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# Warm-air advection and clouds over melting Arctic summer sea ice

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Over the last decade or more, the influence of anomalous advection of heat and moisture into the Arctic from the south has been discussed and argued; however, very few studies have been based on observations and the focus has mainly been on winter. In summer a very special situation is set up by the fact that the ice and snow on surface of the ice, is melting, constraining the surface temperature to near the melting point. When warm and moist air is advected in over the ice, this leads to the formation of very strong surface inversions; in these inversions the relatively high moisture often leads to formation of fog, while partial turbulent decoupling at the MIZ often leads to formation of low-level jets. This leads to a competition between several factors and the vertical structure of the PBL and hence the thermodynamic forcing of the fog and the inversion from turbulence and radiation is determined by the balance of these factors.

In this presentation we will present an analysis of these processes using observations from the Arctic Clouds in Summer Experiment (ACSE), conducted as a part of the SWERUS-C3 expedition on board the Swedish icebreaker Oden, in summer/autumn 2014 traversing across the Arctic from Tromsö, Norway, to Barrow, Alaska, in July and August, and back again in late August and September arriving back in Tromsö early October. The observations include a suite of remote sensing instruments (W-band cloud radar, 449 MHz wind profiler, scanning microwave radiometers as well as a 3D scanning lidar and several ceilometer lidars, etc.) as well as in-situ instruments (radiosoundings, weather station, IR surface temperature and broad-band incoming short- and longwave radiation, as well as eddy-covariance turbulent fluxes).