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15 years of ground-based tropospheric ice cloud measurements with travelling Aerosol Raman Lidars

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With two mobile Aerosol Raman Lidars (MARL, ComCAL) built at AWI numerous measurement campaigns have been performed either aboard a ship (research vessel Polarstern) or at selected locations ranging from the Arctic (Ny-Alesund, 79°N) to Southern Chile (Punta Arenas, 53°S). Among the campaigns performed are ALBATROSS, INCA, PAZI, ACCENT-ACLIT, PEP, STAR, ACCENT-ACTROP and LAPBIAT. Major target of the measurements are cirrus clouds including extremely thin cirrus.
With the elastic backscatter signals at 355 nm and 532 nm ice clouds are detected in the altitude range between 2 km and 30 km. Separate channels detect the elastic backscatter with a polarization plane perpendicular with respect to the polarisation of the outgoing laser beam, allowing the determination of the particle backscatter. The depolarisation is an indicator of the particle shape and therefore allows the discrimination between large ($r > 5$ μm) ice particles which give rise to strong depolarization and small spherical particles which are considered as aerosol.
An overview will be presented over the most interesting results obtained in the last 15 years, which also contribute to NDACC, the global Network of Detection of Atmospheric Composition Change.

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