

## Arctic boundary layer investigations by AMALi lidar and dropsondes

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The Airborne Mobile Aerosol Lidar instrument (AMALi) has been deployed on AWI's polar aircrafts during more than 10 expeditions to the Arctic. Designed as an aerosol backscatter lidar for two wavelengths and three receiving channels, remote measurements of aerosol profiles in the lower troposphere from medium height flight levels (typically 3000 m) have been the main target. Together with drop sondes for in situ air temperature, pressure, humidity and wind profiles, properties of low level clouds, aerosol layers, as well as boundary layer properties have been recorded. The overview presents findings of

- Aerosol formation processes in the Arctic boundary layer
- Sub visible cloud observations
- Subtle Arctic Haze events
- Boundary layer properties as derived from aerosol profiling and their dependence on heat and moisture input from the ice covered Arctic ocean
- Aerosol – cloud interaction
- Mixed phase clouds detection and fine scale cloud top investigations

The analysis highlights the observational possibilities of this airborne active optical remote sensing method in the polar troposphere. A wealth of additional information is achievable by combining it with different remote sensors and with simultaneous in situ measurements by drop sondes or from the second Polar aircraft flying in formation.

An outlook examines future deployment possibilities.