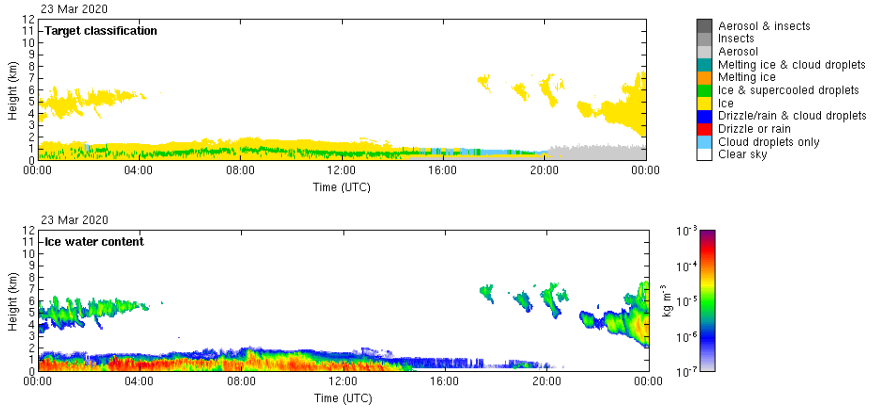
Anmeldung eines Themas für ein/e

Forschungsseminar	**X**	
Methodenseminar	**X**	
Masterarbeit	**X**	(bitte eines oder mehrere ankreuzen)

Thema Datum	Comparison of ground-based remote sensing retrievals of clouds in the Arctic 24.8.2023
Betreuer (mit Kontaktdaten)	Dr. Maximilian Maahn Institut für Meteorologie, Room 101 Stephanstr. 3, 04103 Leipzig 0341 97 32853, maximilian.maahn@uni-leipzig.de
ggf. weitere Kontaktperson	
Gutachter	JProf. Dr. Heike Kalesse-Los
Kurzbeschreibung :	One of the most interesting open questions with respect to Arctic meteorology is why mixed-phase clouds (clouds made from ice and droplets) have long lifetimes even though they constantly loose mass due to precipitation (Morrison et al., 2012). Ground-based multi instrument remote sensing retrievals are the workhorse for studying these clouds. They combine radar, lidar and microwave radiometer measurements in order to retrieve cloud phase as well as ice and liquid water contents. Two different retrieval algorithms by Illingworth et al. (2007) and Shupe et al. (2015) are frequently used, but they have not been compared so far. Based on a multi-year data set from Utqiagvik (formerly known as Barrow) in Alaska, the candidate will compare the performance of both products and investigate the impact of measurement biases. The student will learn methods for analyzing big data sets with Python, but basic Python coding skills are advantageous.  *Figure: Example retrieval of cloud phase and ice water content from Ny-Ålesund using the Illingworth et al., 2007 retrieval*

Literatur:	Morrison, H., G. de Boer, G. Feingold, J. Harrington, M. D. Shupe, and K. Sulia, 2012: Resilience of persistent Arctic mixed-phase clouds. Nature Geosci, 5, 11–17, doi:10.1038/ngeo1332. Illingworth, A. J., R. J. Hogan, E. j. O'Connor, D. Bouniol, M. E. Brooks, J. Delanoé, D. P. Donovan, J. D. Eastment, N. Gaussiat, J. W. F. Goddard, M. Haeffelin, H. K. Baltink, O. A. Krasnov, J. Pelon, J.-M. Piriou, A. Protat, H. W. J. Russchenberg, A. Seifert, A. M. Tompkins, G.-J. van Zadelhoff, F. Vinit, U. Willén, D. R. Wilson, and C. L. Wrench, 2007: Cloudnet. Bull. Amer. Meteor. Soc., 88, 883–898, doi:10.1175/BAMS-88-6-883. Shupe, M. D., D. D. Turner, A. Zwink, M. M. Thieman, E. J. Mlawer, and T. Shippert, 2015: Deriving Arctic Cloud Microphysics at Barrow, Alaska: Algorithms, Results, and Radiative Closure. Journal of Applied Meteorology & Climatology, 54, 1675–1689, doi:10.1175/JAMC-D-15-0054.1.