

GROUND BASED REMOTE SENSING OF ATMOSPHERIC COMPOSITION AT ARRIVAL HEIGHTS, ROSS ISLAND

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A variety of spectrometers are operated at Arrival Heights in Antarctica to measure trace gases in the atmosphere from the absorption features in recorded spectra, usually with sunlight as the source. These include a Dobson spectrophotometer for measuring total ozone, diffraction grating spectrometers working at ultraviolet and visible wavelengths, and a high resolution Fourier transform spectrometer working at mid-infrared wavelengths. The measurements are part of the Network for the detection of atmospheric composition change (NDACC) and the global atmospheric watch (GAW).

While the initial motivation for these measurements programmes was to monitor stratospheric trace gases such as ozone, and HCl, HNO₃, NO, OCIO and BrO which are important in ozone depletion chemistry, several of them also measure tropospheric gases, such as CO, HCN and C₂H₆. As well as providing a record of atmospheric composition, these measurements are useful in providing validation or ground-truth for a variety of satellite based trace gas measurements in polar conditions.

An overview of the measurements will be presented, contrasting them with similar measurements at a mid-latitude site in New Zealand. In some cases it is possible to extract information on the vertical distribution of gases or to separate the contributions from different altitude regions. Some case studies showing this for particular gases will be shown.