



## **Lidar observations of droplets and plate-like ice crystals in layered mixed phase clouds**

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The mixed phase of clouds have been investigated with the new multi-wavelengths Raman-Lidar ComCAL. We studied in detail the characteristics of a frontal and a convective cloud which were detected during a campaign in the coastal region of northern Germany in Bremerhaven (53.57°N, 8.56°E) in July 2006. Additional observations were performed during the ACLIT campaign (Aerosol and Cloud measurements by LIdar in the Tropics) at Paramaribo, Suriname (5.49°N, 55.12°W), where remnants of tropical convective cells were detected.

Mixed phase clouds are structured in layers of different types of particles which are not resolvable by any other remote sensing instrumentation: droplets, plate-like crystals and other crystal-shapes. Our main effort was given to a precise distinction of water droplets and horizontally oriented plate-like ice crystals which impose a problem for the phase-identification based on depolarization measurements. In the temperature range of the mixed phase thin, pure water layers were observed which are not detectable by radar (Quante et al., 2000 ). We show, that the freezing process takes place between 0°C and - 40°C and is strongly influenced by temperature, humidity and aerosols. The shape of ice particles is strongly temperature dependent. The obtained results indicate that plate-like ice-crystals are present not only in temperature ranges between -12°C and -16°C but also at temperatures close to -40°C.