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Cloud condensation nuclei activity and hygroscopic growth of aerosols at Henties Bay, Namibia

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The southeastern Atlantic off the west coast of Africa hosts one of the largest stratocumulus cloud decks in the world, collocated with high atmospheric aerosol loadings from biomass burning, mineral dust, marine and shipping pollution origin. These aerosols are of increasing interest due to their potential to act as cloud condensation nuclei (CCN), thereby impacting cloud development and microphysics in the region. Our understanding of aerosol-cloud interactions in the southeastern Atlantic is severely limited. Their global representation in climate models remains one of the largest uncertainties in estimates of regional and global climate change predictions. Most notably, we are missing knowledge on the cloud nucleating properties of aerosols.
In this framework of the AEROCLO-sA (AErosols, RadiatOn and CLOuds in southern Africa) project, an unprecedented field campaign took place in August and September of 2017 at Henties Bay located along the Namibian coast. A suite of ground-based measurements that include size-resolved aerosol hygroscopicity (H-TDMA), CCN concentrations (mini-CCNC), particle chemical composition (SP2, AMS) and size distribution (SMPS, OPC) have been deployed in order to provide a uniquely clear picture of the physico-chemical properties of the aerosol that enable them to serve as CCN in the region. The presentation will focus on the dependence of CCN activity and hygroscopic growth of aerosols on their chemical composition, origin and transport pathways.