Modeling multigenerational aging of organic aerosol in an air quality model

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Climate and air quality models lack or incorporate a simple and unconstrained treatment of the multi-generational aging of organic gases, a pathway that could improve organic aerosol (OA) model performance and bears heavily on OA's climate- and health-relevant properties. For the first time, we implement an explicit oxidation scheme [1] parameterized using recent experimental data in a regional air quality model to simulate the influence of multi-generational aging of OA in the summertime over Southern California. The scheme includes a resolved treatment of carbon number and structure (linear, branched, cyclic) for alkanes and a lumped treatment for aromatics and biogenics. Preliminary results indicate improvement in region-wide daily-averaged OA concentrations. A comprehensive evaluation at Pasadena, CA based on measurements made during CalNex 2010 suggests improvement in predictions of OA's diurnal profile, degree-of-oxygenation and fossil-versus-modern fraction.

[1] Cappa, C. and K. Wilson, Multi-generation gas-phase oxidation, equilibrium partitioning, and the formation and evolution of secondary organic aerosol. Atmospheric Chemistry and Physics, 2012. **12**(20): p. 9505-9528