



*Supplement of*

## **Observation-based constraints on modeled aerosol surface area: implications for heterogeneous chemistry**

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The default parameters for the size distribution of the emitted particles into the CMAQ model are given below. These values originate from paragraph 14 of Binkowski and Roselle 2003 but were updated in 2014 by Kathleen Fahey to reflect those in Elleman and Covert 2010 table 5. These values are located within the CMAQ source code in the “AERO\_DATA” module ([https://github.com/USEPA/CMAQ/blob/5.2.1/CCTM/src/aero/aero6/AERO\\_DATA.F](https://github.com/USEPA/CMAQ/blob/5.2.1/CCTM/src/aero/aero6/AERO_DATA.F)).

Parameter	Aiken	Accumulation	Coarse
dgvem (nm)	60	280	6000
def_diam (nm)	15.0	80.0	600.0
min_diam_g (nm)	1.0	30.0	120.0
max_diam_g (nm)	80.0	500.0	100.0
sgem	1.7	1.7	2.2
def_sigma_g	1.70	2.0	2.2
min_sigma_g	1.05	1.05	1.05
max_sigma_g	2.5001	2.5001	2.5001

Where:

- dgvem = geometric mean diameter by volume,
- def\_diam = default background mean diameter for each mode,
- min\_diam\_g = minimum geometric mean diameter for each mode,
- max\_diam\_g = maximum geometric mean diameter for each mode,
- sgem = geometric standard deviation of emitted particles in each mode,
- def\_sigma\_g = default background geometric standard deviation for each mode,
- min\_sigma\_g = minimum geometric standard deviation for each mode, &
- max\_sigma\_g = maximum geometric standard deviation for each mode.

References:

Binkowski, F. S. and Roselle, S. J.: Models-3 Community Multiscale Air Quality (CMAQ) model aerosol component 1. Model description, *J. Geophys. Res. Atmos.*, 108(6), doi:10.1029/2001jd001409, 2003.

Elleman, R. A. and Covert, D. S.: Aerosol size distribution modeling with the Community Multiscale Air Quality modeling system in the Pacific northwest: 3. Size distribution of particles emitted into a mesoscale model, *J. Geophys. Res.*, 115, D03204, doi:10.1029/2009JD012401, 2010.