Manuscript prepared for Geosci. Model Dev.
with version 2015/04/24 7.83 Copernicus papers of the LaTeX class copernicus.cls.
Date: 7 April 2017

Uncertainty in aerosol hygroscopicity resulting from semi-volatile organic compounds

Olivia Goulden[1], Matthew Crooks[1], and Paul Connolly[1]

[1]The School of Earth, Atmospheric and Environmental Science, The University of Manchester, Oxford Road, Manchester, M13 9PL

1 Dependence of κ on size distribution

In the main body of the paper, we discuss the effects of SVOCs on the hygroscopicity of non-volatile aerosol modes. Although four different chemical compositions of the particles are considered, only one size distribution is used. In this supplement, we briefly discuss the effect of using different

5   aerosol size distributions of ammonium sulphate on κ_{SVOC}. We have varied one parameter at a time while using the mean values stated in the main paper for the other two parameters.

Figure 1 shows the variation of κ_{SVOC} with number concentration. A notable dependence is observable with a trend for lower κ_{SVOC} values at higher number concentrations. The uncertainty also decreases with increasing number concentration.

10   Figure 2 shows the dependence of κ_{SVOC} on the geometric standard deviation. Lower κ_{SVOC} values are observed at low and high values of the geometric standard deviation. It is possible that the values that give the largest κ_{SVOC} values, in this case 0.5, may depend on the median diameter. This will be investigated further in future work.

The dependence of κ_{SVOC} on median diameter is shown in Figure 3. Little variation in mean

15   κ_{SVOC} can be observed although the uncertainty reduces by a factor of 2 when the median diameter is increased from 50 nm to 200 nm.
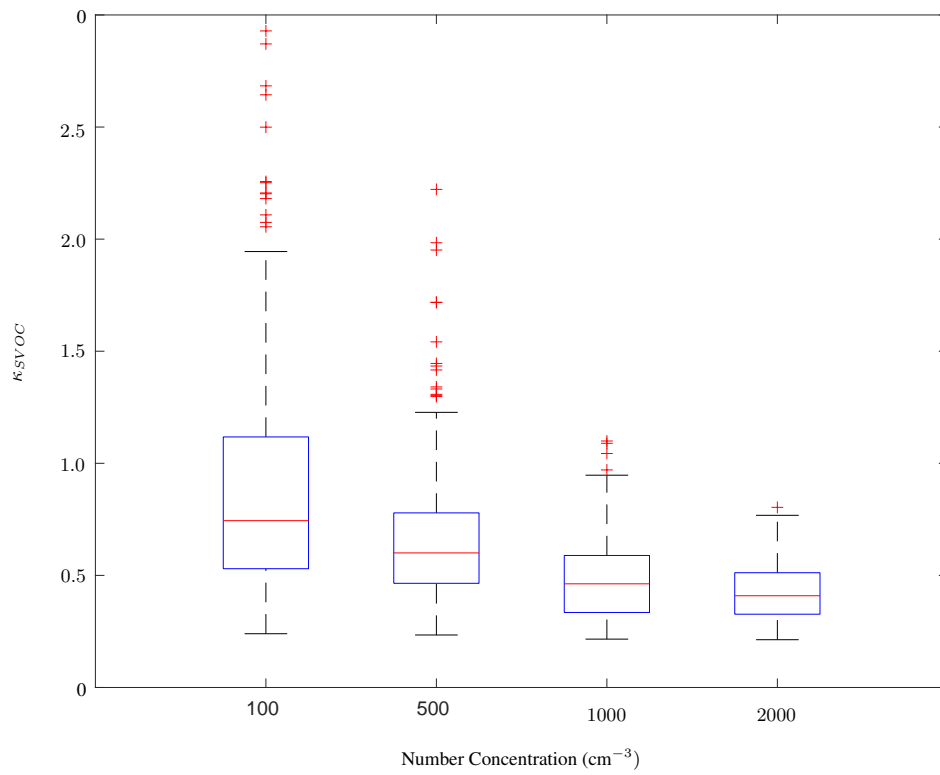
Figure 1. κ_{SVOC} values of ammonium sulphate at a range of mean number concentrations
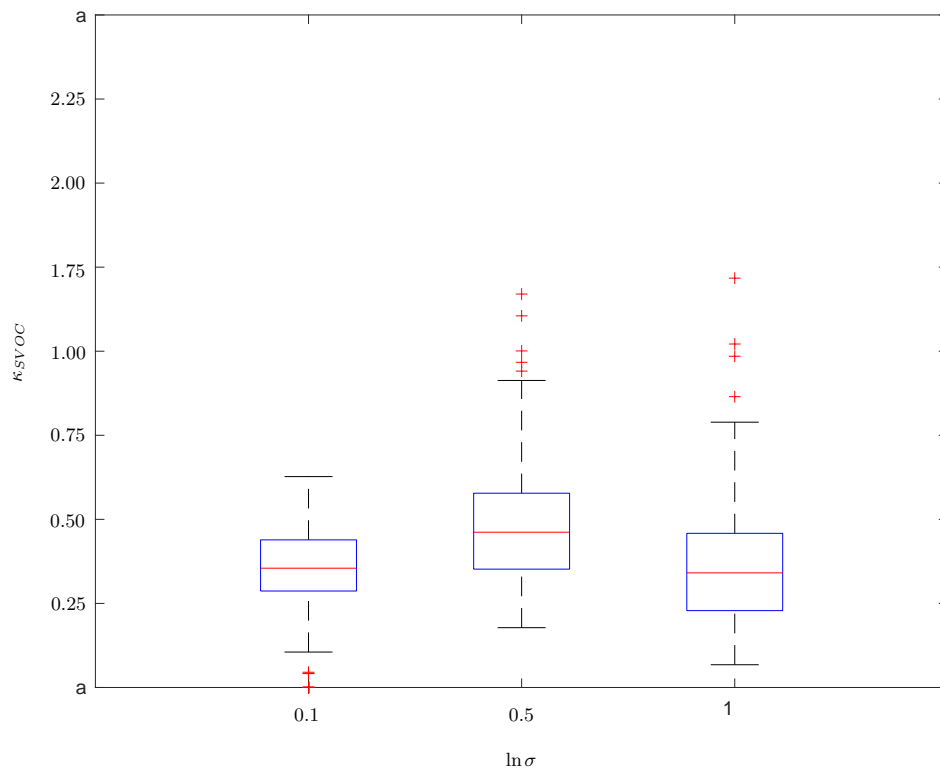
Figure 2. κ_{SVOC} values of ammonium sulphate at a range of geometric standard deviations
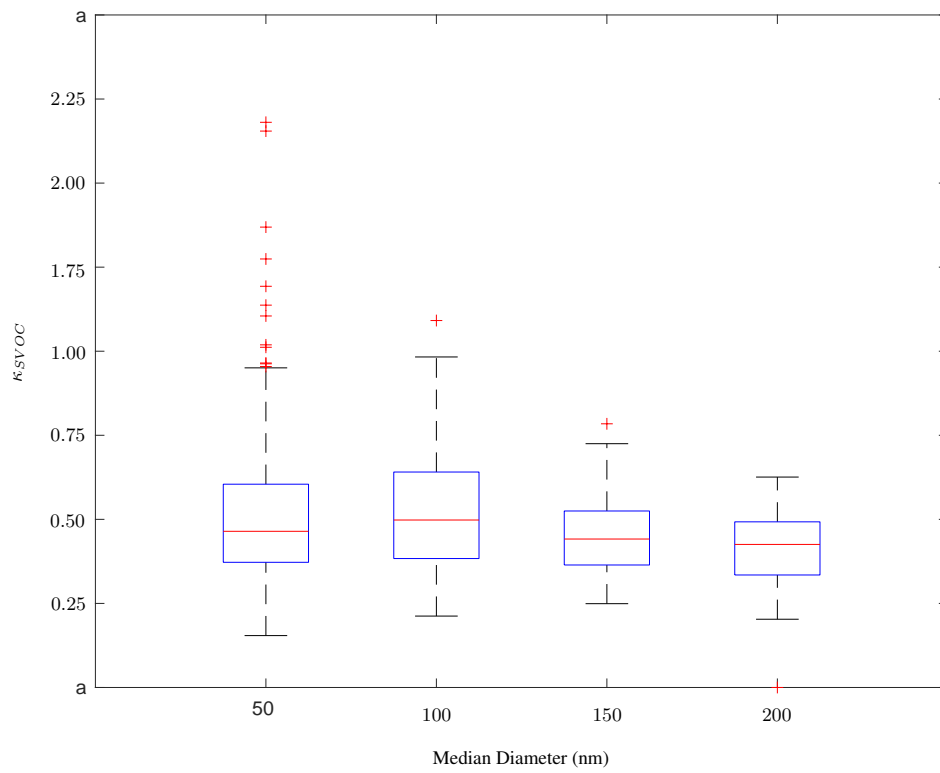
Figure 3. κ_{SVOC} values of ammonium sulphate at a range of mean median diameters