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In situ cloud and aerosol measurements over Coastal Antarctica during intensive field campaigns in 2010, 2011 and 2015

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Few direct measurements have been made of Antarctic aerosol and cloud properties. As a result, a number of studies have suggested they are poorly represented within weather/climate models. This has important consequences for predictions of the mass balance of the Antarctic ice sheet and both weather patterns in the region and worldwide.

In situ measurements of cloud and aerosol properties were collected over the Antarctic Peninsula, coastal continent and Weddell Sea during intensive observation periods in 2010, 2011 and 2015. Airborne measurements were collected using British Antarctic Survey's instrumented Twin Otter research aircraft for all 3 campaigns and additional ground based measurements were made at Halley's Clean Air Sector Laboratory in 2015.

This presentation will focus on the aerosol measurements from these intensive observation periods. The aerosol in the region was found to have strong vertical gradients and to be hygroscopic in nature. The hygroscopicity parameter, κ had a mean value during the 2015 campaign of 0.69, which is consistent with other remote marine locations that are dominated by sea spray emissions. Aerosol properties will be investigated in terms of their air mass history. The relative contribution of emissions from the Antarctic Continent, sea ice and Sea/Ocean regions will be examined. The ice nucleating properties of the aerosol will also be discussed.