

Abstract:

Testing of SOA-models against chamber experimental data

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Modeling of atmospheric secondary organic aerosol (SOA) is an important but difficult task because of the complexity of the chemistry and physics involved in their formation and evolution. The processes with relevance to SOA are treated differently in existing modules and the literature shows that different models can give significantly different results both for what concerns global estimates of SOA formation as for what concerns simulation of local episodes. There may be several reasons for these differences, e.g. chemistry, which is treated in various degree of detail both for what concerns the representation of precursor VOC compounds their reactions and their condensable products. Also the partitioning of condensable gases between gas and condensed phase are treated differently. Further, recent studies have shown that also the formation of oligomers in the condensed phase may be an important process.

One way of testing the performance of of SOA models is to simulate experiments performed in experimental chambers and thus compare the measured data to those of the model output. The EUROCHAMP database on environmental chamber studies offers the possibility of having experimental results regarding the same chemical systems from different chamber facilities.

An exercise has been initiated within the EUROCHAMP project where experimental data on SOA formation obtained from different chambers is being carried out using several different SOA modules. The scope is to obtain a more systematical picture of the uncertainties on SOA-modeling and getting a basis for analysing the differences between the different modelling approaches. The basic idea is that not only models are different, also the chambers show differences in their design, operation and measurement facilities and thus give different opportunities for getting information that can be useful for validation of models as well as different risks of experimental artifacts. Consequently, having chamber data from different chambers regarding the same SOA-forming reactions would offer the best possibilities of an unbiased testing of models. First results of this exercise will be discussed as well as plans for the future.