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Activation of aerosol particles with complex chemical composition as cloud condensation nuclei (CCN) in laboratory experiments, field measurements and model simulations

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Aerosol particles that serve as cloud condensation nuclei (CCN) are of central importance for the formation of clouds and precipitation and for the Earth's radiative balance and climate. The CCN activity and its relation to other properties of aerosol particles from different sources and regions are, however, not yet well characterized. Particularly little is known about the abundance and properties of CCN in tropical regions such as the Indian subcontinent. Field measurement data are sparse, and also the influence of chemical composition on the CCN activity of atmospheric aerosol particles is not yet well understood. Exemplary CCN field measurement data from tropical and extra-tropical locations in Asia and Europe will be compared. Moreover, recent laboratory experiments with mixed organic and inorganic particles will be presented, including biomass burning, primary biological, and secondary organic aerosol components (organic acids, carbohydrates, proteins). The atmospheric relevance and implications of the experimental results will be investigated by sensitivity studies of CCN activation in a cloud parcel model.

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