

Impact of NO_x on secondary organic aerosol (SOA) formation from β -pinene photooxidation

Mehrnaz Sarrafzadeh (1), Iida Pullinen (3), Monika Springer (3), Einhard Kleist (2), Ralf Tillmann (3), Thomas F. Mentel (3), Astrid Kiendler-Scharr (3), Donald R. Hastie (1), and Jürgen Wildt (2)

(1) Centre for Atmospheric Chemistry, York University, 4700 Keele St., Toronto, ON M3J 1P3, Canada

(Mehrnaz7@yorku.ca), (2) Institute of Bio- and Geosciences, IBG-2, Forschungszentrum Jülich, 52425, Jülich, Germany, (3) Institute for Energy and Climate Research, IEK-8, Forschungszentrum Jülich, 52425, Jülich, Germany

Secondary organic aerosols (SOA) generated from atmospheric oxidation of volatile organics contributes substantially to the global aerosol load. It has been shown that odd nitrogen (NO_x) has a significant influence on the formation of this SOA. In this study, we investigated SOA formation from β -pinene photooxidation in the Jülich Plant Atmosphere Chamber (JPAC) under varying NO_x conditions. At higher-NO_x levels, the SOA yield was significantly suppressed by increasing the NO_x concentration. However at lower-NO_x levels the opposite trend, an increase in SOA with increasing NO_x concentration, was observed. This increase was likely due to the increased OH concentration in the stirred flow reactor. By holding the OH concentration constant for all experiments we removed the potential effect of OH concentration on SOA mass growth. In this case increasing the NO_x concentration only decreased the SOA yield. In addition, the impact of NO_x on SOA formation was explored in the presence of ammonium sulfate seed aerosols. This suggested that SOA yield was only slightly suppressed under increasing NO_x concentrations when seed aerosol was present.