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New laboratory simulation experiments of the heterogeneous interaction of Volatile Organic Compounds with natural mineral dust

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Volatile organic compounds (VOCs) are a major source of secondary organic aerosols (SOA) and therefore play a large role in the global aerosol burden and global radiation budget. Recent work has shown that some biogenic VOCs not only undergo gas-phase oxidation to form SOA but can also partake in heterogeneous reactions with various aerosols, including mineral dust.
A series of new laboratory experiments have started utilizing the CESAM Multiphase Atmospheric Experimental Simulation Chamber) simulation chamber at LISA to investigate the effects of irreversible adsorption of biogenic and anthropogenic VOCs on the dust system's optical properties: limonene, glyoxal and methylglyoxal.
In this presentation we discuss first results of experiments conducted on limonene, a common biogenic VOC (BVOC), which has been shown to irreversibly adsorb onto dust particles with the composition of the dust itself playing a major role in adsorption rates. To explore how the optical properties of dust change, especially with regards to aging, experiments utilized soil dust from the Chinese Gobi desert and tracked the physical, chemical, and optical properties of the dust/limonene heterogeneous system throughout a few hours of photochemical aging. The results indicate that limonene adsorption and aging has a clear effect on the scattering and extinction profiles of the dust system. Decoupling the effects that VOC coating/aging and changes in the size distribution have on the aerosol optical properties will be discussed.