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**An overview of atmospheric measurements during recent Arctic cruises with the Swedish icebreaker Oden.**

The climate in the Arctic is changing faster than anywhere else on earth. Poorly understood feedback processes relating to Arctic clouds and aerosol–cloud interactions contribute to a poor understanding of the present changes in the Arctic climate system.

Lack of understanding of these processes is mainly due to the sparse availability of detailed observations. I will present results of two Arctic cruises with the Swedish icebreaker Oden. The most recent campaign was the *Swedish-Russian-US Arctic Ocean investigation on Climate-Cryosphere-Carbon* (SWERUS-C3) in summer/autumn of 2014. SWERUS-C3 travelled mostly on the Siberian shelf from Tromsø to Barrow and back. SWERUS-C3 carried the *Arctic Clouds in Summer Experiment* (ACSE) with a primary objective of studying Arctic clouds, their interaction with tropospheric vertical structure, response to meridional transport of air from south, and the effect on the surface energy balance. These goals were targeted by deploying remote-sensing instruments (W-band Doppler cloud radar, a 449MHz wind-profiling radar, a scanning Doppler lidar, and scanning multiwavelength microwave radiometers), eddy-covariance turbulent flux measurements, and 6-hourly radiosonde launches on Oden.

A similar instrument suite was also used in the *Arctic Summer Cloud Ocean Study* (ASCOS) in 2008. ASCOS focused on the study of the formation and life cycle of low-level Arctic clouds in the North Atlantic sector of the central Arctic ocean. During ASCOS a lack of cloud condensation nuclei was at times a controlling factor in low-level cloud formation, and hence for the impact of clouds on the surface energy budget. ASCOS provided detailed measurements of the surface energy balance from late summer melt into the initial autumn freeze-up, and documented the effects of clouds and storms on the surface energy balance during this transition. Mixed-phase clouds were observed most frequently during ASCOS. During ACSE fog and liquid-phase stratus clouds were observed more frequently during summer, whereas mixed-phase clouds were more predominant during autumn.