Overview of the MUCHACHAS Campaign: 2Dimensional Basis Set

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The Multiple Chamber Aerosol Chemical Aging Experiments, or MUCHACHAS campaign, was a project jointly funded by EUROCHAMP and the U.S. EPA. The campaign focused on a simple hypothesis: *Oxidation by OH radicals of organic vapors associated with Secondary Organic Aerosols will significantly change the SOA loading and characteristics*. Specifically, we expect that lightly oxidized first-generation VOC products will yield secondary products with lower vapor pressures, thus increasing SOA levels, while more heavily oxidized later-generation products will tend to fragment into lighter OVOCs, thus reducing SOA levels. MUCHACHAS focused principally on the effect of OH on first-generation SOA produced from the reaction between alpha-pinene and ozone. Our objective was to exploit the complementary strengths of several chamber facilities in a unified scientific study. In this case AIDA, PSI, SAPHIR, and the Carnegie Mellon University chambers permit extensive examination of the temperature dependence, NO_x dependence, sensitivity to the photolysis spectral characteristics (fluence and intensity), and sensitivity to the presence or absence of an OH-radical scavenger during initial theSOA formation step. The key feature of the experimental design was to separate that initial SOA formation step from subsequent OH aging by turning on a continuous OH source only after the initial SOA formation was complete. The experiments are thus substantially different from "photo-oxidation" experiments with simultaneous exposure to ozone and OH radicals.

We shall describe a 2-dimensional volatility basis set with saturation concentration as the principal axis and oxygen-to-carbon as a secondary axis. Preliminary model descriptions of the aging experiments based on aging operators within this basis will be shown.