# International network for coordinating work on the physicochemical properties of molecules and mixtures important for atmospheric particulate matter

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Predicting the impact of atmospheric aerosols, through their evolving size and chemical composition, relies on using mechanistic models that attempt to predict the partitioning of potentially millions of chemical compounds between the gas phase and condensed phase. Uncertainties in the physicochemical properties of these pure components and condensed phase mixtures affect our ability to accurately predict and resolve this partitioning.

Recent reviews by the international community have highlighted the significant discrepancies that exist between values of the critical physicochemical properties when determined by different experimental methods. Despite this, there is no coordinated effort to reconcile these differences or to start compiling appropriate data, with appropriate screening, to improve the predictive techniques essential for improving atmospheric aerosol models. Current compilations of data for tuning predictive tools are extremely sparse and can be expanded from the pre-existing literature. On top of this, there are no recommended standards to establish accepted criteria for future measurements or an agreed set of modelling tools to determine how accurate the data has to be to predict evolving aerosol properties. Ultimately, we do not even know what level of accuracy in properties might be attainable and acceptable.

How do we move forward? The complexity of measuring/collating/evaluating data for a range of properties is now beyond the capability of a single group. Instead, a larger scale coordination of researchers is essential to ensure data are screened within a consistent framework, without bias. Driven by this, here we present evidence from an international network that has hitherto not existed, to: Coordinate and enable trans-national access to appropriate laboratory and modelling studies on the properties of individual components and mixtures, and create a standardised database of collaboratively agreed data thereby directly improving the performance of property predictive techniques and mechanistic aerosol models.