B07-O06

INVESTIGATING LEADS AND THE ATMOSPHERIC BOUNDARY LAYER NEAR SVALBARD

Guenther Heinemann *(Environmental Meteorology, University of Trier, Germany)*
Clemens Drüe
Andreas Preußer
Irina Govorina

heinemann@uni-trier.de

In March 2014, we conducted the aircraft-based experiment LEAST (**Le**ad and **A**BL **S**tudy in the **T**ranspolar System) around Svalbard. The investigations comprised studies of atmosphere/sea-ice/ocean exchange processes over the Storfjorden polynya and in the marginal ice zone north of Svalbard, detailed studies over large leads and high-resolution thermal mapping for verification of remote sensing algorithms. LEAST is mainly based on measurements with the research aircraft POLAR 5 of Alfred Wegener Institute (AWI, Bremerhaven, Germany). Besides navigational and basic meteorological instrumentation, the aircraft was equipped with radiation and surface temperature sensors, two laser altimeters, a thermal infrared scanner, a laser scanner, a dropsonde system, and video and digital cameras. In order to determine turbulent heat and momentum fluxes, POLAR 5 was instrumented with a turbulence measurement system collecting data on a nose boom with a sampling rate of 100 Hz.

Apart from one calibration flight and one IR scanner test flight, a total of six research flights have been performed, three of them were boundary layer flights. Because of an unusual warm winter in the Svalbard region (temperatures 15K above normal conditions in February 2014) a huge zone of open water extended north of Svalbard. We probed the ABL in this zone during off-ice flow with dropsondes in two cases. Due to the long fetch, the height of the internal thermal boundary layer was as high as 1000m. The ABL over the Storfjorden polynya was studied by a series of low-level legs and profile by the aircraft. The ABL flights were combined with studies of leads. The lead studies were flown in order to investigate single large leads. High-resolution infrared scans (3m) and visible scans (1m) were obtained for an area of about 15kmx15km, the boundary layer over the leads was studied by low-level aircraft legs. Air and surface temperatures were quite low (down to -40°C), and intensive atmosphere/ocean interaction was observed. Low-level flights over leads showed warm plumes extending about 2km downstream of the lead.

The data of LEAST are valuable for the verification of satellite remote sensing algorithms for the quantification of sea ice production and lead detection as well as for the validation of numerical models in simulations of the ABL.