A 2-year climatology of clouds at Eureka, Canada prepared from High Spectral Resolution lidar data.

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Measurements show that Arctic is warming faster than the rest of the globe. Warming is also predicted by climate models. However, there is more disagreement between the predictions of individual models in the Arctic then at lower latitudes. Differences in cloud parametrization are the likely to be the main source of the model-to-model variations. Unfortunately, it is difficult to evaluate model predictions of Arctic cloudiness because of a lack of reliable cloud observations.

The Canadian Network for the Detection of Atmospheric Change (CANDAC) and the NOAA Study of Environmental Arctic Change (SEARCH) have installed an instrumentation suite at Eureka(80 deg N, 86 deg W) in the Nunavut territory of Northern Canada. These instruments include the University of Wisconsin Arctic High Spectral Resolution Lidar(AHSRL) and the NOAA 8.6 mm wavelength cloud radar (MCR). Both instruments have operated nearly continuously since Sept 2005.

This paper presents a record of cloud cover, cloud altitude and cloud phase derived from the lidar. It also presents comparisons between lidar, radar, and convention meteorological observations of cloudiness. It is shown that optically thin clouds are frequently observed at this site. As a result, the observed fractional cloud cover depends strongly on the optical depth threshold used to define the presence of cloud. The lidar data indicates that Eureka has fewer clouds than DOE Atmospheric Radiation Measurement (ARM) site in Barrow, Alaska and fewer clouds than were observed during the Surface Heat Budget of the Arctic Ocean(SHEBA) experiment.