

## **A Parameterisation for the Dynamic Condensation of Semi-volatile Organic Compounds**

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The properties of aerosol particles in the atmosphere have a profound effect on both weather and climate but the relationship between them is poorly understood. One process that is particularly difficult to analyse and model is the formation of secondary organic aerosol (SOA) formed through the condensation of gases in the atmosphere. This effects number concentration, material properties and the size of the particles; all of which can change the number of cloud droplets. In addition to this, the gas phase of the organic compounds that form SOA undergo chemical reactions to produce very numerous different compounds which can be computational expensive to model individually.

Attempts to model this process often rely on equilibrium absorptive partitioning theory to calculate the condensed phase of the organic compounds, however, equilibrium is a state that takes atmospherically unrealistic timescales to reach. The result is often an over prediction of condensed mass in small particles and subsequently an underestimation in large particles; both of which can significantly alter the supersaturation and consequently the number of cloud droplets. We present here a method of modelling approximately the dynamic condensation process to give more accurate condensed masses at atmospherically relevant timescales.

By exploiting the properties of a widely applied logarithmically spaced volatility basis set along with various mathematical methods we have derived a method that produces vapour phase concentrations and time evolution of the particle size distributions which agree well with solution obtained through the vastly more computationally expensive direct numerical simulation.