

## 5.028 Climate forcing of different secondary organic aerosol descriptions in the Community Earth System Model (CESM).

Presenting Author:

**Simone Tilmes**, NCAR, [tilmes@ucar.edu](mailto:tilmes@ucar.edu)

Co-Authors:

**Alma Hodzic**, NCAR

**Louisa Emmons**, NCAR

Abstract:

We use the Community Earth System Model (CESM) to investigate the importance of different descriptions of particulate organic matter (OM) for climate simulations. We compare different schemes for the production of secondary organic aerosols (SOA). The simple scheme that only emits SOA gas (SOAG) based on assumptions on yields of Volatile Organic Compounds (VOC) is compared to a scheme that includes the Volatility Basis Set (VBS) to represent the aging process of VOCs during the path of formation of SOAs. This scheme parameterizes intermediates, following Hodzic et al. (2015), which includes newly available constraints from laboratory measurements (wall-corrected yields) and explicit modeling on both production and removal of organic aerosols. We also derive a medium complex VBS approach that is cheaper for climate model simulations. For the different model version, we will identify the climate forcing (direct and indirect), i.e. through aerosol- radiation interaction and aerosol-cloud interaction throughout the 20<sup>th</sup> century. The different descriptions will be evaluated with observations from recent aircraft campaigns.