Particle characterization with the combination of cloud radar and lidar data over Eureka, Nunavut.

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Large uncertainties exist in the current understanding of arctic clouds. In order to get insight into cloud macro- and microphysical properties, reliable long term datasets are required, particularly regarding cloud particle size, shape and phase, which are directly related to radiative transfer in the atmosphere.

As a combined effort by the Canadian Network for the Detection of Atmospheric Change (CANDAC) and NOAA's Study of Environmental Arctic Change (SEARCH), atmospheric data are collected almost continuously at the Zero-altitude PEARL Auxiliary Laboratory (\O PAL). Cloud and aerosol scattering properties are investigated with the combination of measurements from the CANDAC Millimeter-wave Cloud Radar (MMCR) and the University of Wisconsin's Arctic High Spectral Resolution Lidar (AHSRL). Histograms of the scattering properties, as well as their vertical distributions, are computed from a dataset spanning the 2005-2008 period. Selected cases of various wintertime particle types such as cloud droplets, precipitation and Arctic Haze aerosols are also studied in order to investigate their respective properties. The results have implications for our understanding of cloud microphysical properties and the relative occurence in the atmosphere of different particle types.