

The effect on cloud properties of the co-condensation of semi-volatile organics onto externally mixed aerosol

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Current models to predict aerosol-cloud interactions miscalculate the number of activated cloud droplets compared to field measurements. One possible cause of this discrepancy is the co-condensation of semi-volatile organics onto the aerosols as they rise in the atmosphere which increases their size and subsequent ability to activate into cloud droplets. Semi-volatiles, like water, can occur in both a vapour and a condensed phase and the concentration in each is determined by its volatility, with high volatility substances preferring the vapour phase.

Standard absorptive partitioning theory that models the condensation of semi-volatiles onto a single aerosol mode has been extended to the more realistic case where multiple different aerosol modes are present. This model is used to investigate the effect on the number of activated droplets of various aerosol properties including number concentration, size and chemical composition.