5.133 The CAPRICORN Project – investigating cloud-aerosol interactions over the Southern Ocean.

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Abstract:

The pristine atmosphere of the Southern Ocean makes it an ideal testbed for the investigation of aerosol-cloud interactions. Current state-of-the-art climate models significantly underestimate both aerosol and cloud loading in the Southern Ocean, resulting in a large bias in the shortwave radiative balance in this region representative of too much shortwave radiation being absorbed at the surface (e.g. Mason et al., 2014). Here we present initial data from the Clouds, Aerosols, Precipitation and atmospherIc Composition Over the southeRN ocean (CAPRICORN) project. This is the first of a series of projects designed to reduce this bias in models by increasing the number of measurements in this region and developing our understanding of aerosol and cloud processes, and importantly, the interactions between them.
A major experimental campaign occurred in March-April, 2016 aboard Australia's blue-water research vessel, the RV Investigator. During this campaign a comprehensive suite of instrumentation was deployed to measure: precipitation, cloud and radiation properties; aerosol characteristics, including both microphysics and composition, with additional measurements of cloud and ice nuclei; numerous trace gas measurements including volatile organic compounds, as well as in-situ vertical profiles of cloud properties and atmospheric composition achieved with regular sonde launches. Data from this campaign will be used to improve the performance of the Australian Community Climate and Earth-System Simulator (ACCESS) model in a number of cloud and dynamics

processes. Additionally, data will help to validate cloud, aerosol and precipitation measurements from satellites. Although in its initial stages of analysis, this data set is a valuable addition to a data-poor region of the earth, and its measurement breadth could lead to significant advances in a field of science with such high uncertainty.

Mason, S., et al. (2014). *Journal of Climate*, *27*(16), 6189–6203. http://doi.org/10.1175/JCLI-D-14-00139.1