TITLE: Classification of cloud microphysical properties as a function of sea ice concentration conditions during MOSAiC

P. Saavedra-Garfias[1], H. Kalesse-Los[1], G. Spreen[2], V. Ludwig[2], H. Griesche[3], K. Ebell[4], A. Walbröl[4], R. Engelmann[3], M. Radenz[3], P. Seifert[3]

[1]Leipzig Institute for Meteorology, University of Leipzig, Leipzig, Germany
[2] University of Bremen, Bremen, Germany
[3] Leipzig Institute for Tropospheric Research (TROPOS), Leipzig, Germany
[4] University of Cologne, Cologne, Germany
e-mail: pablo.saavedra@uni-leipzig.de

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ABSTRACT:

As part of the $(AC)^3$ Arctic Amplification project, we are studying the influence of specific sea ice conditions like the presence of leads or polynyas on micro- and macrophysical cloud properties such as cloud fraction, altitude, thickness, thermodynamic phase, and their coupling state with respect to the underlying surface during the MOSAiC expedition's legs 1 to 3. To characterize the micro- and macrophysical properties of surface-coupled clouds in correspondence to sea ice concentration (SIC) in the vicinity of the measurement site, only situations are analyzed where wind favored the transportation of air from location where open sea ice is detected.

Cloud microphysical properties are obtained from the CloudNet classification algorithm which uses the instrumentation suite on board of RV Polarstern provided by the ARM mobile facility, the TROPOS OCEANET-Atmosphere suite and liquid water path retrievals by the University of Cologne. Primarily, the classical Matlab-based CloudNet classifications retrieved by TROPOS are used. Furthermore, the recently released ARM "evaluation" Active Remote Sensing Clouds (ARSCL) data product for the KA-band cloud radar is also evaluated by the new Python CloudNet version developed at the Finish Meteorological Institute. Discrepancies between those two CloudNet versions will be evaluated and reported as feedback for the ARM evaluation data set.

High resolution (1-km) merged AMSR2-MODIS satellite retrievals of Sea Ice Concentration by the University of Bremen are used as information for sea ice monitoring. The present contribution only exploits SIC data, however future studies will focus on MOSAiC specific products for the classification of leads.

Statistics for the cloud properties as a function of SIC will be presented as first approach to investigate the influence of sea ice conditions to Arctic clouds.

Sessions to submit:
C013 - Coupled-system Processes of the Central Arctic Atmosphere-Sea Ice-Ocean System: Harnessing Field Observations and Advancing Models