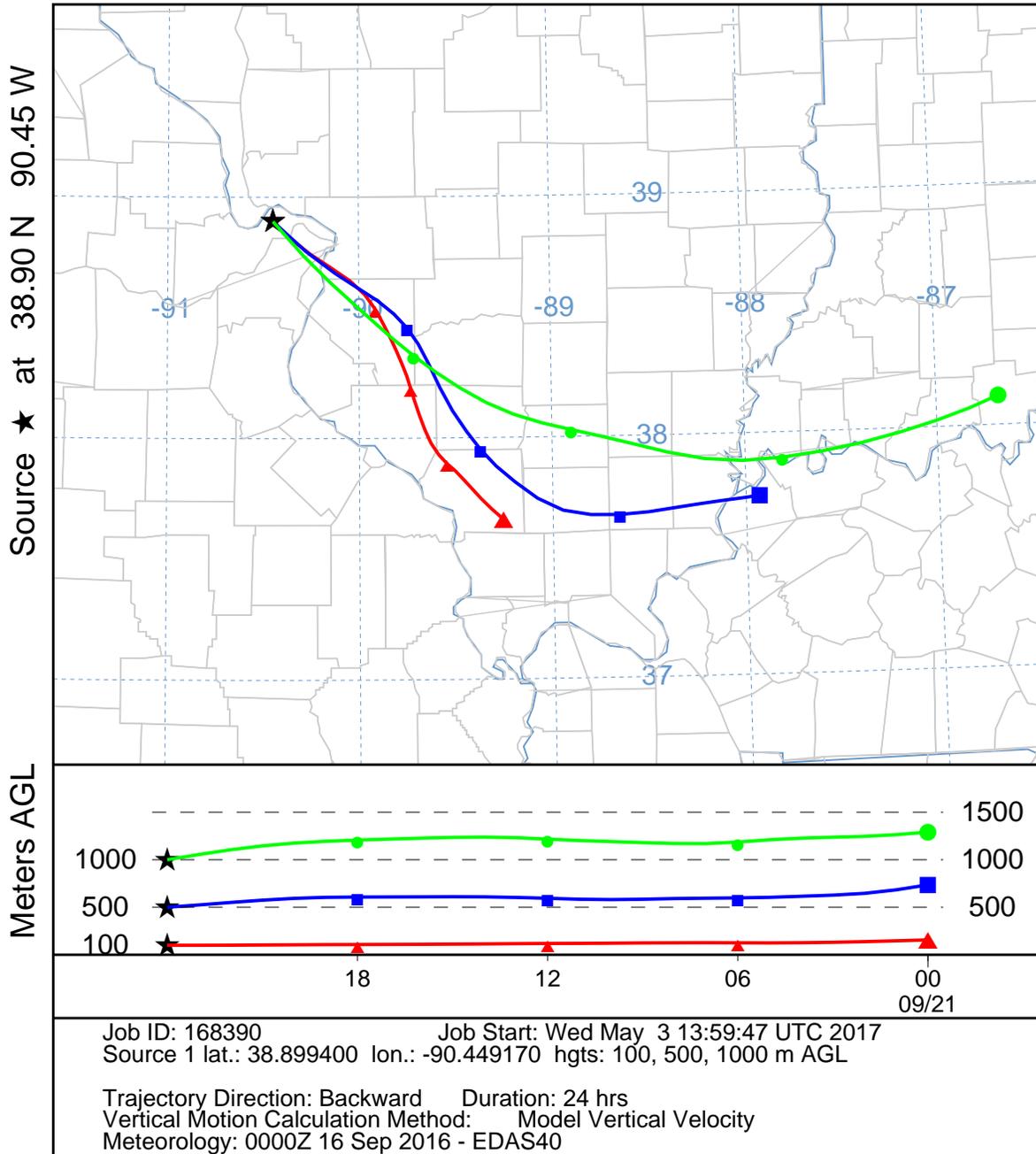
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 Backward trajectories ending at 0000 UTC 19 Jun 16
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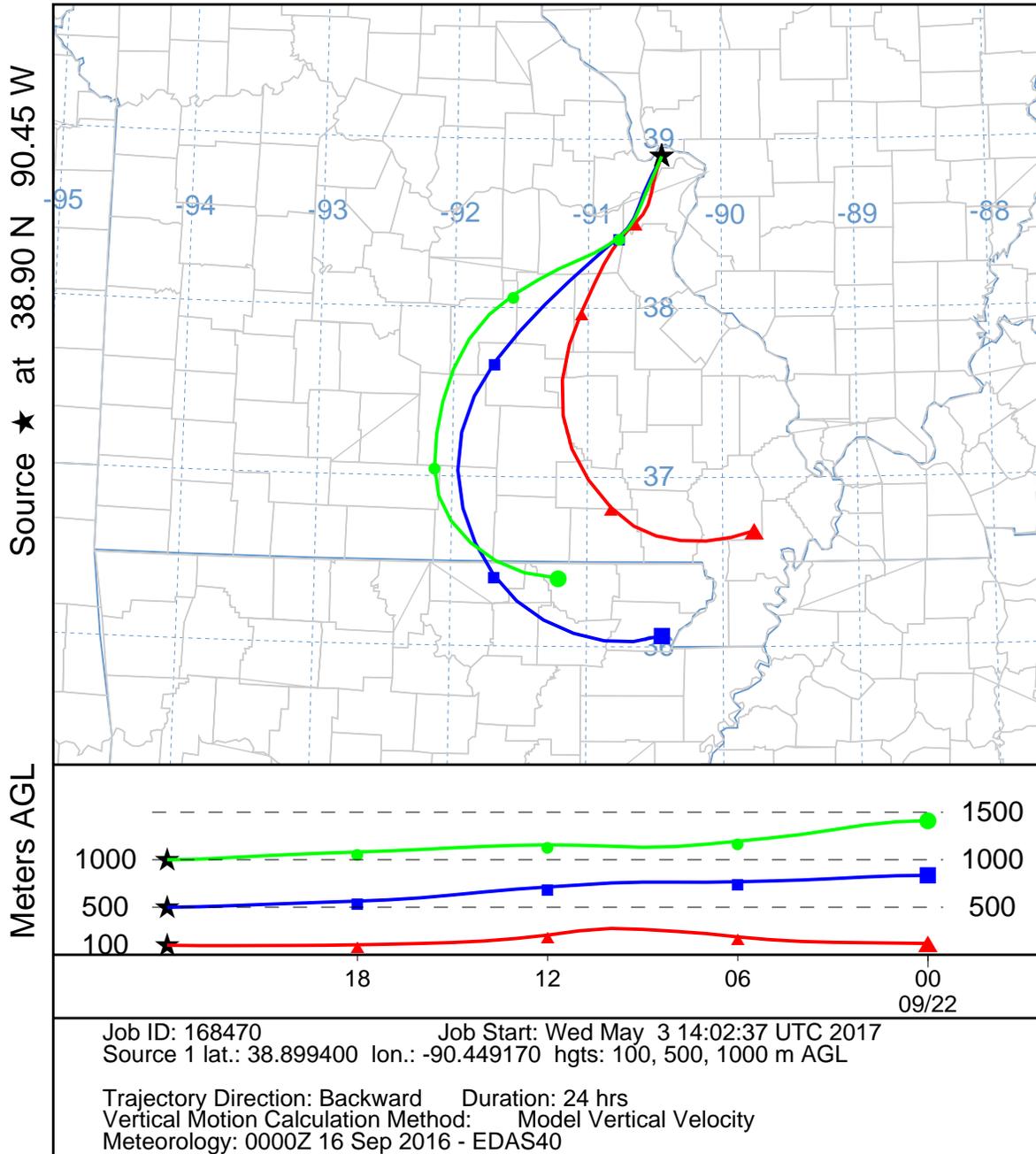
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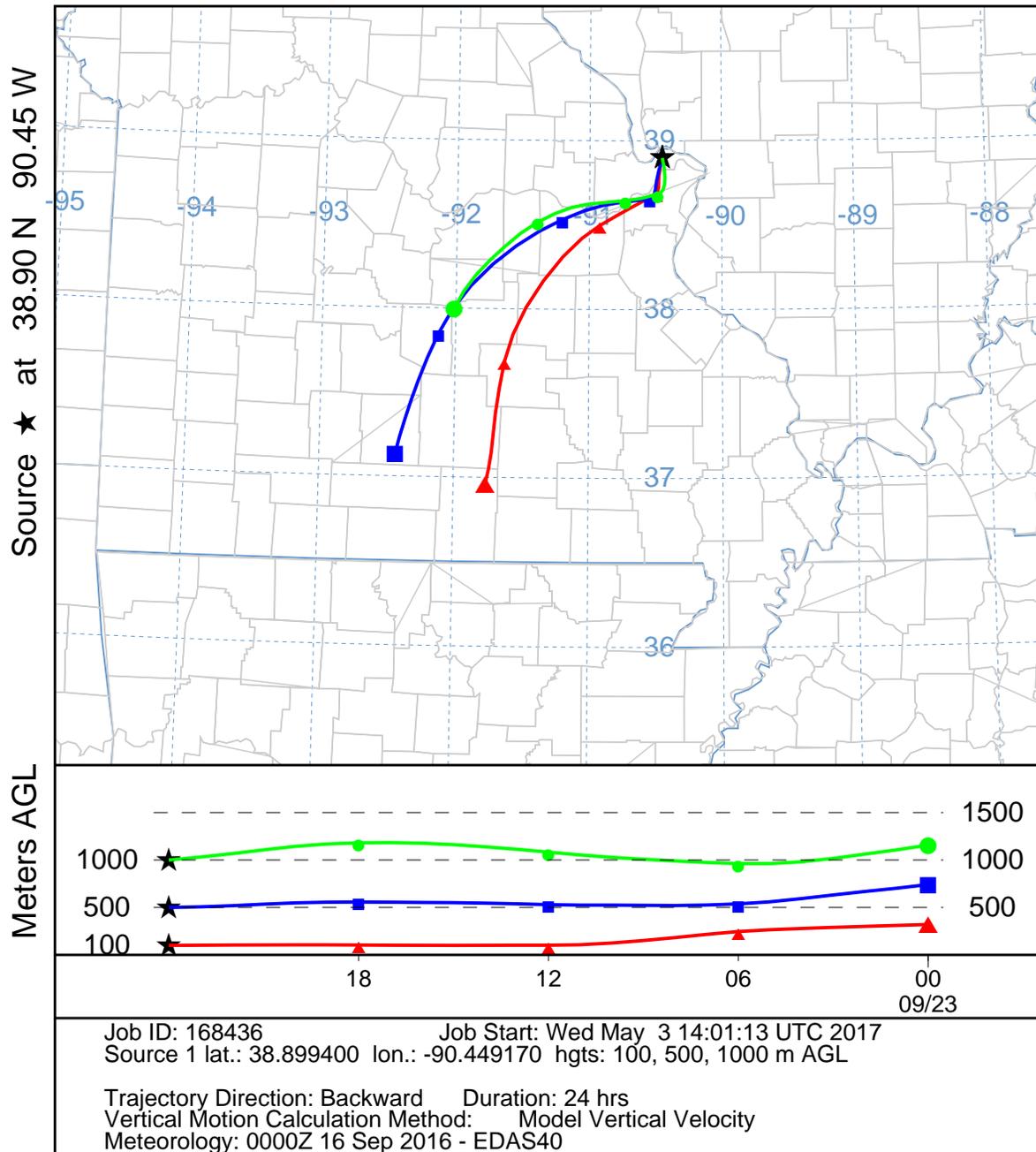
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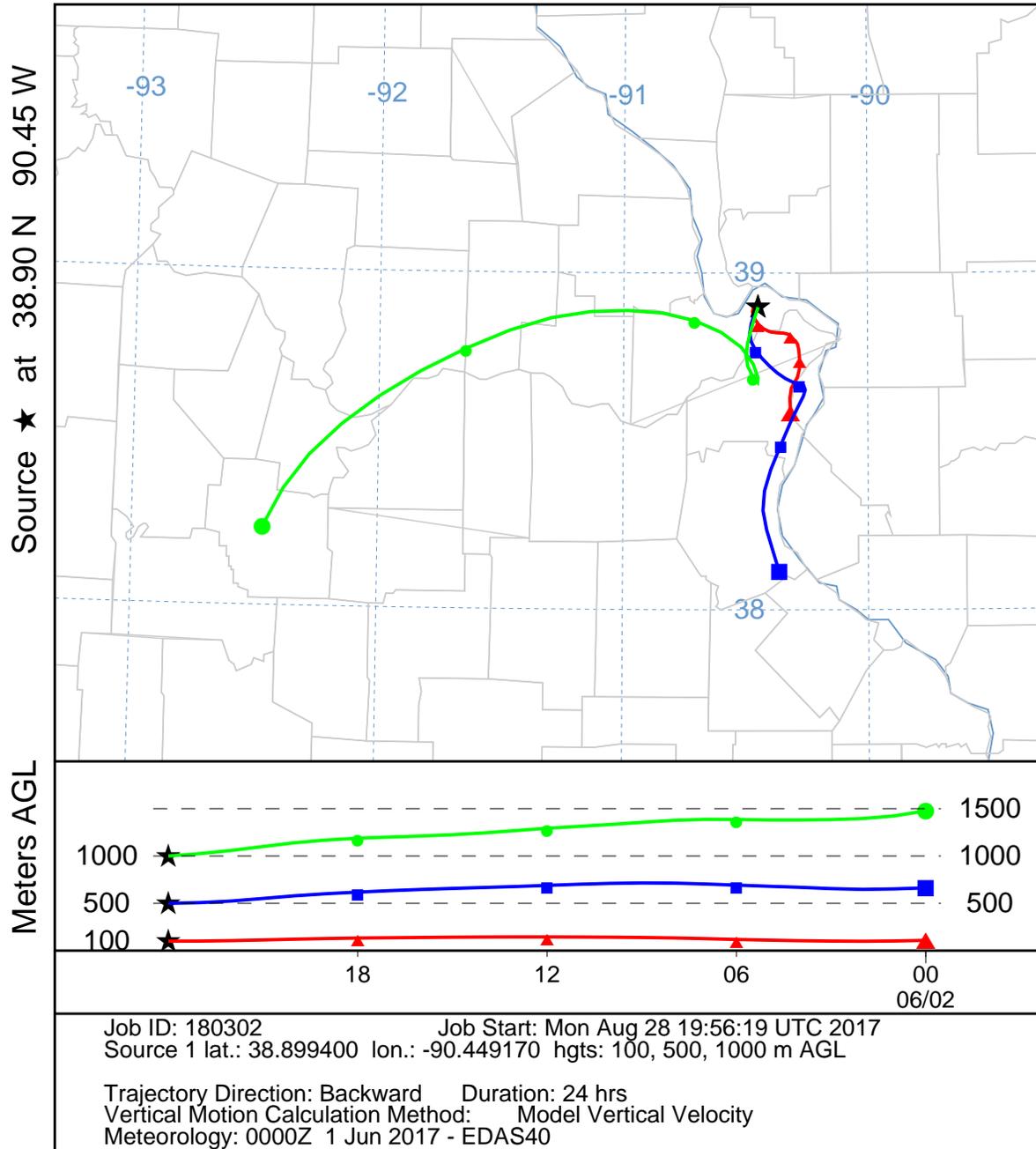
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 Backward trajectories ending at 0000 UTC 23 Sep 16
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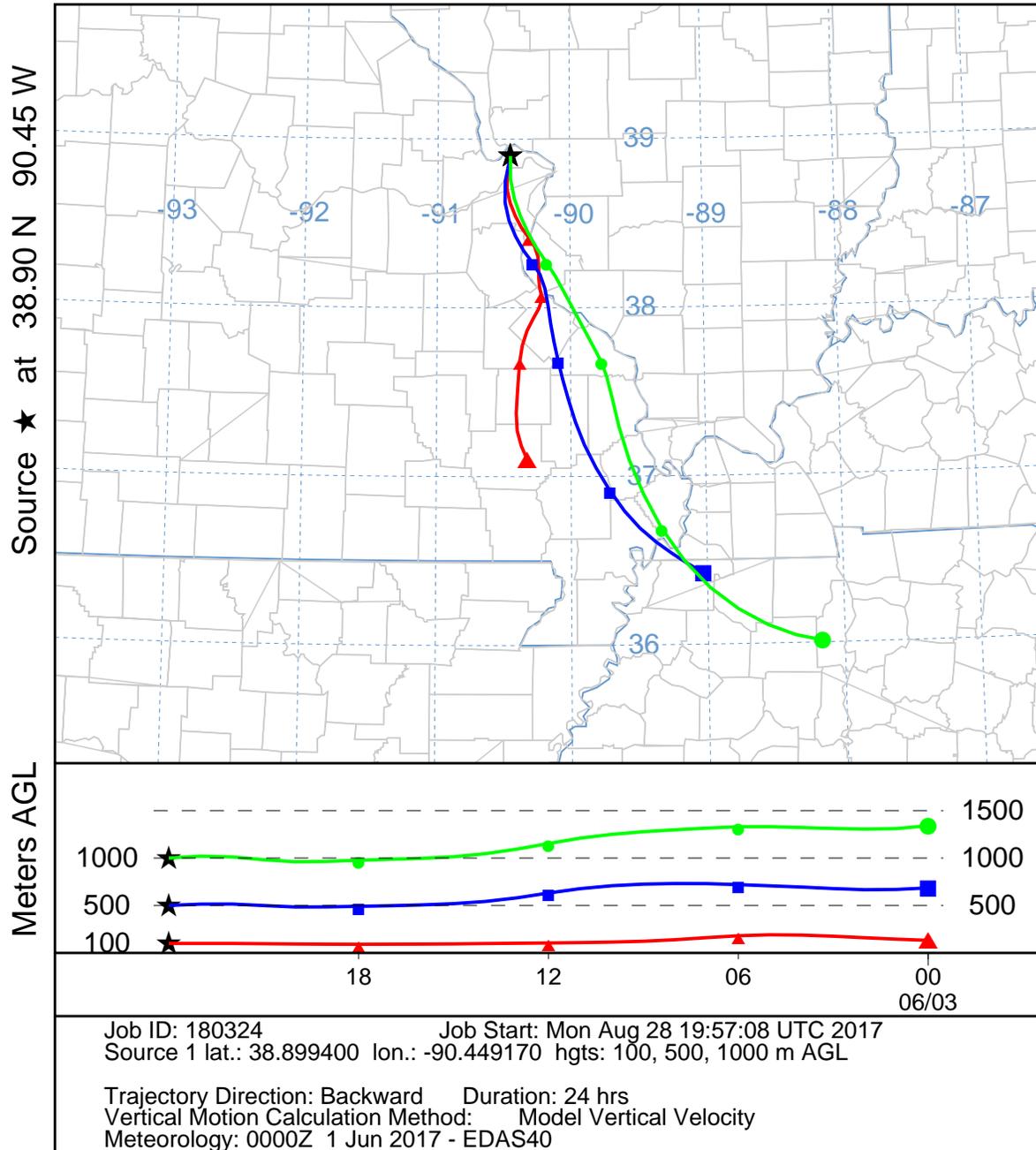
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 Backward trajectories ending at 0000 UTC 24 Sep 16
 EDAS Meteorological Data



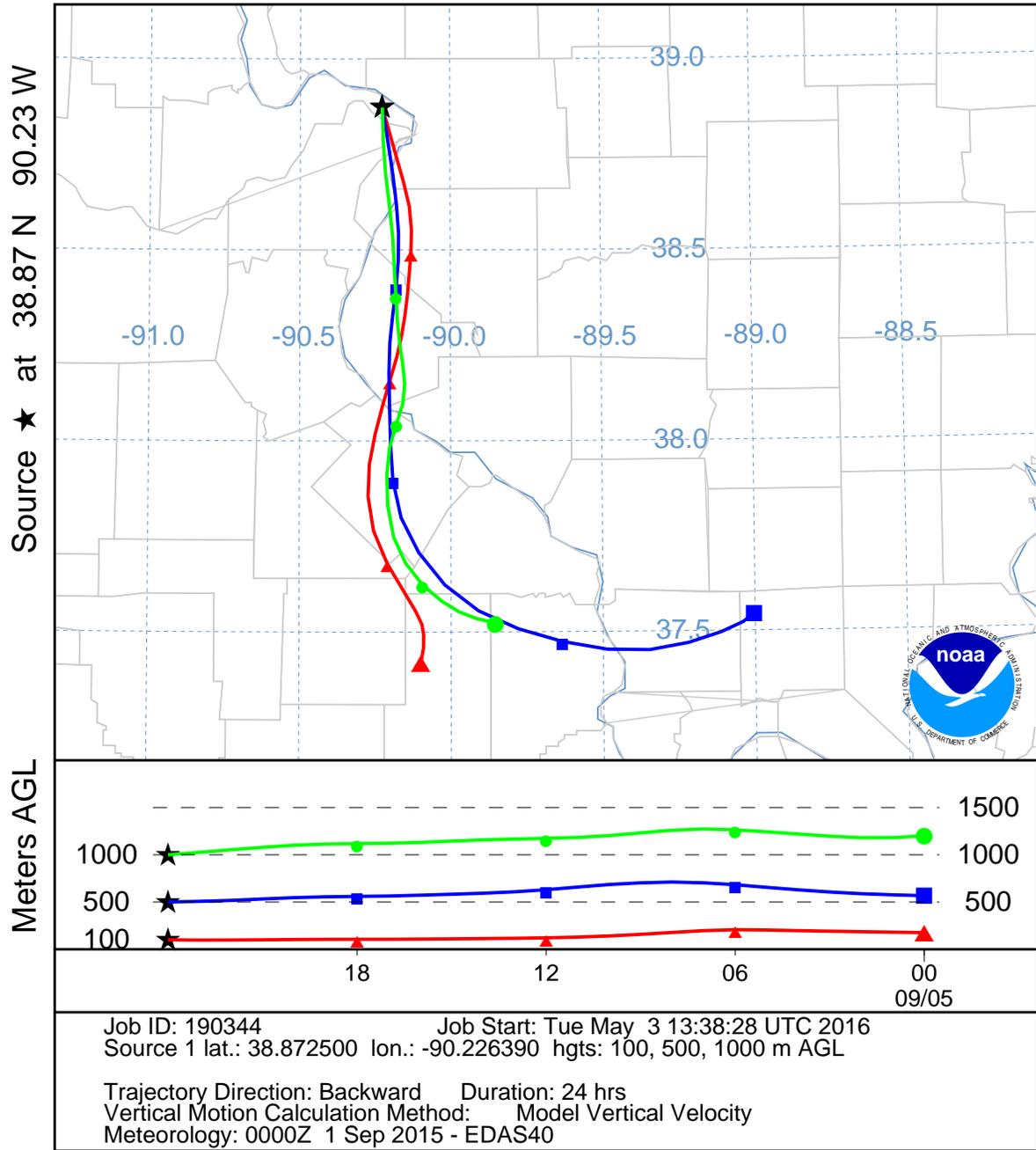
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 Backward trajectories ending at 0000 UTC 03 Jun 17
 EDAS Meteorological Data



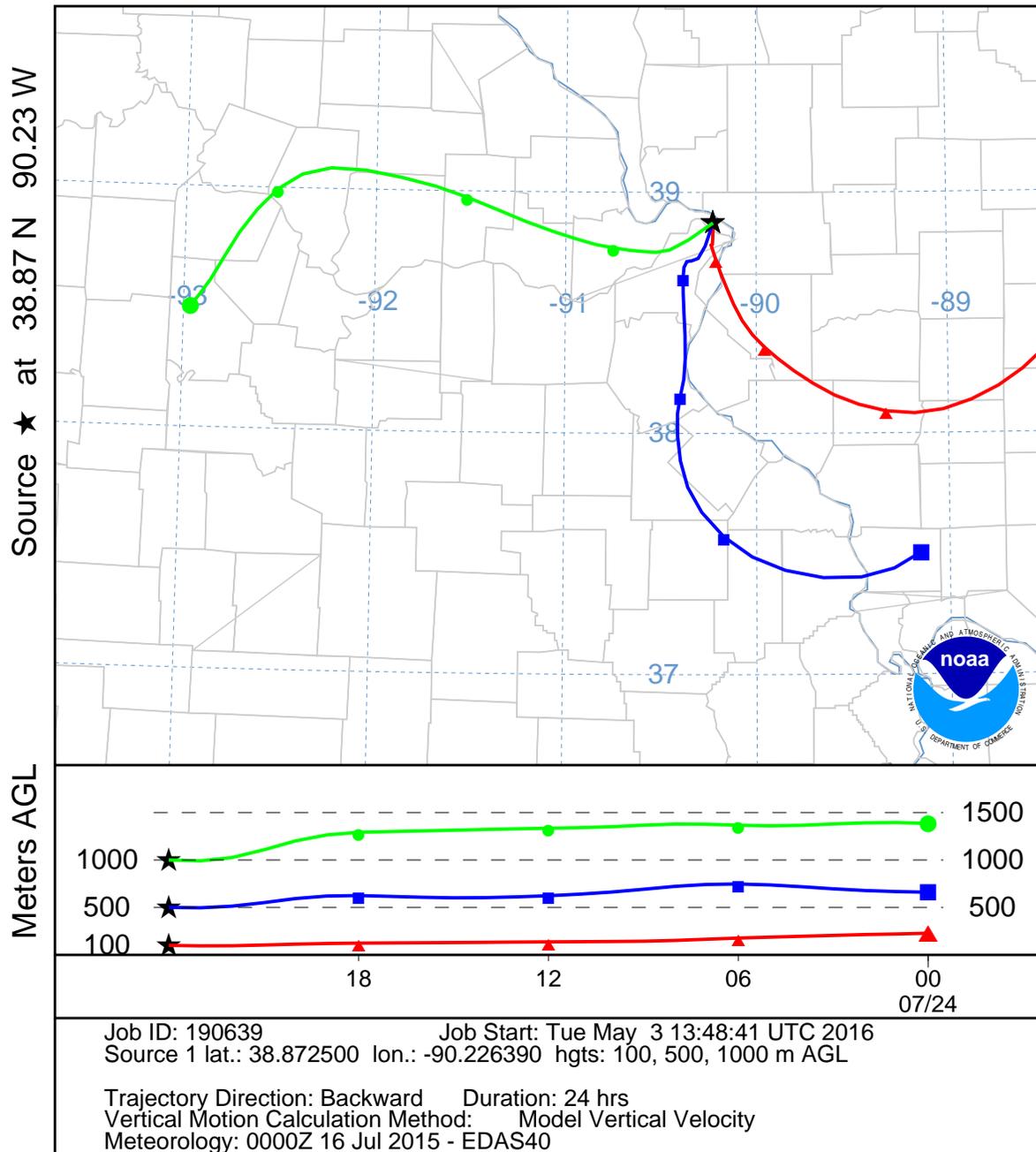
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 Backward trajectories ending at 0000 UTC 04 Jun 17
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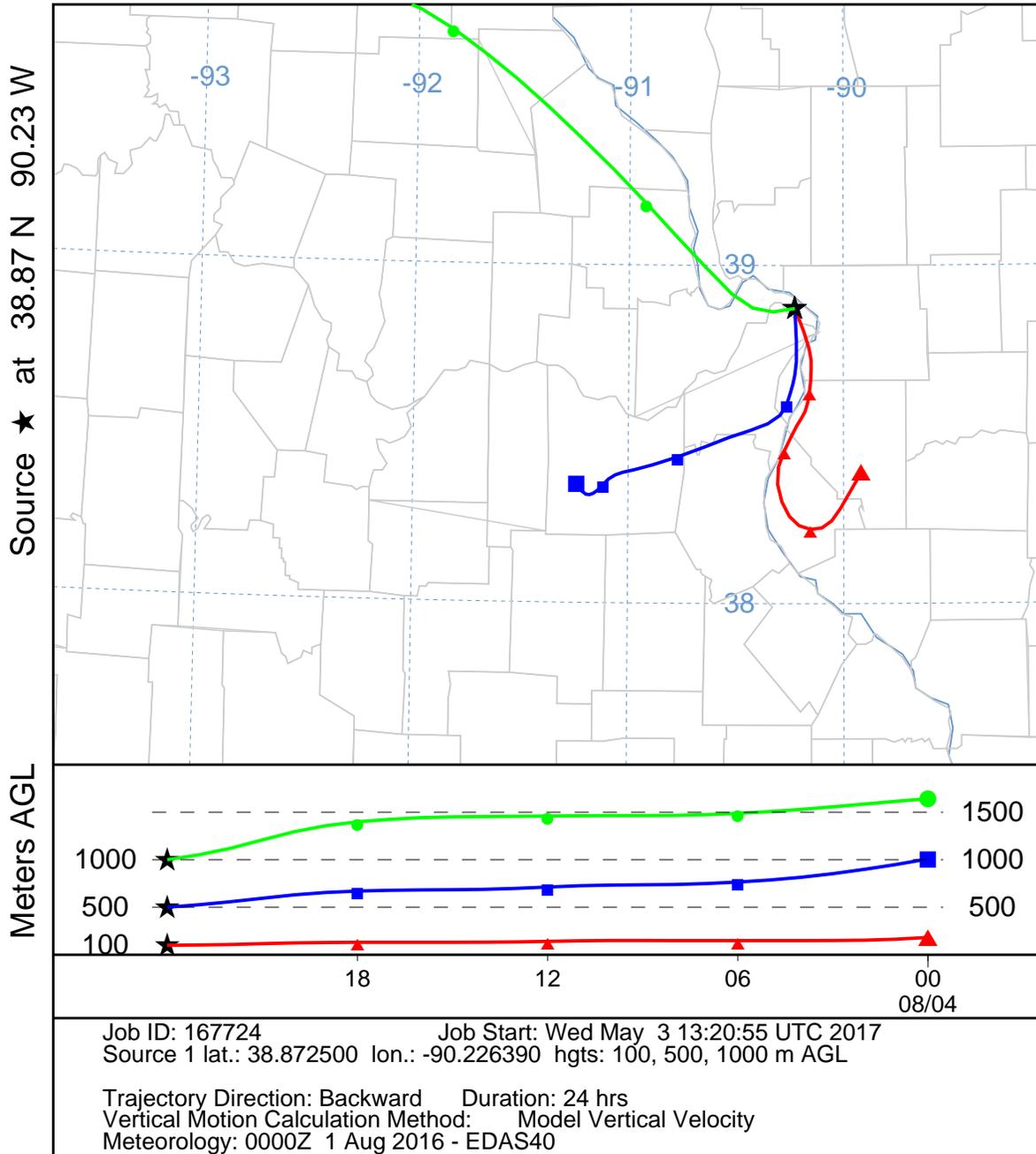
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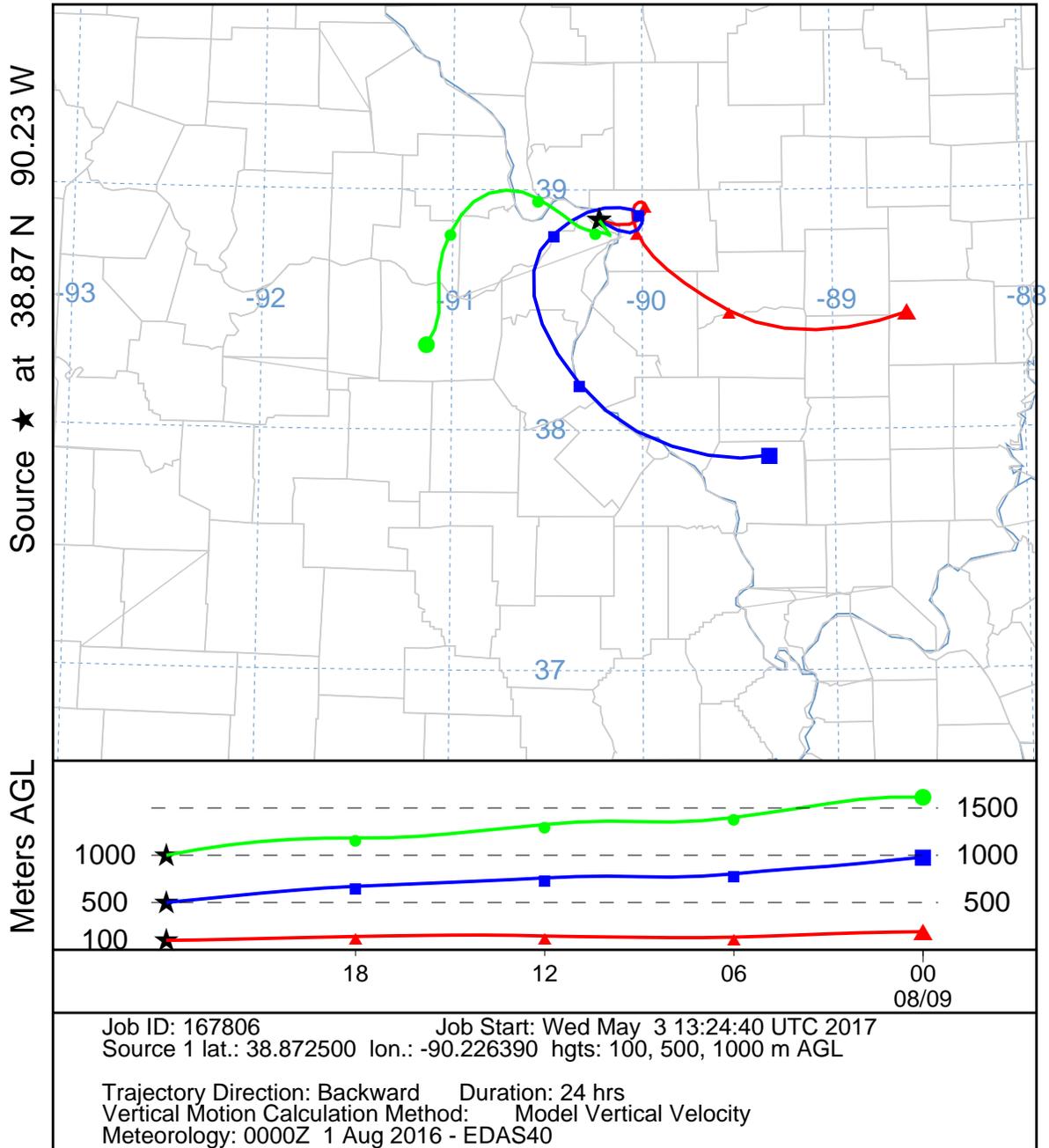
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 EDAS Meteorological Data



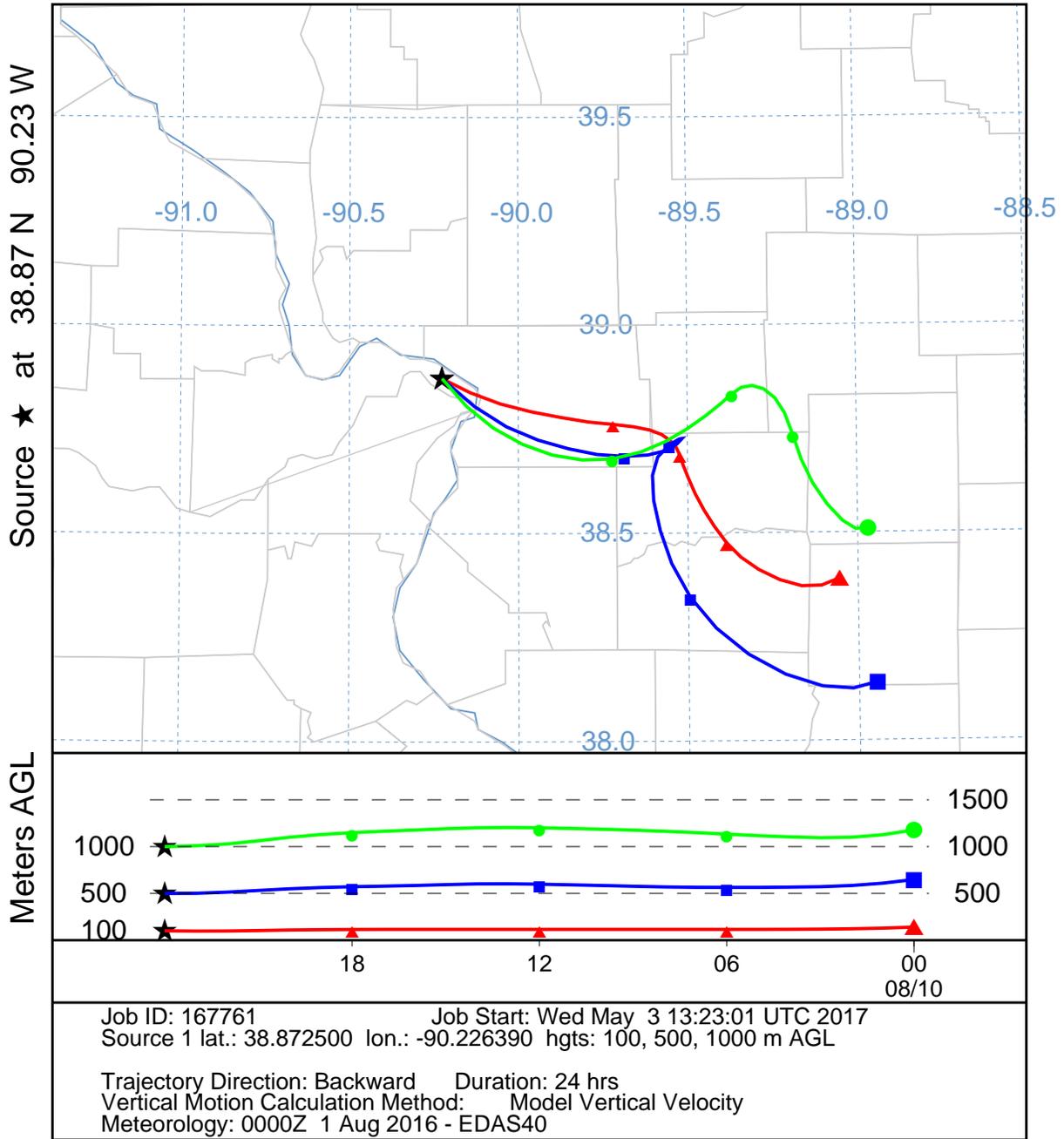
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 Backward trajectories ending at 0000 UTC 05 Aug 16
 EDAS Meteorological Data



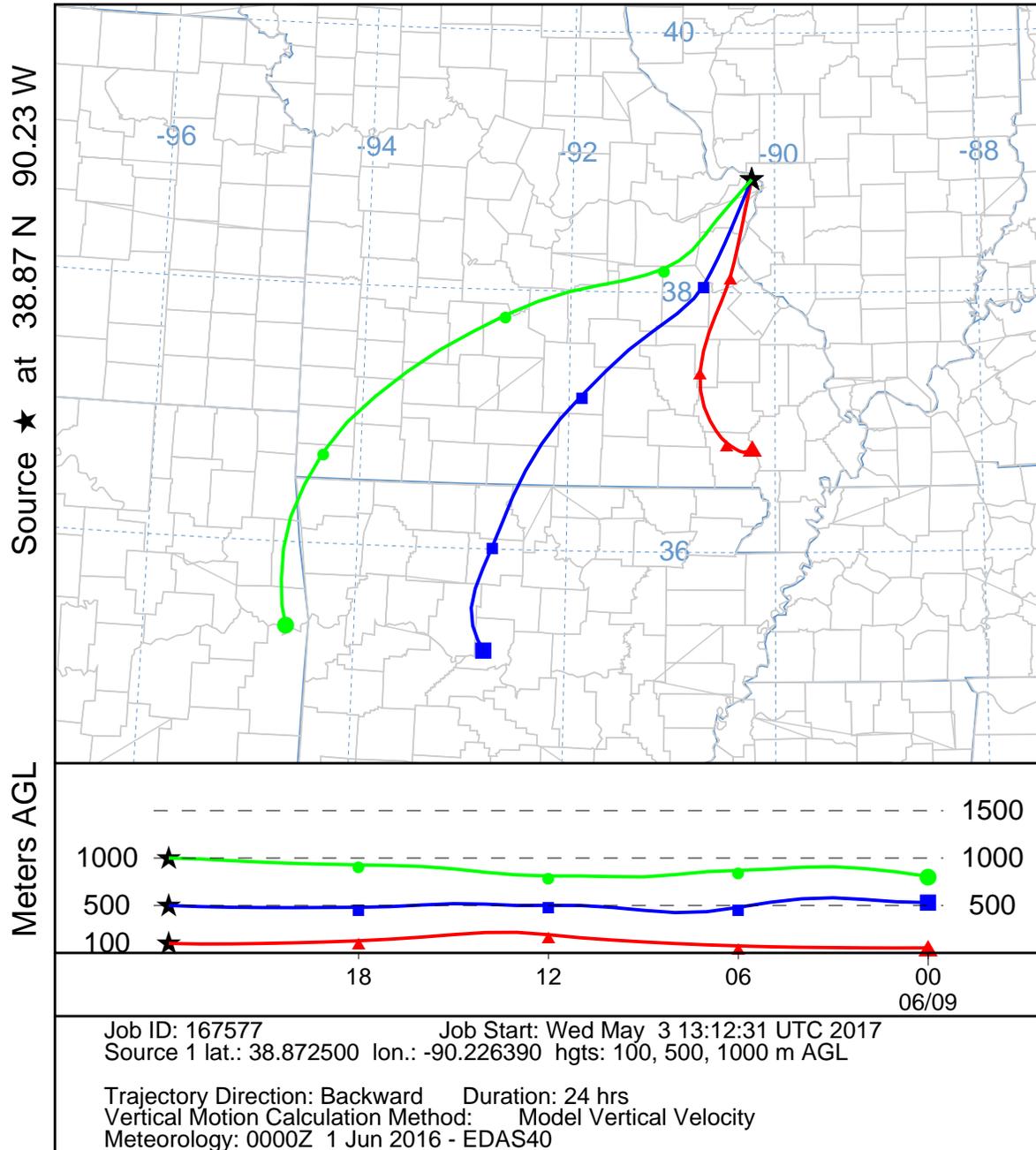
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 EDAS Meteorological Data



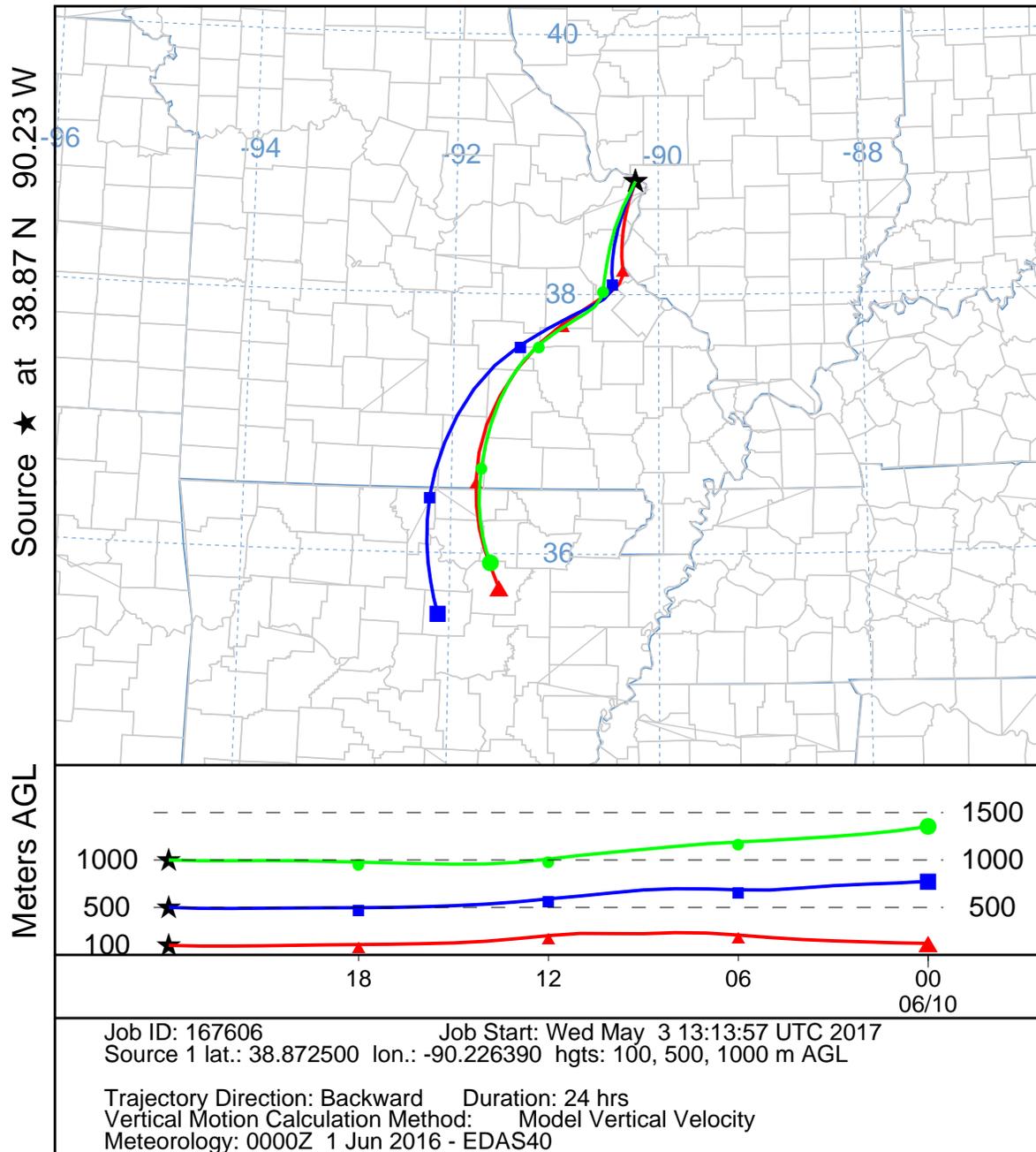
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 EDAS Meteorological Data



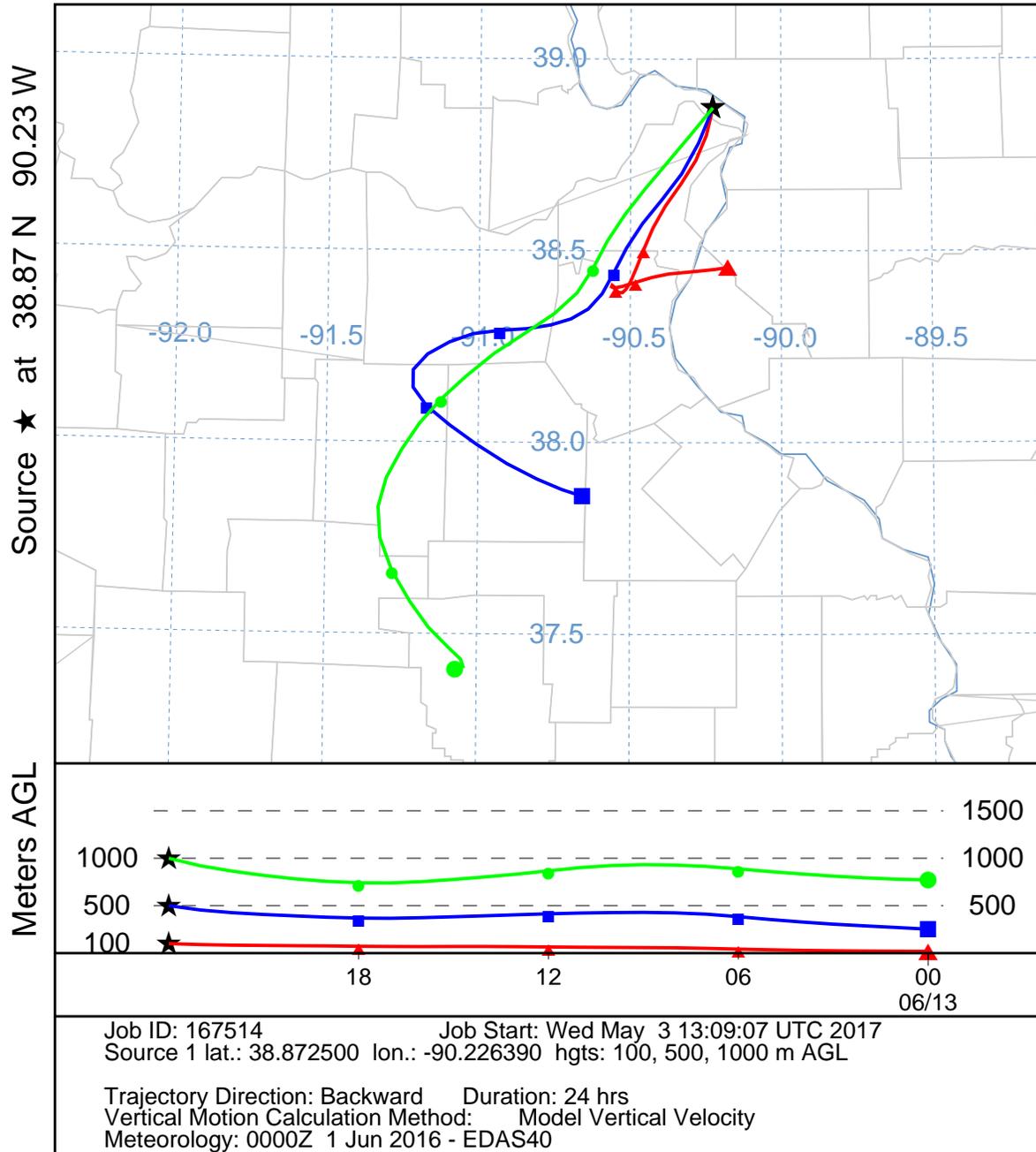
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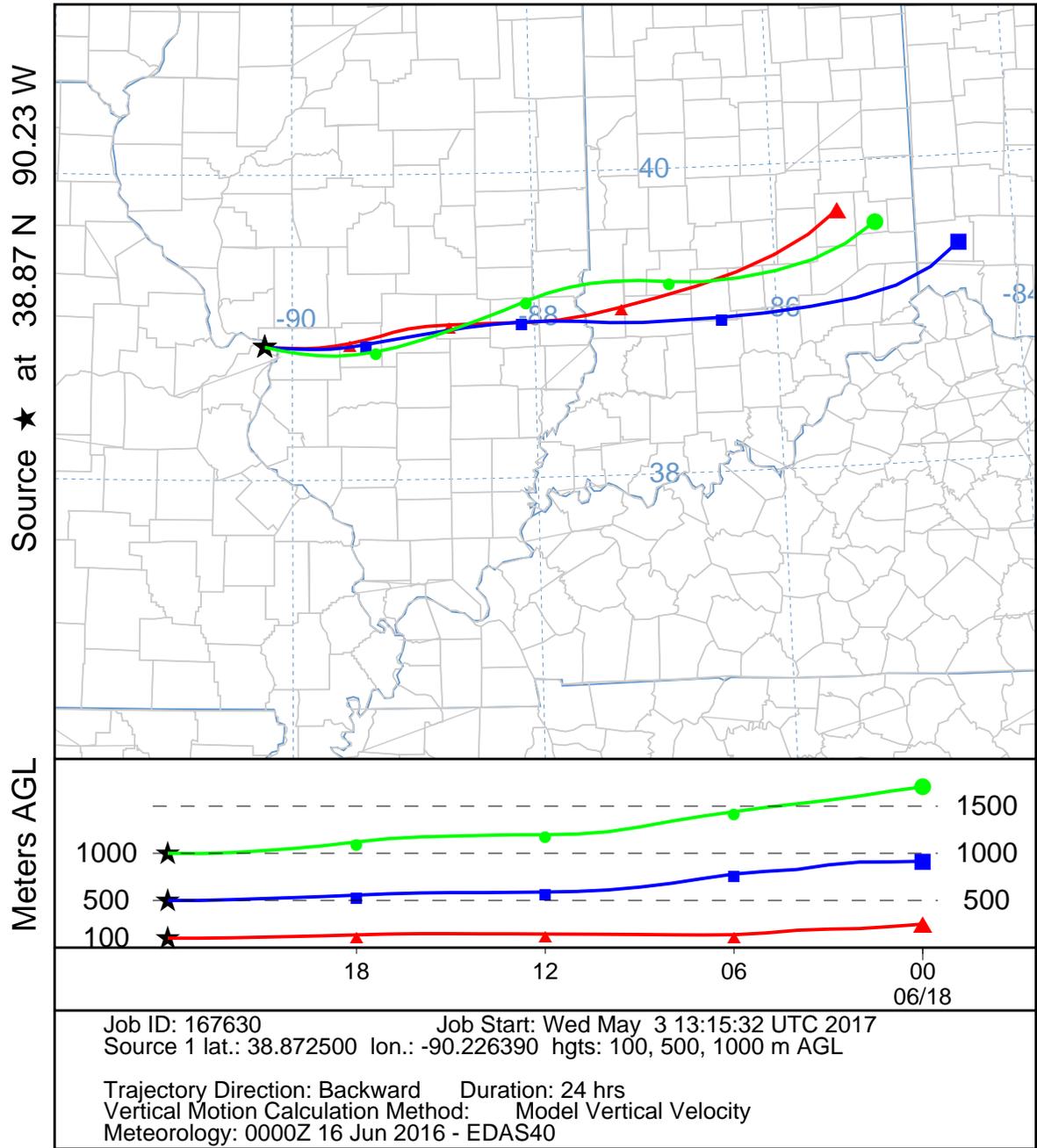
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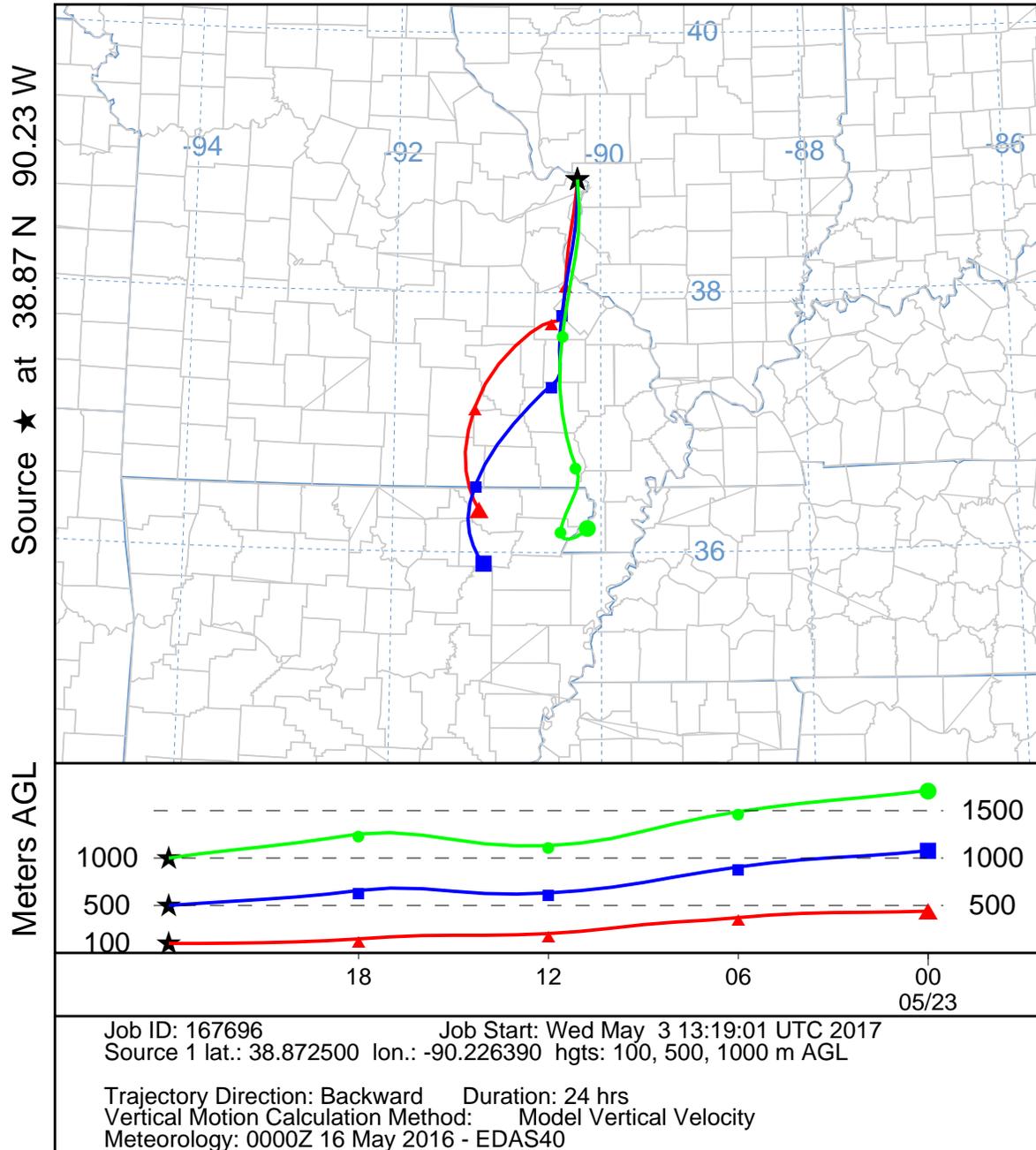
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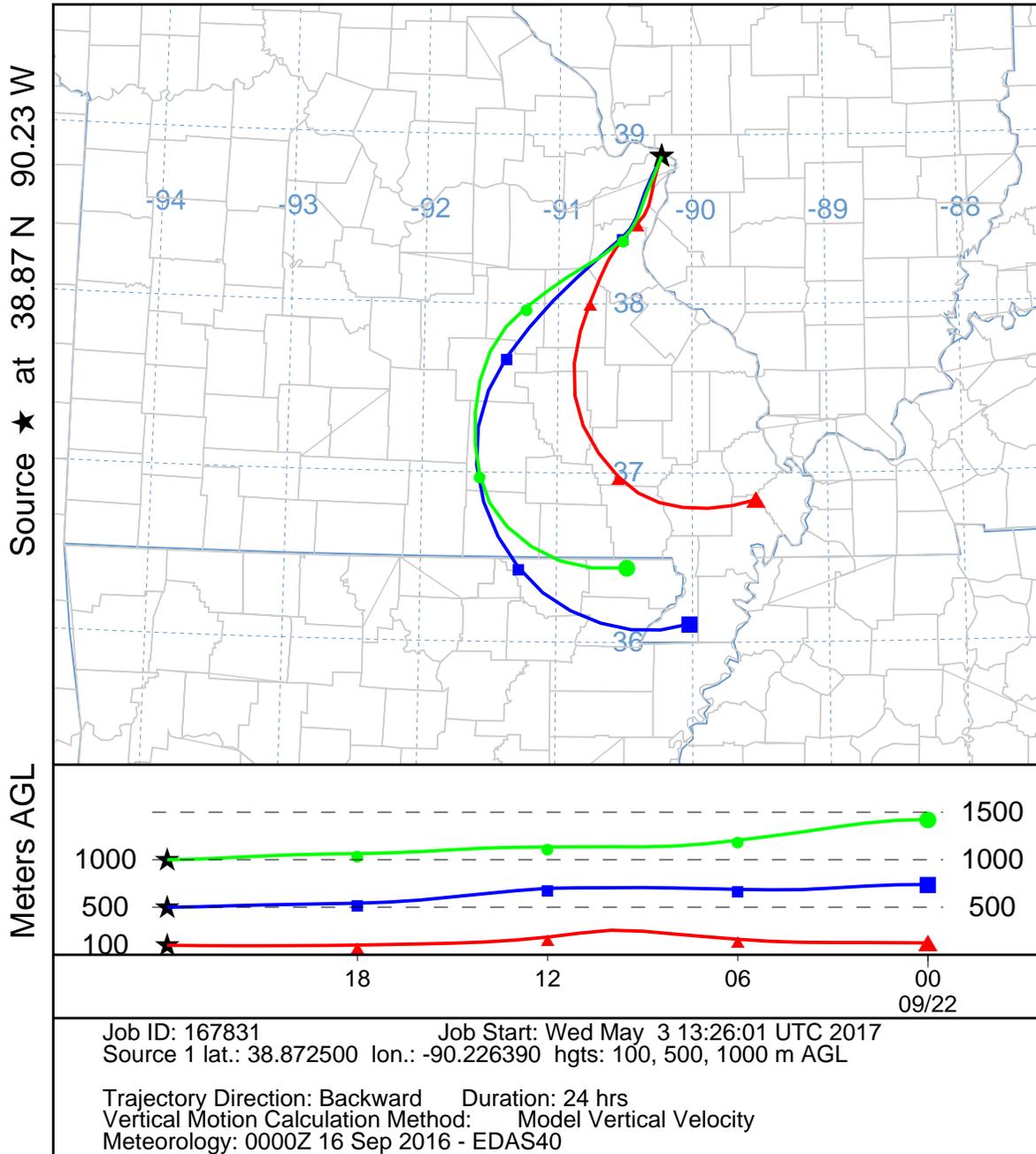
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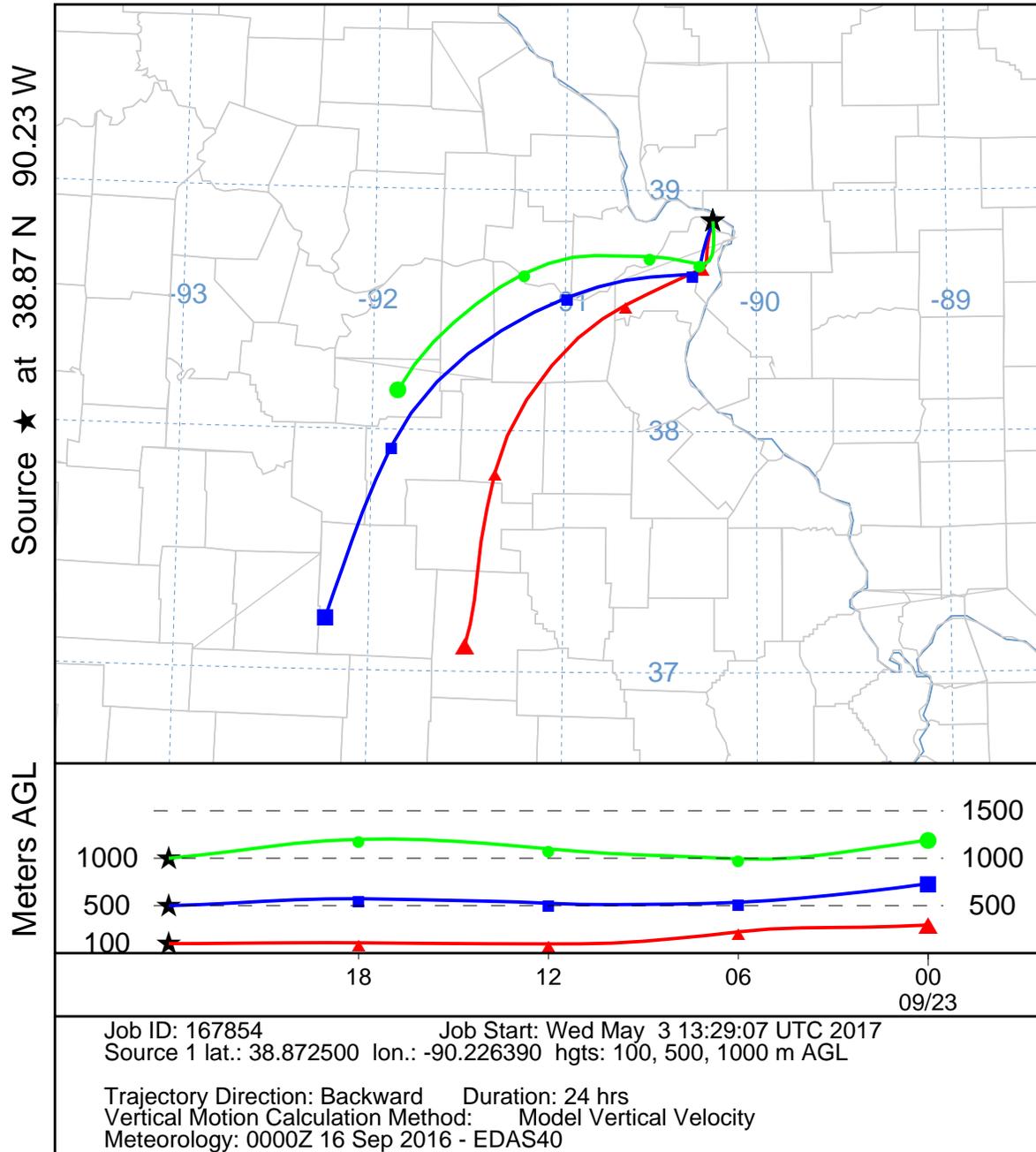
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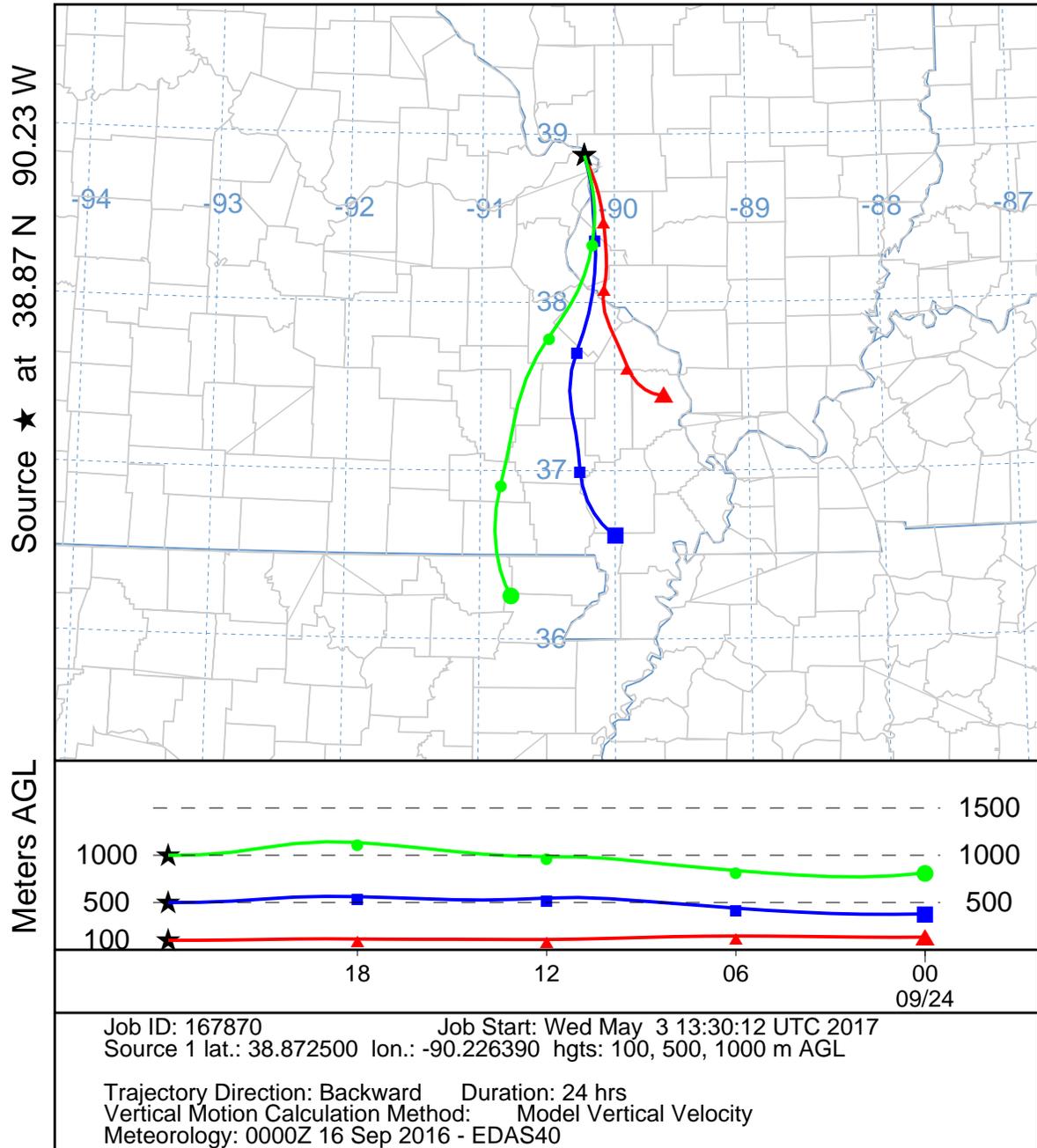
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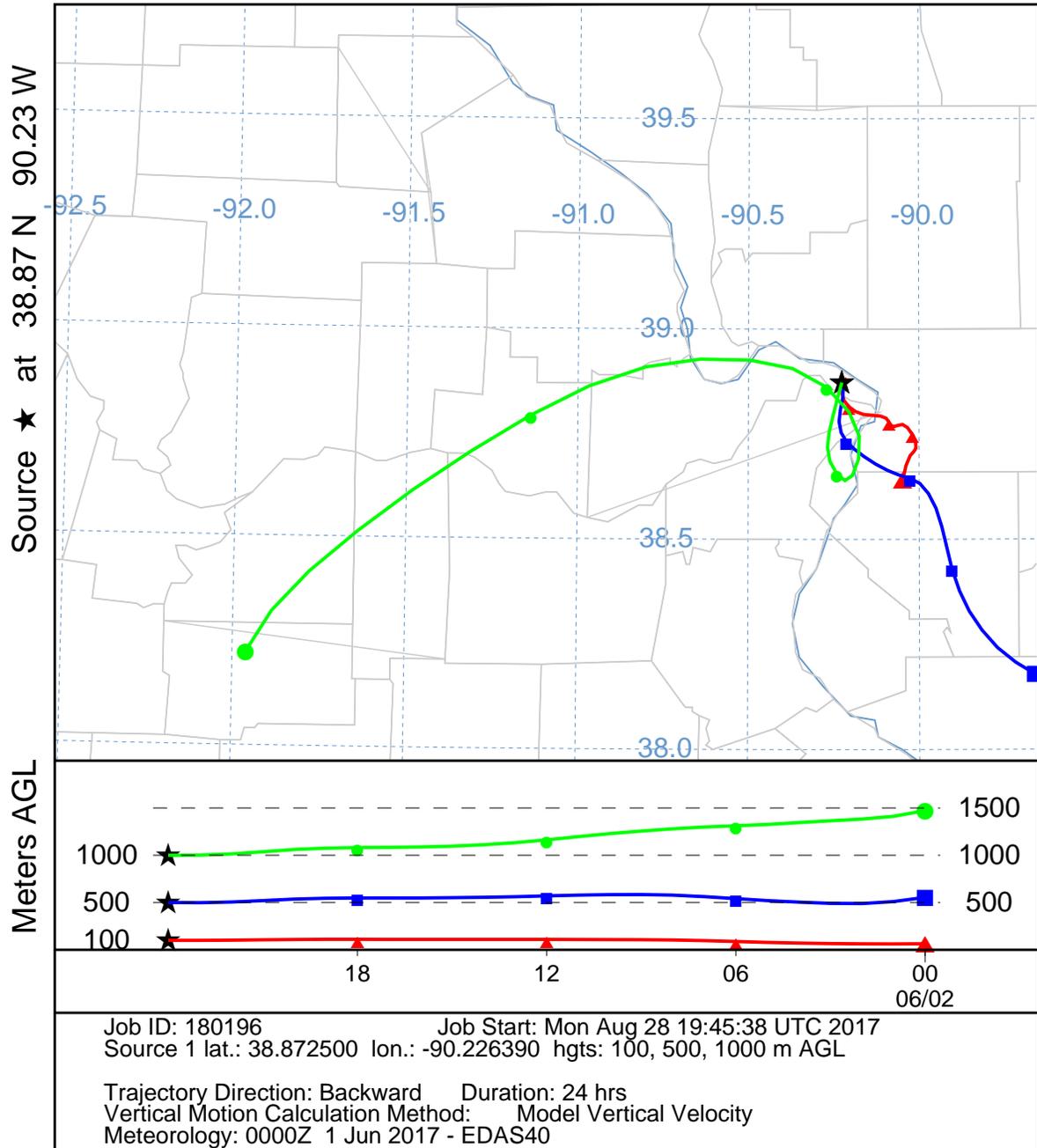
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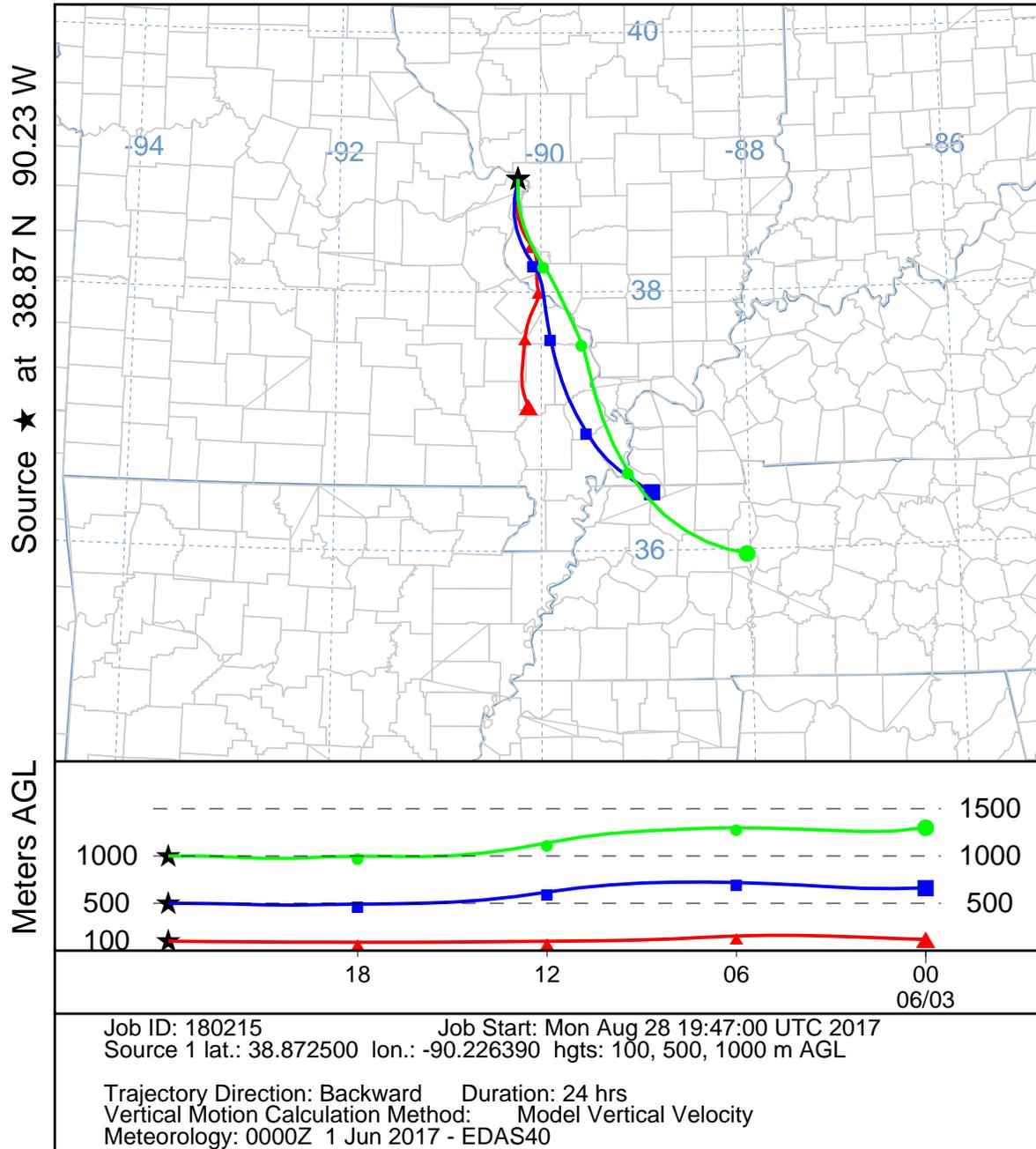
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 EDAS Meteorological Data



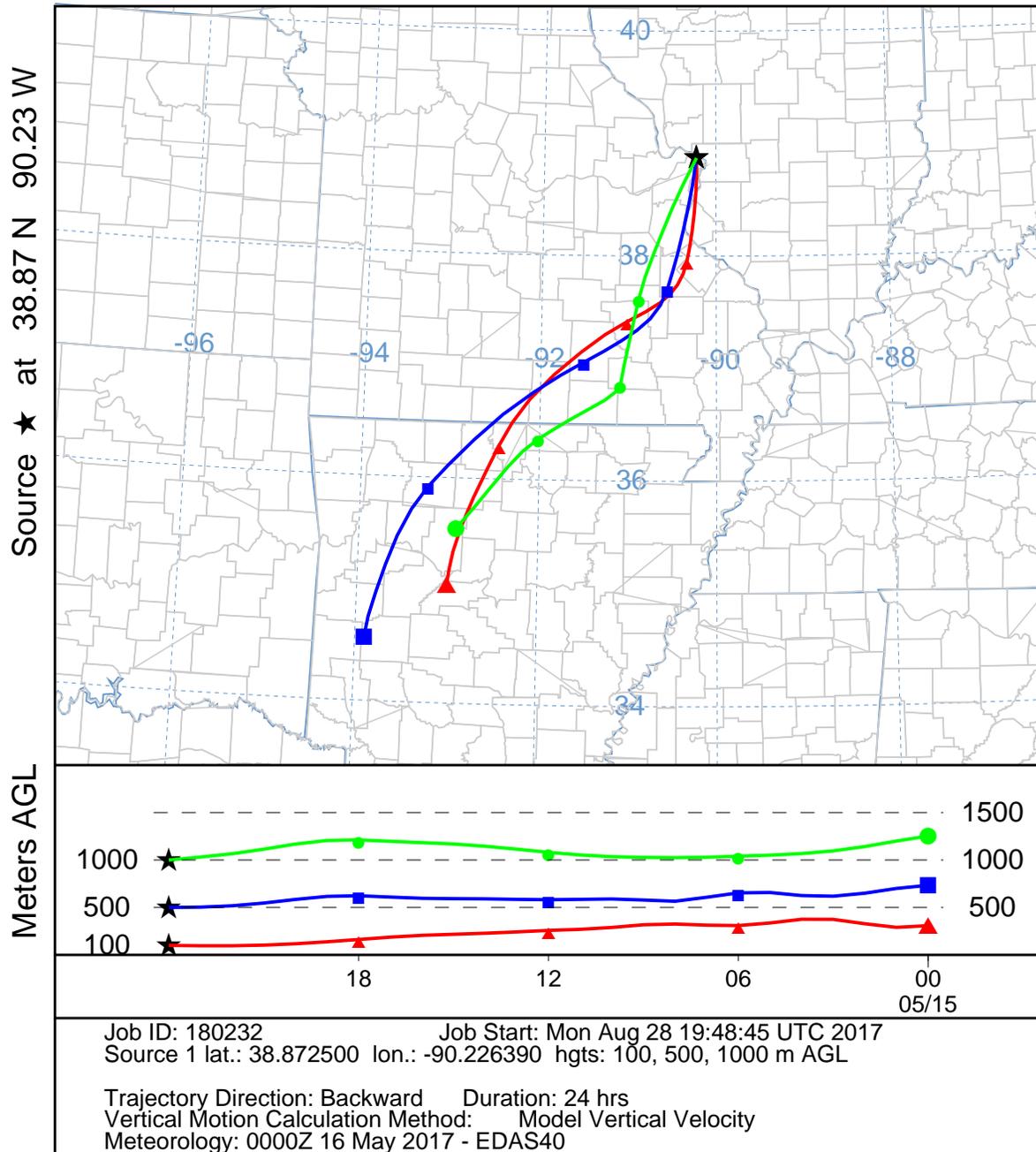
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 Backward trajectories ending at 0000 UTC 03 Jun 17
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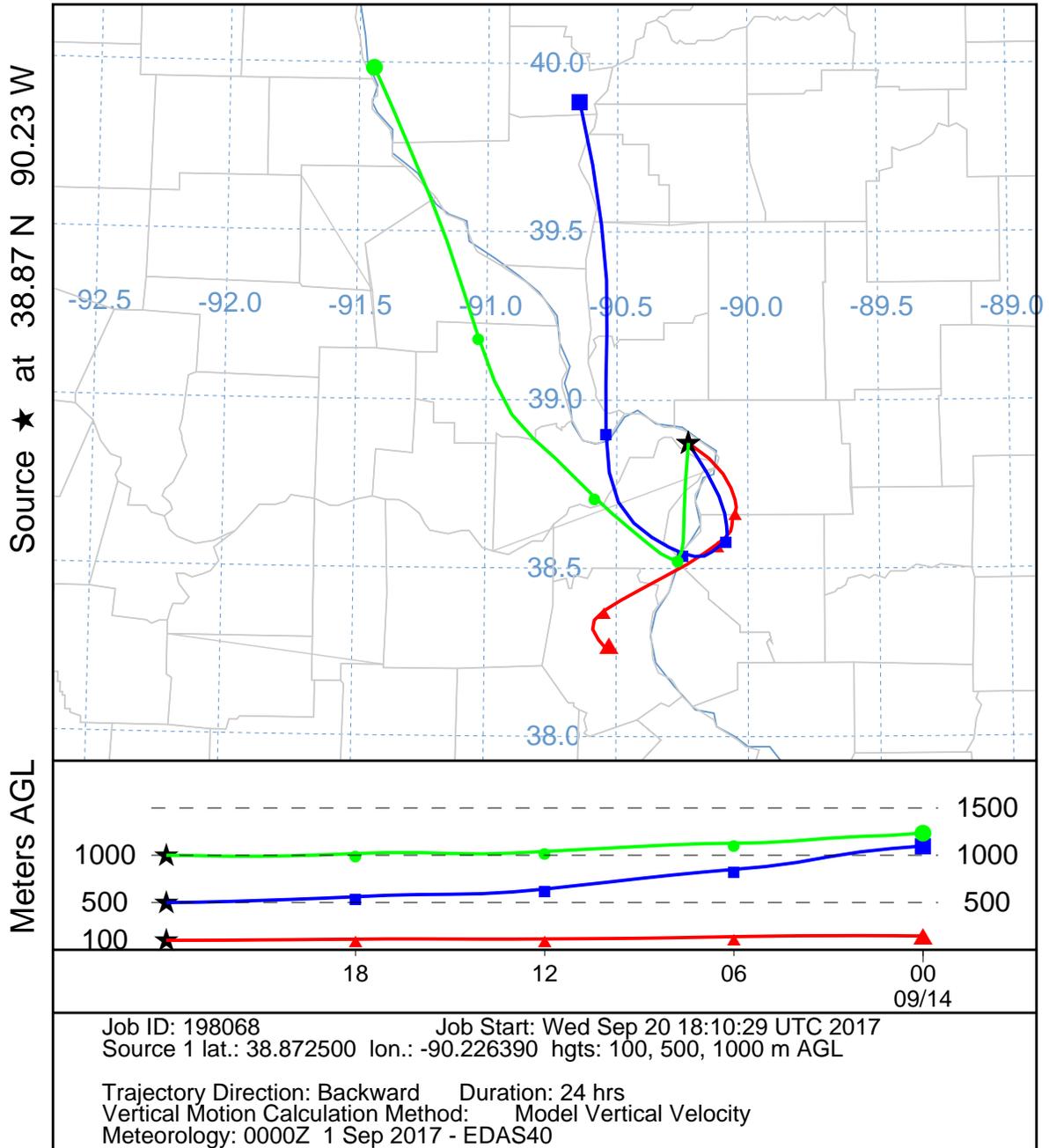
West Alton (77 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 04 Jun 17
 EDAS Meteorological Data



West Alton (72 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 16 May 17
 EDAS Meteorological Data



West Alton (73 ppb)-NOAA HYSPLIT MODEL
 Backward trajectories ending at 0000 UTC 15 Sep 17
 EDAS Meteorological Data



Morgan, Cheri

From: Missouri DNR <MODNR@public.govdelivery.com>
Sent: Monday, November 06, 2017 11:35 AM
To: Alexander, Jennifer; Payne, Stan; wendy.vit@dnr.mo.gov; Beydler, Van; Patterson, Connie; Morgan, Cheri; Nahach, Lisa; Moore, Kyra; Bybee, Darcy; Schmidt, Connie; Bungart, Renee
Subject: Courtesy Copy: Missouri Air Conservation Commission - December 7, 2017 Public Hearing

This is a courtesy copy of an email bulletin sent by Cheri Morgan.

This bulletin was sent to the following groups of people:

Subscribers of Air Public Notices (1152 recipients)



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Missouri Air Conservation Commission Will Hold Public Hearing

The Missouri Air Conservation Commission will hold a public hearing at 9 a.m., Thursday, Dec. 7, 2017 in the Bennett Spring Conference Room of the Elm Street Conference Center, 1730 East Elm St., Jefferson City, Mo. Visitors may access the conference center via the lower level of the building.

The commission will hear testimony related to the following two proposals:

1. Revised recommendation for area boundaries related to the 2015 ozone standard.

More information is available at dnr.mo.gov/env/apcp/stateplanrevisions.htm.

2. Correction to redesignation request and maintenance plan for the 2008 ozone standard.

The correction would fix an error in estimated mobile emissions in the emissions inventory and motor vehicle budgets. The commission already approved the redesignation request and maintenance plan for the 2008 standard. The public hearing will focus only on the correction. More information is available at dnr.mo.gov/env/apcp/stateplanrevisions.htm.

The public may review relevant documents at the Missouri Department of Natural Resources, Air Pollution Control Program, 1659 Elm St., Jefferson City, (573) 751-4817, and in the public notices section of the program's website: dnr.mo.gov/env/apcp/public-notices.htm. This information is available at least 30 days prior to the public hearing date.

The department will accept comments until 5 p.m. on Dec. 14, 2017. Please send written comments to Darcy Bybee, Chief of the Air Quality Planning Section, MoDNR, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176. You may email comments to the Air Quality Planning Section's State Implementation Plan email group at apcpsip@dnr.mo.gov or via the program's website noted above. The department gives equal consideration to written comments and testimony delivered during public hearings.

People with disabilities requiring special services or accommodations to attend the meeting can make arrangements by calling the program directly at (573) 751-4817 or the Division of Environmental Quality's toll-free number at (800) 361-4827. If they prefer, they may write two weeks in advance of the meeting to Missouri Department of Natural Resources, Air Conservation Commission Secretary, P.O. Box 176, Jefferson City, MO 65102. Hearing-impaired people may contact the program through Relay Missouri, (800) 735-2966.\TTY.

Visit our webpage dedicated to the Missouri Air Conservation Commission's meetings:
dnr.mo.gov/env/apcp/macc.htm



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State Plan Actions

On Public Notice | Proposed for Adoption



On Public Notice

Technical Correction to the Redesignation Request and Maintenance Plan for the St. Louis (Missouri) 2008 Ozone Standard Nonattainment Area

This technical correction addresses the St. Louis nonattainment area Redesignation Request and Maintenance Plan under the 2008 ozone standard. The plan was submitted to the U. S. Environmental Protection Agency on September 12, 2016, including a maintenance plan to demonstrate the area will continue to meet the standard in future years as outlined in emission inventory projections, contingency measures, and motor vehicle budgets. Technical corrections to the emissions inventory and motor vehicle budgets fix an error in the mobile emission estimates. The correction does not affect the maintenance of air quality in the five-county St. Louis region in the future year. Redesignation to attainment will occur when the U. S. Environmental Protection Agency gives final approval to the plan, including the technical correction.

Technical Correction to the Redesignation Request and Maintenance Plan for the 2008 Ozone Standard Nonattainment Area

Submit Comments Now

A public hearing is scheduled for this correction on December 7, 2017. Comments about this correction will be accepted through close of business on December 14, 2017.

Revision to Area Boundary Designation Recommendation for the 2015 Ozone Standard

Missouri is proposing to submit to the U.S. Environmental Protection Agency a revised boundary designation recommendation for the 2015 ozone standard. This revised recommendation replaces the recommendation submitted to the EPA on September 30, 2016. Nonattainment recommendations are for areas with monitored violations based on 2015-2017 preliminary monitoring data and areas contributing to the violation. All other areas of the state are recommended for an unclassifiable/attainment designation. The air program intends to submit this revised recommendation to EPA to consider prior to finalizing the designations for the 2015 ozone standard. This action will not be submitted for inclusion in the Missouri State Implementation Plan.

Revision to Area Boundary Designation Recommendation for the 2015 Ozone Standard

- [Appendix A](#)

Submit Comments Now

A public hearing is scheduled for plan action on December 7, 2017. Comments about this plan action will be accepted through close of business on December 14, 2017.

Proposed for Adoption

Missouri State Implementation Plan Revision – Redesignation Request & Maintenance Plan for the 2010 Sulfur Dioxide Standard

This SIP revision addresses redesignation requirements for the Jefferson County nonattainment area under the 2010 1-hour sulfur dioxide (SO₂) National Ambient Air Quality Standard (NAAQS), per the Clean Air Act. A portion of Jefferson County was designated nonattainment in August 2013. However, monitoring data for 2013-2015 show the area has attained the standard of 75 parts per billion. The SIP revision includes a maintenance plan to demonstrate Jefferson County will continue to meet the standard in future years through permanent and enforceable emissions

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Contact Information

Air Pollution Control Program

P.O. Box 176

Jefferson City, MO 65102

800-361-4827

573-751-4817

Contact Us

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[Meet the Air Pollution Control Program Director](#)

reductions. Redesignation to attainment will occur when U. S. Environmental Protection Agency gives final approval of this plan.

A public hearing was held for this plan action on August 31, 2017. Comments about this plan action were accepted through close of business on September 7, 2017.

Comments Received:

- **Ameren Missouri** 
 - **Attachment 1** 
 - **Attachment 2** 
 - **Attachment 3** 
- **Environmental Protection Agency Region VII** 
- **Holcim – Sainte Genevieve Plant** 
- **Regulatory Environmental Group for Missouri (REGFORM)** 
- **Interdisciplinary Environmental Clinic, Washington University School of Law** 
 - **August 31, 2017 public hearing presentation** 

The plan was reviewed and revised in response to comments. The revised plan and response to comments are posted below. Consideration for adoption is currently scheduled for the December 7, 2017, Missouri Air Conservation Commission meeting.

Redesignation Request & Maintenance Plan for the 2010 Sulfur Dioxide Standard Jefferson County Nonattainment Area

Summary of Comments and Responses

By Division

About Us
Division of Administrative Support-Jobs
Division of Environmental Quality
EIERA
Missouri Geological Survey
Missouri State Parks

Explore by Topic

Asbestos Information
Drinking Water
Ecycle
Education and Interpretation
Online Searchable Databases
Operator Certification
Regional Offices

Historic Preservation
Media Inquiries and News
Public Meetings and Notices
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DEPARTMENT OF NATURAL RESOURCES
STATE OF MISSOURI

MISSOURI AIR CONSERVATION COMMISSION

IN RE:

REVISION TO AREA BOUNDARY DESIGNATION RECOMMENDATION
FOR THE 2015 OZONE STANDARD

MISSOURI STATE IMPLEMENTATION PLAN REVISION - TECHNICAL
CORRECTION TO THE REDESIGNATION REQUEST AND MAINTENANCE
PLAN FOR THE ST. LOUIS (MISSOURI) 2008 OZONE STANDARD
NONATTAINMENT AREA

Public Hearing
1730 East Elm Street
Lower Level
Bennett Spring Conference Room
Jefferson City, Missouri 65101
December 7, 2017

BEFORE:

David Zimmermann, Chair, Missouri Air Conservation
Commission
Gary Pendergrass, Missouri Air Conservation Commission
Jack Jones, Missouri Air Conservation Commission
Mark S. Garnett, Missouri Air Conservation Commission
Kevin Rosenbohm, Missouri Air Conservation Commission
Kyra Moore, Director of Staff, Missouri Air Conservation
Commission

Reported by:
Julie K. Kearns, CCR 993
Alaris
3432 West Truman Boulevard, Suite 207
Jefferson City, Missouri 65109
(573) 636-7551

1 P R O C E E D I N G S

2 (Hearing started at 9:48 A.M.)

3 CHAIRMAN ZIMMERMANN: The hearing will come to
4 order. Let the record show the following Commissioners
5 are present: Mark Garnett, Gary Pendergrass, Dave
6 Zimmermann, Jack Jones and Kevin Rosenbohm.

7 The Air Conservation Commission of the State of
8 Missouri has called this public hearing pursuant to
9 Section 643.050(2) in accordance with Section 643.070,
10 Revised Statutes of Missouri, and the EPA promulgated Rule
11 40 CFR 51.102 for the purpose of hearing testimony

12 relating to: **Revisions to the Area Boundary Designation**
13 **Recommendation for the 2015 Ozone Standard**, Missouri State
14 Implementation Plan Revision - Technical Correction to the
15 Redesignation Request and Maintenance Plan for the St.
16 Louis, Missouri 2008 Ozone Standard Nonattainment Area.

17 The hearing record will close at 5 P.M. on
18 December 14, 2017. Anyone who has not been scheduled to
19 appear, but who wishes to be heard should indicate that
20 you wish to speak on the sign-in sheets available at the
21 door. Section 643.100 of the Missouri statutes provides
22 that all oral testimony be given under oath and recorded.
23 Accordingly, when you are called to testify, please
24 present yourself to the court reporter first to be sworn
25 in.

1 Finally, we notified the Kansas City, St. Louis
2 County, and Springfield local air pollution control
3 agencies, Illinois, Kansas and other surrounding states,
4 and the U.S. Environmental Protection Agency of this
5 public hearing. Chairman, this concludes my testimony.

6 CHAIRMAN ZIMMERMANN: Thank you. First Revision
7 to Area Boundary Designation Recommendation for the 2015
8 Ozone Standard. Adel.

9 (Witness sworn.)

10 MR. ALSHARAFI: Good morning, Mr. Chairman,
11 members of the Commission. My name is Adel Alsharafi. I
12 am employed as an Environmental Engineer with the Missouri
13 Department of Natural Resources' Air Pollution Control
14 Program or air program. I work at 1659 East Elm Street,
15 Jefferson City, Missouri.

16 I am here today to present testimony on the
17 proposed area designation recommendation titled Revision
18 to the Area Boundary Designation Recommendation for the
19 2015 Ozone Standard, which I will refer to as the revised
20 document. The executive summary for the revised document
21 starts on page 109 of the briefing document.

22 In today's presentation, I will briefly go
23 through the 2015 ozone National Ambient Air Quality
24 Standard or NAAQS and the five-factor analysis the air
25 program used to develop our area boundary designation

RECOMMENDATION FOR ADOPTION

PROPOSED REVISION OF AREA BOUNDARY DESIGNATION RECOMMENDATION FOR THE 2015 OZONE STANDARD

On December 7, 2017, the Missouri Air Conservation Commission held a public hearing for the document – *Proposed Revision of Area Boundary Designation Recommendation for the 2015 Ozone Standard*. A summary of comments received and the air program's corresponding responses is included on the following page(s). Revisions were made to the proposed plan as a result of comments received.

In 2015, the U.S. Environmental Protection Agency (EPA) strengthened the 8-hour ozone National Ambient Air Quality Standard (NAAQS) to 70 parts per billion. The air program submitted Missouri's original boundary designation recommendations on September 30, 2016, which relied on 2013 to 2015 monitoring data. However, two additional years of monitoring data is now available, and the air program is proposing to revise Missouri's boundary designation recommendation to include the additional monitoring data. The air program prepared the revised boundary designation recommendations following EPA's Area Designations Memorandum (February 25, 2016). Nonattainment recommendations are for areas with monitored violations based on 2015 to 2017 preliminary monitoring data and areas contributing to the violations. All other areas of the state are recommended for an unclassifiable/attainment designation.

The proposed revision to the area designation recommendations document has not been reprinted in the briefing document due to its volume. However, the summary of recommendations is included for reference. The entire revised recommendation document is available for review at the Missouri Department of Natural Resources' Air Pollution Control Program, 1659 East Elm Street, Jefferson City, Missouri, 65101, (573)751-4817. It is also available online at <http://dnr.mo.gov/env/apcp/stateplanrevisions.htm>.

The air program recommends the commission adopt the state's revised boundary recommendation. If the commission adopts this this revised recommendation, the department will submit it to the EPA for consideration during the designation process.

COMMENTS AND RESPONSES ON
MISSOURI STATE IMPLEMENTATION PLAN REVISION –
REVISION OF AREA BOUNDARY DESIGNATION RECOMMENDATION
FOR THE 2015 OZONE STANDARD

On December 7, 2017, the Missouri Air Conservation Commission held a public hearing for the – *Proposed Revision of Area Boundary Designation Recommendation for the 2015 Ozone Standard*. During the public comment period, the air program received written comments from the Environmental Protection Agency Region 7 (EPA) and the Sierra Club. The following is a summary of comments received and the Missouri Department of Natural Resources' Air Pollution Control Program's (air program) corresponding responses. The air program finalized the state's area boundary recommendation based on consideration of comments received.

COMMENT #1: EPA recognized Missouri's desire to reconsider its initial recommendations based on new monitoring data and acknowledged the air program's September 22, 2017, letter in which the air program asked EPA not to act on the initial boundary recommendation submittal. EPA stated that it will designate areas nonattainment based on monitored violations or contribution to the violations in the next round of final designations. In addition, EPA stated that states should expect final designations by the spring of 2018. If EPA modifies a state's recommendation, EPA will send a 120-day letter to give the state a chance to comment on EPA's modification.

RESPONSE: The air program appreciates EPA's feedback. No revision was made based on this comment.

The following comments were received from the Sierra Club.

COMMENT #2: Sierra Club asserted that the air program, on page 7, erroneously stated that Franklin and Jefferson counties do not have large clusters of point sources and most of their point sources are located too far from the monitor to have significant effects on it. They pointed to Figure 7 of the proposed document to show that Ameren Labadie, located in Franklin County, is the largest source of Nitrogen Oxides (NOx) emissions in the region. They also mentioned other large NOx sources such as Ameren Rush Island in Jefferson County, Ameren Sioux in St. Charles County and Ameren Meramec in St. Louis County. The commenter stated that none of these sources have control for NOx emissions such as selective catalytic reduction or selective non-catalytic reduction. Sierra Club argued that if emission sources in Jefferson County and Franklin County do not have significant impact on the violating monitor, then there would not be basis for the Cross-State Air Pollution Rule (CSAPR) in which modeling under this rule has shown that NOx sources from Texas have an impact in Illinois.

RESPONSE: CSAPR is a separate federal action that is different from and irrelevant to the boundary recommendation process. The air program analysis followed EPA's five factor analysis as described in its proposed document. The air program's revised analysis focused on emissions

and emission-related sources that are in close proximity to the violating monitor. The West Alton monitor is in a unique location surrounded by two clusters of NO_x and Volatile Organic Compound (VOC) emission sources. These emission sources reside in the City of St. Louis and the counties of St. Louis, St. Charles and Madison County, Illinois. The air program acknowledges that there are large emission sources in Franklin and Jefferson counties, but the emission sources closer to the violating monitor have the most significant contribution to the monitor. To make this distinction more clear, the air program revised and added the narrative on page 17 of the proposed document to reflect this point.

COMMENT #3: Sierra Club commented that the air program, on page 24 of the proposal, stated that the predominant wind patterns in the region are from the south. Franklin and Jefferson counties are south of the West Alton monitor, so emissions from those counties must be a primary contributor to pollution measured at that monitor.

RESPONSE: As mentioned in the previous response, emission clusters in close proximity to the violating monitor will have the most impact on the violating monitor. The predominant wind in St. Louis area is south-southeast and south based on data from the St. Louis Downtown Airport. Franklin County is southwest of the violating monitor; therefore, NO_x emission sources are not expected to reach the violating monitor when the winds come from the south. On the other hand, the air program agrees that NO_x emission sources in Jefferson County are in the path of the wind going to the violating monitor. However, the air program notes that the path between the Jefferson County sources and the violating monitor passes by other monitors such as Arnold West (68 ppb) and Blair Street (66 ppb), which are both in compliance with the standard. This fact supports the air program's conclusion that NO_x emission sources surrounding the violating monitor are contributing the most to the violation. No revision was made based on this comment.

COMMENT #4: Sierra Club stated that it is inconsistent for the air program to conduct its emission analysis based on 2014 emission data while also relying on 2015 – 2017 ambient monitoring data. Nonetheless, Franklin and Jefferson counties account for 28.3% of the NO_x emissions in the Missouri's side of St. Louis Metropolitan Statistical Area even if the 2014 emission data is used. Sources in these counties clearly make up a significant portion of NO_x emissions in the region.

RESPONSE: The air program based the analysis on 2014 National Emission Inventory (NEI) since 2017 NEI was not available. As discussed in the proposal, the air program evaluated each county individually. The data from the document shows that emissions from St. Louis County were the highest for both NO_x at 40% and VOC at 46.5%. Second largest emissions came from St. Charles County with NO_x at 19% and VOC at 17.5%. The NO_x emissions from Jefferson County and Franklin County were the third highest at 14.5% and fourth highest at 13.8%, respectively. Although the combination of emissions from Jefferson and Franklin counties were 28.3%, the individual percentages were both lower than St. Charles County. The total percentage of emissions from the City of St. Louis and the counties of St. Louis and St. Charles demonstrates that the majority, or over 60%, of the emissions surrounding the violating monitor are associated with these three areas. In fact, total emissions from Madison County (IL) were greater than emissions from either Jefferson or Franklin. Given the unique location of Alton Monitor, which is surrounded by St. Louis City, St. Louis County, St. Charles County and

Madison County (IL) and given these counties' large emissions and the close proximity of these emissions to the monitor, the air program continues to assert that the City of St. Louis and the counties of St. Louis and St. Charles should be designated as nonattainment and the other counties should be designated as unclassifiable/attainment. No revision was made based on this comment.

COMMENT #5: Sierra Club stated that Franklin and Jefferson counties projected population growths are more significant than the projected population growths of the City of St. Louis and St. Louis County. Therefore, mobile source emissions will also increase from Franklin and Jefferson counties.

RESPONSE: The mobile source emissions are discussed in Section 5.2 of the proposed document. As stated in the document, St. Charles County has the highest projected population growth of 36.89% from 2010 to 2030. In comparison, Jefferson and Franklin counties are projected to have 14.17% and 14.36% population growth, respectively, from 2010 to 2030. Although the population growth for these counties is higher than others in the area, the mobile emissions are not expected to increase as the commenter pointed out. In fact, recent future mobile source emissions projections show them decreasing area wide. This is due to several factors including fleet turnover and new mobile sources rules that will be enacted by EPA. The air program revised the proposed document to address this comment and clarify that mobile emissions in these counties are expected to decrease despite the increase in population.

COMMENT #6: Sierra Club stated that certified 2015-2017 monitoring data is required for the proposed revision to the boundary recommendation.

RESPONSE: EPA is expected to finalize the designations in the spring of 2018. By that time the 2017 monitoring data are expected to be quality assured and certified. No revision was made based on this comment.

COMMENT #7: Sierra Club requested individual years of monitoring data to see if 2017 data was better or worse than previous years.

RESPONSE: The air program revised the proposed document to include individual monitoring data for 2015, 2016 and 2017. Overall, data from 2017 shows a decrease in ozone concentrations from that of 2016 as shown in the below table. Although all of the monitors show an increase in monitored concentrations in 2016, the monitors closest to the large NOx emission sources noted by Sierra Club in Comment #2 show a decrease in monitored concentrations from 2015 to 2017. Arnold West in Jefferson County decreased from 69 ppb in 2015 to 66 ppb in 2017. Pacific in St. Louis County decreased from 65 ppb in 2015 to 62 ppb in 2017. This decrease in the monitors farther away from the violating monitor further supports the air program's revised boundary recommendation.

Monitor Name	Monitor Identifier	County Name	2015 (ppb)	2016 (ppb)	2017 (ppb)
Arnold West	29-099-0019	Jefferson	69	70	66

Blair Street	29-510-0085	St. Louis City	63	68	68
Bonne Terre	29-186-0005	Ste. Genevieve	63	67	65
Farrar	29-157-0001	Perry	67	69	67
Foley	29-113-0003	Lincoln	65	65	66
Maryland Heights	29-189-0014	St. Louis	69	73	67
Orchard Farm School	29-183-1004	St. Charles	66	76	68
Pacific	29-189-0005	St. Louis	65	67	62
West Alton	29-183-1002	St. Charles	70	75	72