



## Quantifying the ionic reaction channels in the Secondary Organic Aerosol formation from glyoxal

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Glyoxal, a common organic gas in the atmosphere, has been identified in recent years as an important Secondary Organic Aerosol (SOA) precursor (Volkamer et al., 2007). But, unlike with other precursors, the SOA is largely produced by particle-phase reactions (Volkamer et al., 2009) and equilibria (Kampf et al. 2013) that are still not entirely characterized. Since 2009 series of smog chamber experiments have been performed within the Eurochamp program at the Paul Scherrer Institute, Switzerland, to investigate SOA formation from glyoxal. In these experiments, glyoxal was produced by the gas-phase oxidation of acetylene in the presence of seeds, the seed composition and other conditions being varied. The 2011 campaign resulted in the identification of salting processes controlling the glyoxal partitioning in the seeds (Kampf et al. 2013). This presentation will report results of the 2013 campaign focusing on the identification of the various reactions (ionic or photo-induced) contributing to the SOA mass.

In particular, the contribution of the ionic reactions, i.e. mediated by  $\text{NH}_4^+$ , were investigated by quantifying the formation of imidazoles (imidazole, imidazole-2-carboxaldehyde, 2,2'-biimidazole) from the small condensation channel of glyoxal with ammonia. For this, the SOA produced were collected on quartz filters and analyzed by Orbitrap LC/MS (Q-Exactive Thermo Fisher). The formation of other products such as organic acids was also investigated to determine potential competing reactions. Time-resolved MOUDI sampling coupled with nano-DESY/ESI-MS/MS analysis was also used to identify nitrogen- and sulphur-containing products from all the reactions. The results obtained for a range of conditions will be presented and compared with recent mechanistic information on the ionic reaction channels (Nozière et al., in preparation, 2013). The implementation of all this new information into a glyoxal-SOA model will be discussed.