

IN and CCN Measurements on RV Polarstern and Cape Verde

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Two field campaigns, one situated on RV Polarstern (Oct. – Dec. 2015) and one on the Cape Verde islands (Jan. – Feb. 2016) measuring ice nuclei (IN) and cloud condensation nuclei (CCN) concentrations as a function of supersaturation and temperature are presented. The Polarstern cruise from Bremerhaven to Cape Town yields a cross section of IN and CCN concentrations from 54°N to 35°S and passes the Cape Verde Islands at 15°N.

Measurements were conducted using the commercial CCNC and SPIN instruments from DMT. During both campaigns, a comprehensive set of aerosol characterization data including size distribution, optical properties and chemical information were measured in parallel.

The ship based measurements provide a measure of variability in IN/CCN concentration with geographic position. As an example a clear influence on IN and CCN number concentration of the Saharan desert dust outflow between the Canary Islands and Cape Verde or the continental aerosol from Europe and South Africa was observed. The measurements on Cape Verde provide information on the temporal variability at a fixed position varying between clean marine and dust influenced conditions. Both datasets are related to auxiliary data of aerosol size distribution and chemical composition.

The datasets are used to distinguish the influence of local sources and background concentration of IN/CCN. By combining of the geographically fix measurements with the geographical cross section, typical ranges of IN and CCN concentration are derived.

The datasets will be part of the BACCHUS database thereby providing valuable input for future climate modeling activities.