



DEASCO3 –2008 Base08b Simulation Specifications

Scenario Name: CAMx OSAT/PSAT 2008 Base Simulation version B

DEASCO3 Code: “SA_Base08b”

Date Specifications Prepared: January 15, 2013

Time Window for Modeling/Analysis: CAMx modeling start date – January 15, 2013. .

Description: 2008 annual using 36/12 km CAMx ozone and particulate source apportionment technology (OSAT/PSAT) model simulation using actual 2008 Base B emissions from preliminary WestJumpAQMS emissions modeling results using FINN fires. (Note: Base B corrects double counting of SUIT O&G emissions in southwestern Colorado over 2008 Base A)

Purpose/Objective: Identify contributions of FINN fire emissions to modeled 8-hour ozone concentrations for actual 2008 year conditions.

Expected Analysis Methods: Prepare animations for specific fires in 2008 as was done for 2002. For the present simulation these would include:

- Source Apportionment Tracers - run ozone, NO_x, VOC, primary PM, SO₄ and NO₃ tracers, state-specific source regions in western U.S. and 3 source categories
 - Ozone Source Apportionment Technology (OSAT)
 - Particulate Source Apportionment Technology (PSAT)
- Spatial plots or animations of modeled contributions of fire emissions to 8-hour ozone concentrations, overlaid with observed daily maximum 8-hour ozone concentrations
- Other displays TBD based on discussions with DEASCO3 team and FLM “inner circle” collaborators

Input Data:

Emissions – Emission data are based on preliminary WestJumpAQMS Base08b emission inventory using FINN fires. The three OSAT emission source groups are:

- Biogenic
 - WRAP Enhanced MEGAN biogenic emissions
- Fires
 - Inventory from NCAR (FINN) fires processed for WestJumpAQMS 36/12 km domains using WRAP plume rise approach.
- Everything else

Emissions Processing Approach

- Use WestJumpAQMS preliminary Base08b emissions for 36/12 km domains.
- Merge all pre-merged emissions to generate CAMx 2-D and point source emission inputs for Base08b.
- Flag FINN fire emissions using point source override to be Source Category #2 for OSAT/PSAT.

Other Ancillary Inputs and Model Settings

- See “Summary of Key Findings” in the below section.
- Time period simulated – annual, actual year, meteorology for 2008 from WestJumpAQMS
- Domains – Run with 36 km CONUS and 12 km WESTUS domains using two-way grid nesting
- Source apportionment (OSAT/PSAT):
 - 1 Source Region
 - 3 Source Categories: (1) Biogenic+Lightning; (2) FINN Fires (WF, Rx, Ag); and (3) Remainder
 - Initial Concentration (IC) and Boundary Condition (BC)
 - 3 Source Groups with OSAT (4 Tracers), PSAT SO₄ (2 Tracers), PSAT NO₃ (7 Tracers) and PSAT Primary PM (6 Tracers) means we are adding 59 new tracer species to simulation
- Simulate 2008 annual period as four quarters
 - 10 day spin-up period for each Quarter
- Multi-Processing Strategy
 - Investigate strategies for MPI and OpenMP

Results

Relevant Output Products

- Spatial plots or animations of modeled contributions of fire emissions to 8-hour ozone concentrations, overlaid with observed daily maximum 8-hour ozone concentrations.
- Spreadsheets of observed and modeled total and modeled fire contributions for ozone, NO_x, EC, OC, SO₄, NO₃ and other PM_{2.5} at monitoring sites (AQS, IMPROVE, CASTNet and STN).
- Animation of gridded fire emissions and fire ozone contributions.
- Other TBD.

Summary of Key Findings

Source apportionment (OSAT/PSAT) simulations for 2008 are being performed with CAMx v5.40 with corrected in-line TUV. Definition of CAMx 36/12 km modeling domains and options are contained in WestJumpAQMS Modeling Protocol:

- http://www.wrapair2.org/pdf/WestJumpAQMS_Modeling_Protocol_and_SourceApportionment_Design_Draft_Final.pdf

The three Source Categories (Groups) for the DEASCO3 Base08ba simulation are given in Table 1.

Table 1. DEASCO3 2008 CAMx Base08b OSAT/PSAT emission source groups

Emissions Source Groups	Low-level Sources	Elevated Sources
1	Biogenic sources	Lightning
2	FINN fires (low-level)	FINN fires (elevated)
3	Everything else (low-level)	Everything else (elevated)

Interpretation/Recommendations

Will obtain separate contribution of fire emissions, as well as natural (biogenic+lightning) and anthropogenic emissions to ozone and PM_{2.5} throughout the CONUS and WESTUS domains. Generate animations of modeled total 8-hour ozone, modeled ozone due to fires, fire emissions and observed ozone. Additional displays will be generated as needed.