

# OTC Modeling Committee Update

## OTC/MANEVU Stakeholders Meeting

April 24, 2025

### OTC Modeling Committee

Chairs, Kevin Civerolo and Eric Zalewsky, NYS DEC  
Committee Lead, Alexandra Karambelas, OTC/NESCAUM



# OZONE TRANSPORT COMMISSION

# Accomplishments

Tracked 2024 OTR O<sub>3</sub> levels and preliminary attainment status

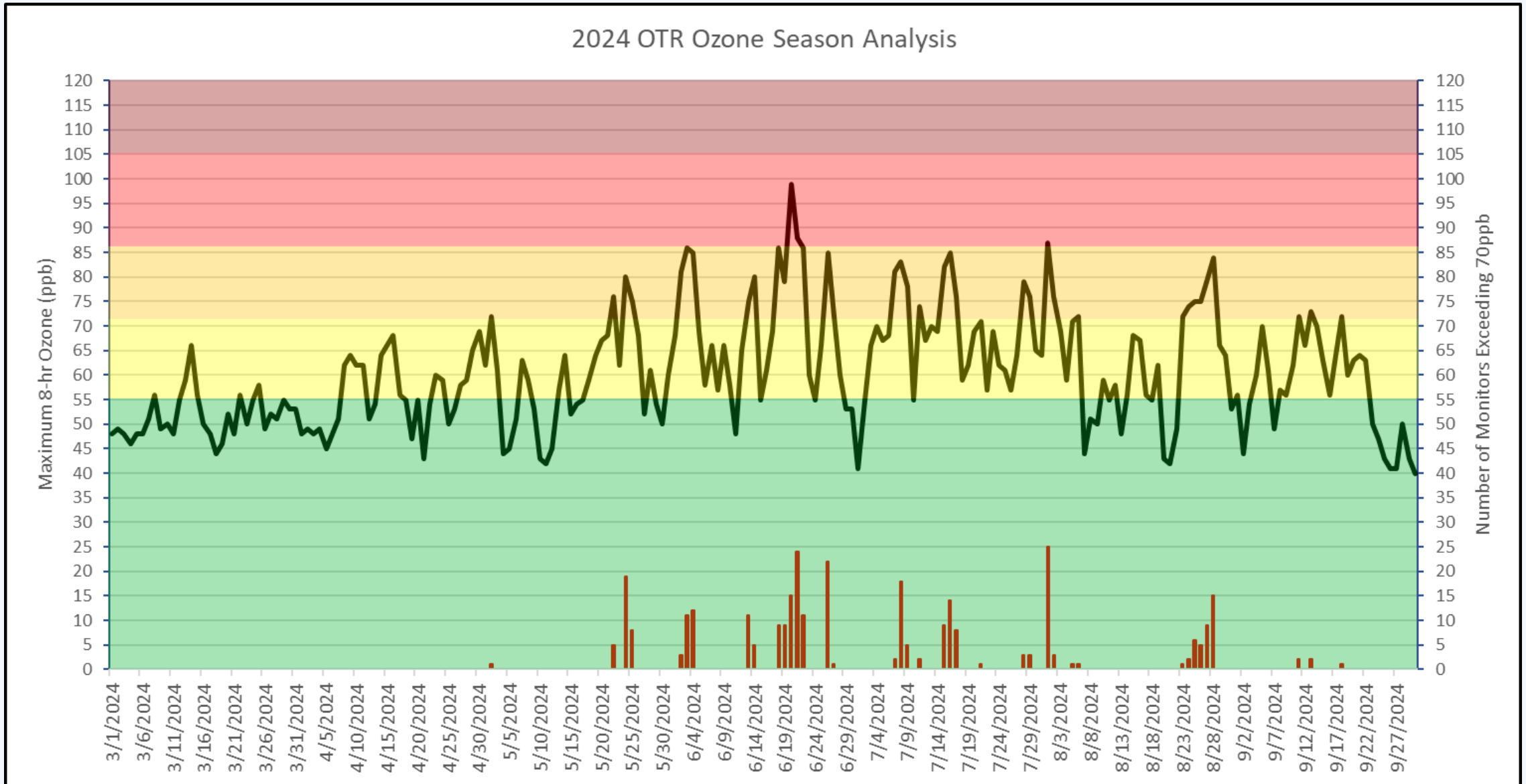
Completed expanded retrospective O<sub>3</sub> analysis (2016 platform)

- Comparison between modeled O<sub>3</sub> projections and actual monitoring observations in 2023
- Expanded analysis to include the rest of the 12OTC2 modeling domain

Boundary Condition/Dry Deposition Testing

- Tested two sets of Boundary Conditions and Dry Deposition Schemes with 2022v1
- Boundary Condition: Hemispheric CMAQ (H-CMAQ) and GEOS-Chem
- Dry Deposition: STAGE and M3Dry

# 2024 OTR Summary



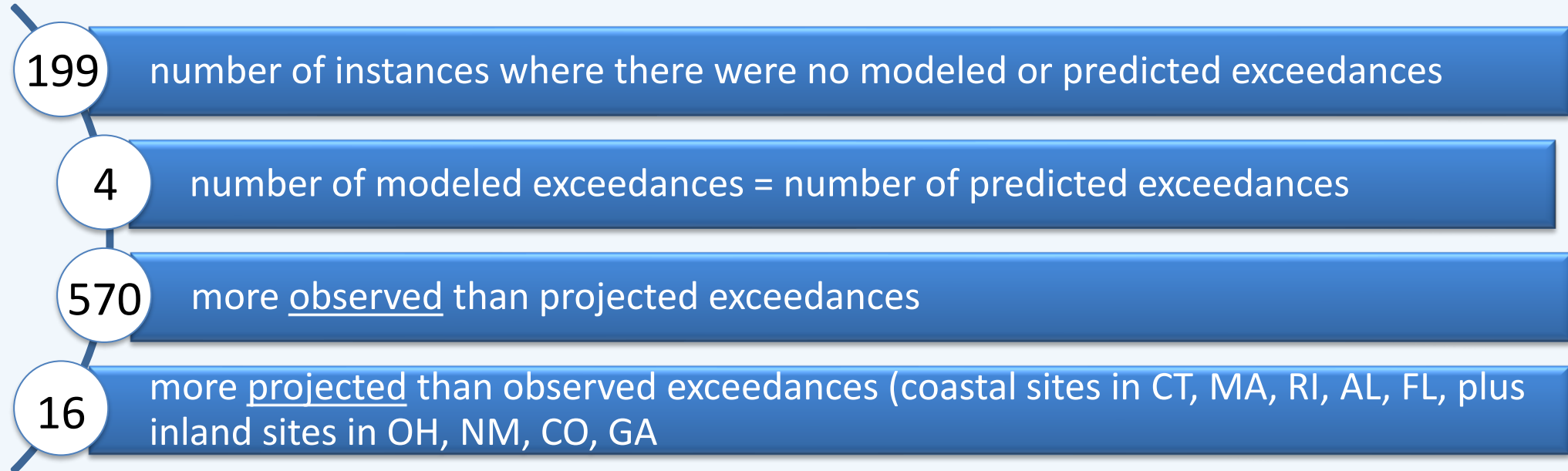
Data prepared by Marcus Chase (NH DES)

# Preliminary 2022-24 Ozone Design Values (ppb)

Monitors w/22-24 DV in Violation of 2015 NAAQS			Preliminary (ppb)				
Agency	Site	AQS Code	22-24 DV	Max	2nd High	3rd High	4th High
CT	Greenwich	90010017	79	85	81	80	79
CT	Danbury	90011123	76	87	79	78	78
CT	Stratford	90013007	80	81	81	79	78
CT	Westport	90019003	80	87	86	85	82
CT	East Hartford	90031003	72	99	76	75	74
CT	Middletown	90079007	74	96	81	75	74
CT	New Haven (Criscuolo Park)	90090027	72	88	81	78	77
CT	Madison	90099002	76	82	80	75	74
CT	Groton (Fort Griswold)	90110124	71	78	77	76	73
MD	Essex	240053001	71	81	74	72	71
MD	Edgewood	240251001	71	87	73	73	73
NJ	Lawrence (Rider University)	340210005	71	80	80	76	76
NJ	East Brunswick (Rutgers University)	340230011	71	81	81	77	72
NY	NYC (Queens College)	360810124	71	74	70	69	69
NY	East Farmingdale (Babylon)	361030002	72	80	71	70	69
NY	Old Field (Flax Pond)	361030044	72	79	72	72	70
NY	White Plains	361192004	71	83	77	76	75
PA	Bristol	420170012	73	85	82	80	76
RI	South Kingstown (East Matunuck)	440090008	71	84	73	70	68

# 2023 Observed vs Projected Ozone (2016 Platform)

- CMAQ 2023 O<sub>3</sub> projected from 2016 base year
- 789 monitors in full 12OTC2 modeling domain



- Wildfire smoke had obvious impacts on observed O<sub>3</sub> in 2023
- OTC modeling has shown that modeled O<sub>3</sub> projections are generally lower than observed O<sub>3</sub> in 2023

# Boundary Condition/Dry Deposition Testing

2022 v1 modeling platform using CMAQ v5.4.0.5

Boundary conditions developed from:

1. Hemispheric CMAQ (H-CMAQ)

2. GEOS-Chem

CMAQ air quality model configurations for deposition calculation module:

1. M3Dry: has always been in CMAQ

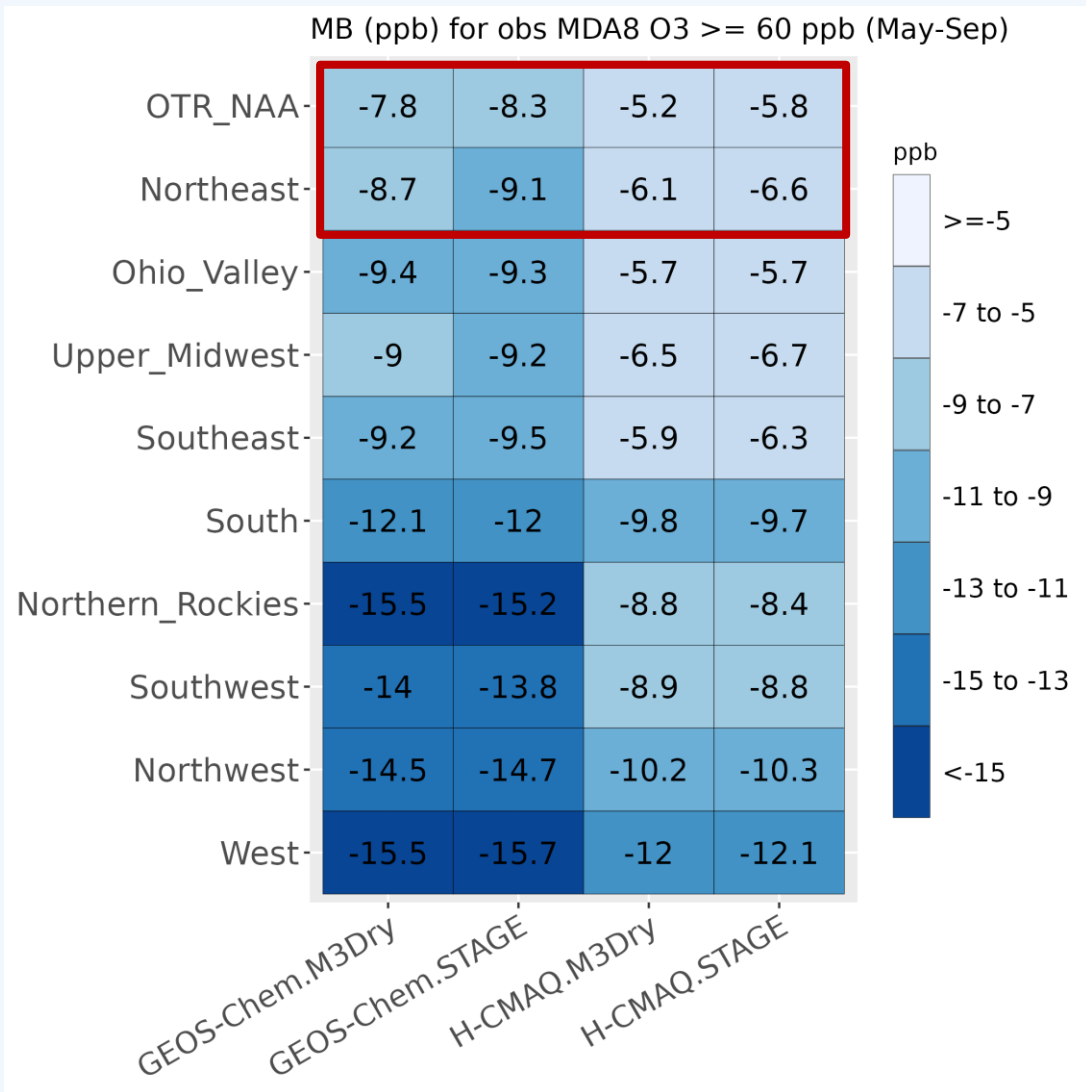
2. STAGE: new in CMAQ v5.3

Model performance evaluations for the 12US2 CONUS domain

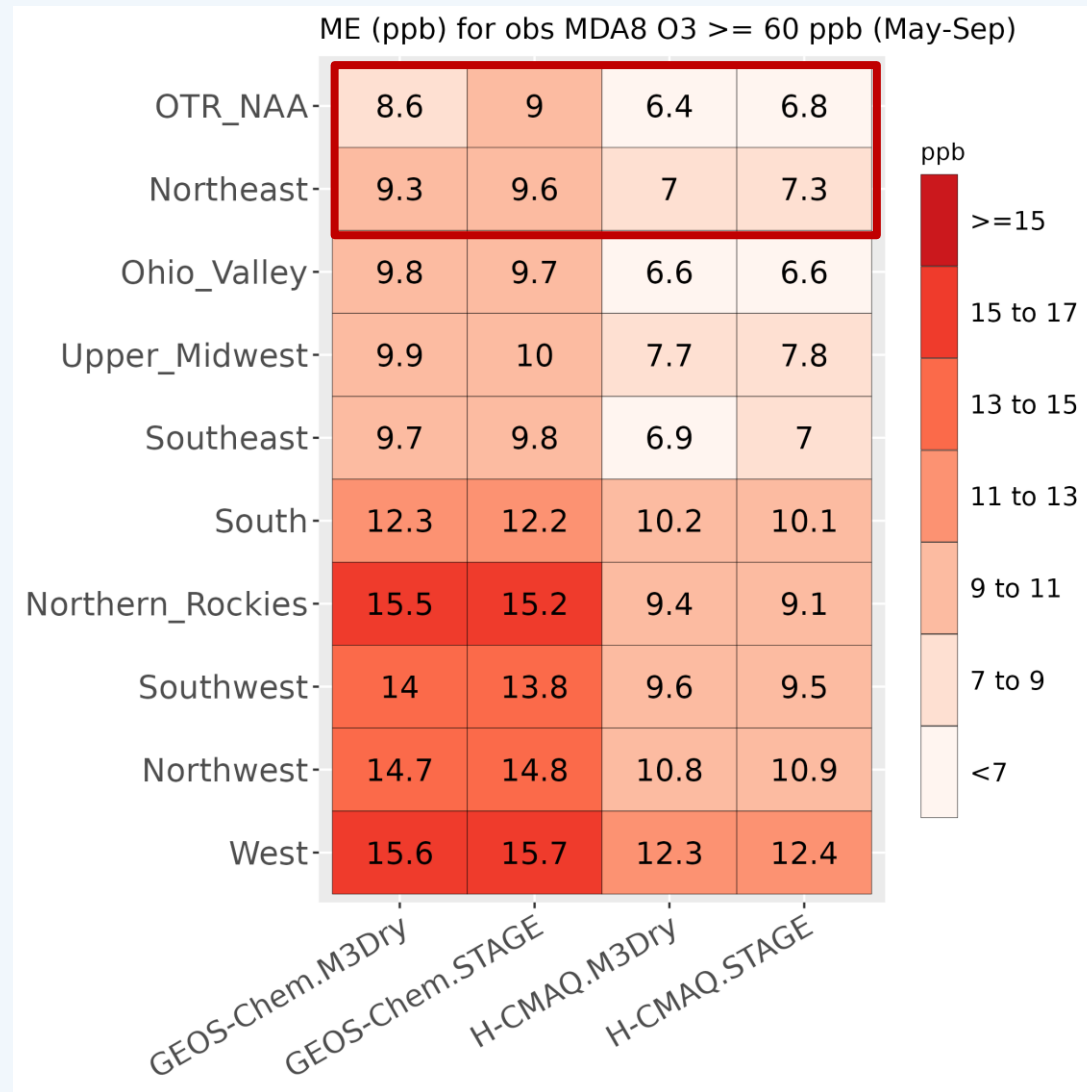


# Model Performance for O<sub>3</sub> by Region

## Mean Bias (May – Sep)

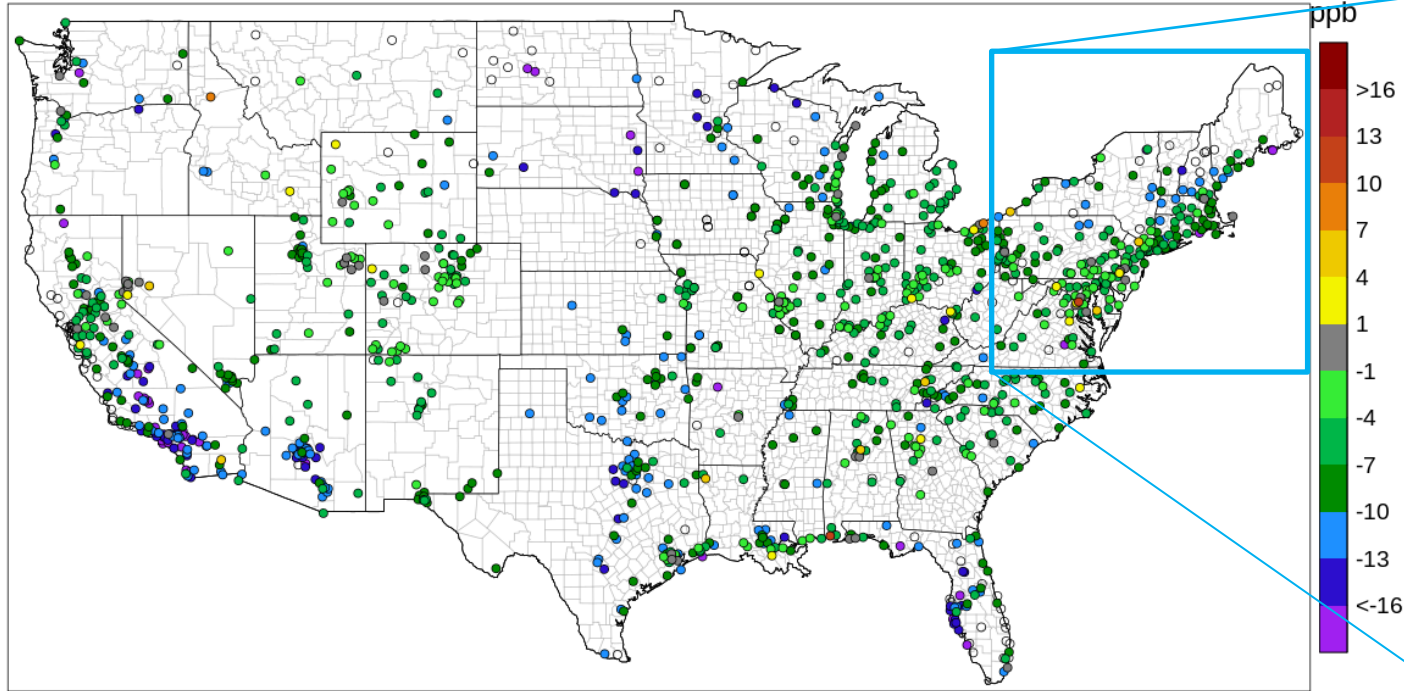


## Mean Error (May – Sep)



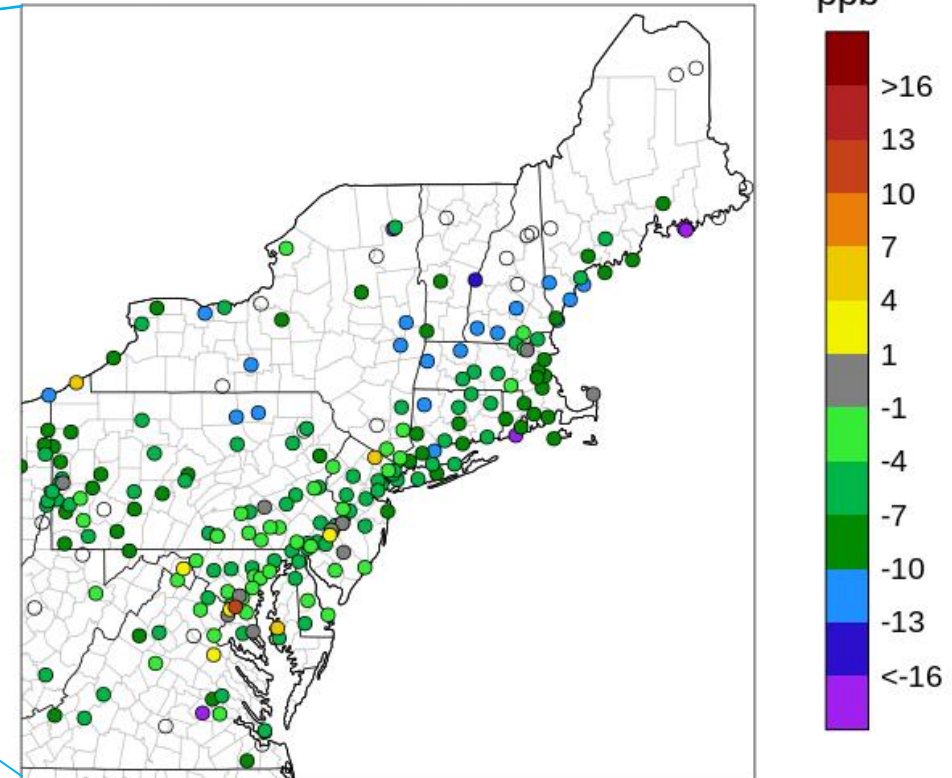
# Mean Bias (Mod. MDA8 O<sub>3</sub> – Obs.) May to Sep

MB (ppb) with 60 ppb threshold



CMAQ v54p5, 12US2, 2022hc, H-CMAQ.M3Dry, EPA, may-sep

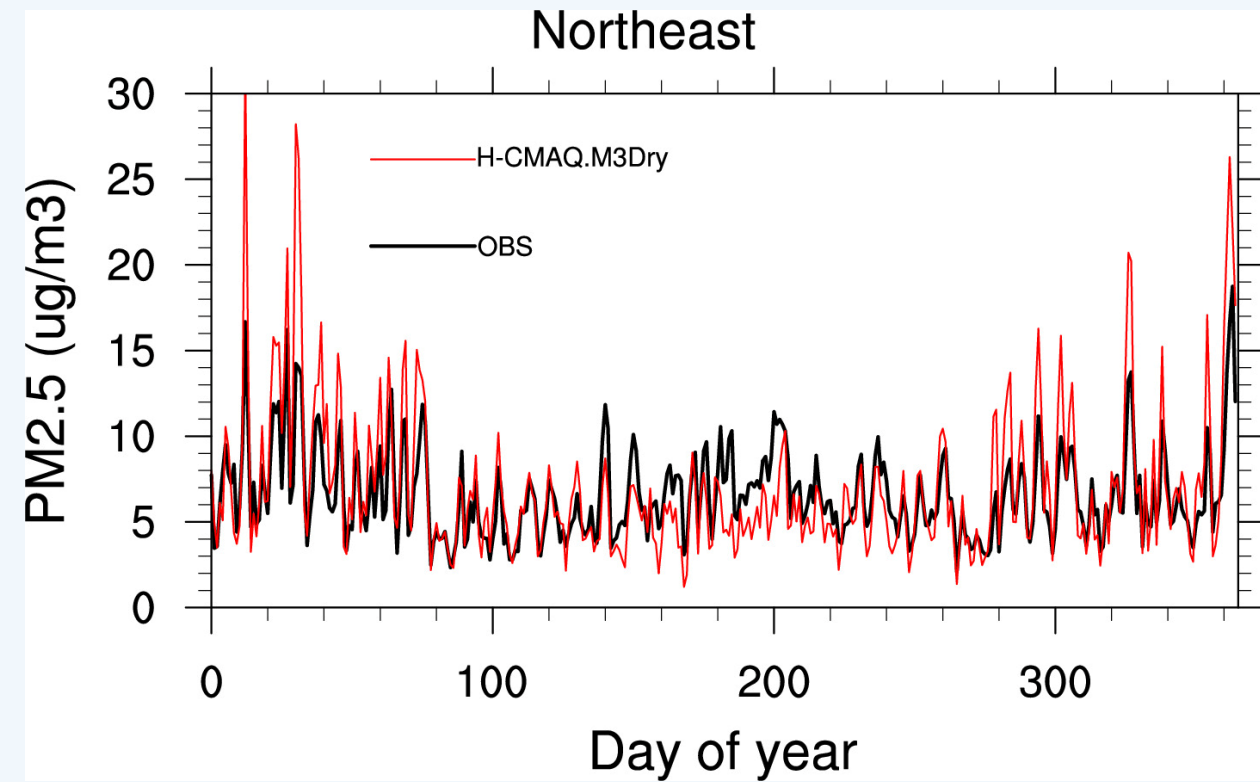
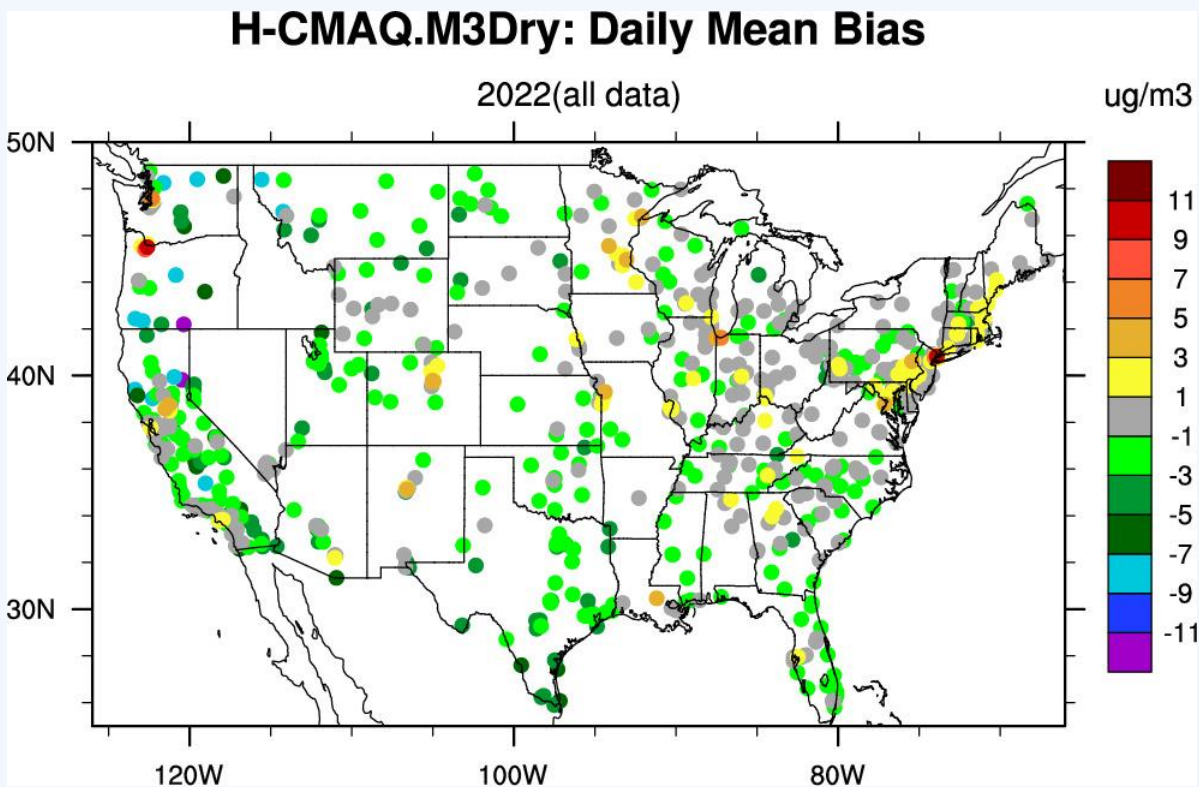
MB (ppb) with 60 ppb threshold



CMAQ v54p5, 12US2, 2022hc, H-CMAQ.M3Dry, EPA, may-sep



# Mean Bias in Annual PM<sub>2.5</sub>



# Ongoing Initiatives

Continue working with EPA, states, MJOs on 2022 modeling platform – 2022 base year and 2026 analytic year

- 2022v1, base year released September/October 2024, analytic year (2026) February 2025
- 2022v2, base year to be released this spring, analytic year later in 2025
- 2022v1 analytic year 2032 and 2038?
- Initial AQ modeling to focus on base year evaluation and 2026

Updating Modeling Committee Action Plan

Began work on Modeling Technical Support Document

# Summary

- Regional modeling with the 2022 v1 emissions platform using CMAQ with EPA's EGU emissions is currently being evaluated, new 2022 v2 platform is coming later this year
- 2022 v1 base year and 2026 analytic year modeling using CMAQ with ERTAC EGU emissions is ongoing
- H-CMAQ with M3Dry yields the best model performance for high O<sub>3</sub> days in the eastern US
  - Boundary conditions (H-CMAQ, GEOS-Chem) had a larger impact than choice of dry deposition scheme (M3Dry, STAGE) on modeled O<sub>3</sub>
- O<sub>3</sub> non-attainment is still an issue in the OTR, and cross-committee efforts to develop emissions sensitivity tests are ongoing

# Thank you!

## Model Committee Chairs

- Kevin Civerolo and Eric Zalewsky, NYSDEC  
([kevin.civerolo@dec.ny.gov](mailto:kevin.civerolo@dec.ny.gov) and [eric.zalewsky@dec.ny.gov](mailto:eric.zalewsky@dec.ny.gov))

## OTC Committee Lead

- Alexandra Karambelas, OTC/NESCAUM  
([akarambelas@nescalum.org](mailto:akarambelas@nescalum.org))

## Emissions Inventory Lead

- Susan McCusker, MARAMA ([smccusker@marama.org](mailto:smccusker@marama.org))

## O<sub>3</sub> Season Updates

- Marcus Chase, NHDES ([marcus.a.chase@des.nh.gov](mailto:marcus.a.chase@des.nh.gov))