The tropical atmosphere is a region of high photochemical activity due to the significant concentrations of UV, OH and rich sources of organic precursor material. In Northern Australia, there is also a marked seasonal cycle in primary aerosol emissions largely driven by biomass burning emissions in the dry season (around April-October). Aerosol in this region, particularly the fraction active as cloud condensation nuclei or CCN has potential climate significance, although the factors controlling CCN properties in tropical Australia are still poorly understood.

We report results from a series of ground-based measurements of ambient aerosol and CCN activity conducted in June 2010 at the Centre for Australian Weather and Climate Research’s Tropical Atmospheric Research Station at Gunn Point, on the NT coast. These comprised aerosol physical and chemical properties, including high-resolution size distribution for particles between 14 and 700 nanometers, size-resolved chemical composition, and CCN activity over a super-saturation range of 0.1 to 0.9 %.

Our initial analyses indicate that all samples collected during the field campaign were influenced to some degree by smoke. The number concentration of CCN was found to increase with increasing smoke levels however the relative fraction of CN able to form CCN decreases.

This work is the beginning of a long-term observational program that will inform the development of atmospheric chemistry components of the Australian Climate Community Earth System Simulator model (ACCESS) and be used to validate remote sensing products.