



DEASCO3 –2008 Base08c Simulation Specifications

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

DEASCO3 Code: “SA_Base08c”

Date Specifications Prepared: March 11, 2013

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

Description: 2008 annual using 36/12 km CAMx ozone and particulate source apportionment technology (OSAT/PSAT) model simulation using actual 2008 Base C emissions from preliminary WestJumpAQMS emissions modeling results using 2008 DEASCO3 fires. (Note: Base C differs from 2008 Base B by replacing the FINN fires with the DEASCO3 fires)

Purpose/Objective: Identify contributions of DEASCO3 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 2008 Base B. 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)
- 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 Base08c emission inventory using DEASCO3 fires. The three types of APCA emission source groups are:

- Biogenic
 - WRAP Enhanced MEGAN biogenic emissions
- Fires
 - 2008 DEASCO3 fires generated by Air Sciences using new plume rise algorithms. Separate contributions by WF, Rx and Ag.
- Everything else

Emissions Processing Approach

- Use WestJumpAQMS preliminary Base08c emissions for 36/12 km domains.

- Merge all pre-merged emissions to generate CAMx 2-D and point source emission inputs for Base08c.
- Flag DEASCO3 fire emissions using point source override to separately track the ozone contributions due to wildfires (WF), prescribed burns (Rx) and agricultural burning (Ag).

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):
 - 21 Source Region (see Figure 1).
 - 5 Source Categories: (1) Biogenic+Lightning; (2) DEACO3 WF fires; (3) DEASCO3 Rx Fires; (4) DEASCO3 Ag fires;; and (5) Remainder
 - Initial Concentration (IC) and Boundary Condition (BC)
 - 107 Source Groups for OSAT (4 Tracers) only [Notes: due to large number of Source Groups will need to perform PMDETAIL PSAT modeling in a separate run due to memory constraints.]
- 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 Base08c simulation are given in Table 1.

Table 1. DEASCO3 2008 CAMx Base08c OSAT/PSAT emission source groups

Emissions Source Groups	Low-level Sources	Elevated Sources
1	Biogenic sources	Lightning
2	NA	DEASCO3 Wild Fires (WF)
3	NA	DEASCO3 Prescribed Burns (Rx)
4	NA	DEASCO3 Agricultural Burning (Ag)
5	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.

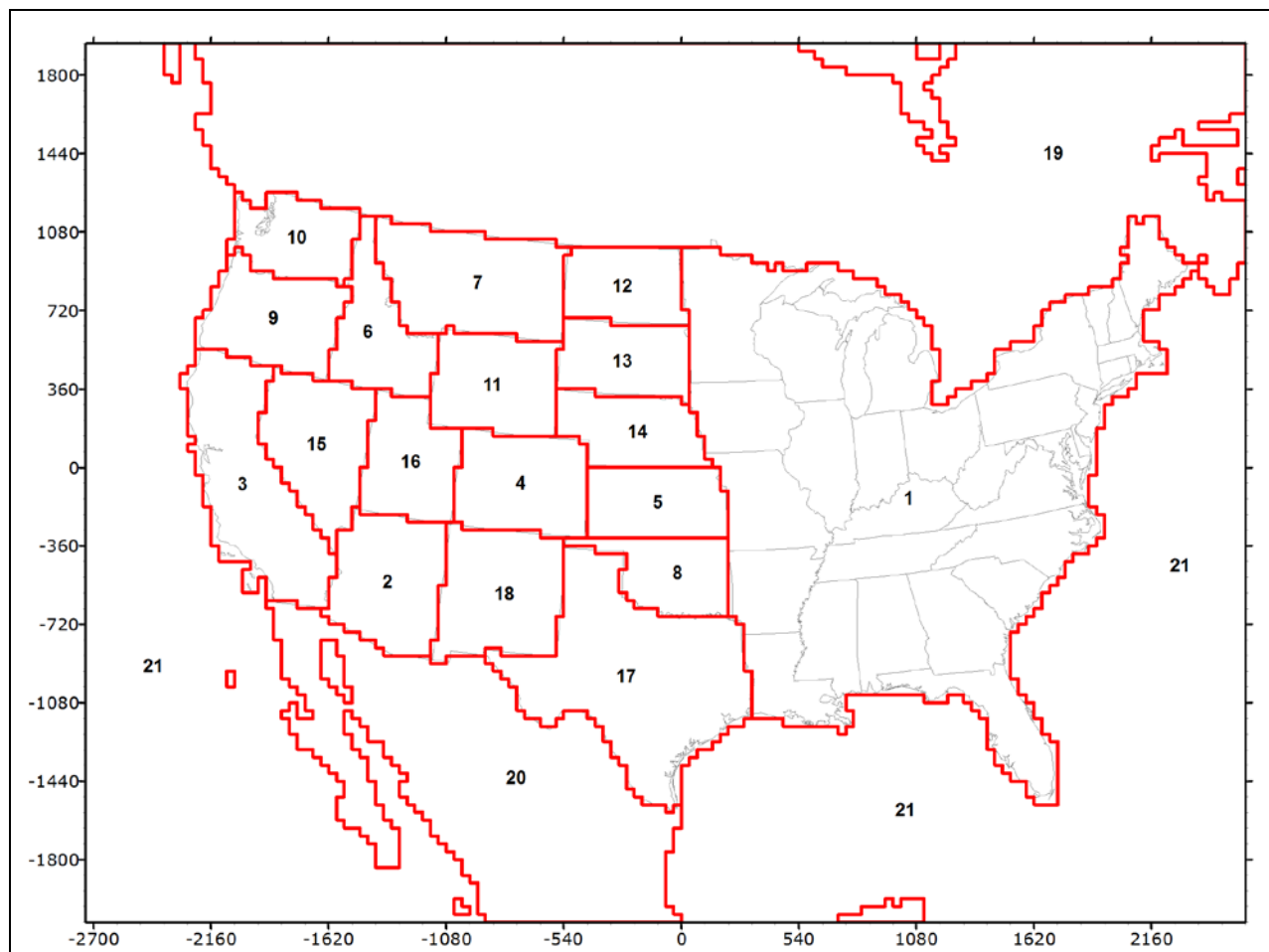


Figure 1. Source Regions to be used in the 2008 Base C DEASCO3 fires ozone source apportionment run using 2008 36/12 km domains.