



Cloud Condensation Nuclei Concentrations and Efficiencies of Tropical Marine Trade Wind Aerosols

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As part of the Rain in Cumulus over the Ocean Experiment - Puerto Rico Aerosol and Cloud Study (RICO-PRACS) November 2004 - January 2005, we measured cloud condensation nuclei (CCN) properties of tropical trade wind aerosols. Two measurement sites on the island of Puerto Rico were used, one in-cloud (mountain) site and one upwind (below-cloud) site. The upwind site was at Cape San Juan, which is at the most north-eastern tip of the island. This site is ideal for measurements of marine air, since the prevailing wind direction is from the south westerly trade winds, and upstream of the island are no major sources of anthropogenic pollution. Results presented here are based on measurements at the upwind site.

We measured CCN concentrations and activation efficiencies as CCN/CN ratios (i.e., CCN divided by total particle concentration) as a function of supersaturation, with two CCN counters. The first instrument measured total CCN spectra and the second CCN spectra as a function of particle size. The size was selected by a Differential Mobility Analyser upstream of the CCN counter, and a CN counter was running in parallel to this CCN counter. The method of measuring size dependent CCN spectra gives more detailed information than measurements without size resolution. It simplifies closure studies with particle chemical composition and/or hygroscopic growth measurements, which we determined by a Quadrupole Aerosol Mass Spectrometer and a Hygroscopic Tandem Differential Mobility Analyser. By combining these size dependent CCN spectra with aerosol number size distributions, the size distributions

of CCN can be derived for a given supersaturation.

We will present the first results from the RICO-PRACS experiment, namely a comparison of CCN efficiencies and CCN size distributions and the relationship of particle chemistry and hygroscopic growth to the CCN efficiencies.