MSc Project

Supervisors: Primary Supervisor – Prof. Johan Ström, ACES

Co-supervisor – Dr Daniel Partridge, Exeter University

Title: Long term trends in cloud base height in the Arctic

Clouds are a defining feature of the climate system. Presently, clouds have an overall cooling effect on the global mean surface temperature; however, observations indicate that the anthropogenic influence on the Arctic climate to a significant extent may come from clouds, which may lead to a warming of the climate in this region.

Microphysical properties of the clouds are clearly relevant for the Arctic radiation budget as the size of the hydrometeors directly influence the optical properties of the cloud. However, the temperature (e.g. altitude) of the clouds plays also a major role in the sign of the radiative forcing.

In this study we investigate whether there is a systematic change in cloud base, or rather effect emission temperature of the cloud. We will achieve this by combining lidar measurements to determine cloud base and broad band radiative flux measurements to determine the radiative forcing of the clouds. These measurements will be used in conjunction with a simple cloud parcel model to investigate how cloud base and cloud microphysical properties interplay to affect cloud optical depth and the radiative forcing of clouds in the Arctic.