

Anmeldung eines Themas für ein/e

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

Thema Datum	Observing a cloud's clock: Cloud age classification with radar 31.8.2020
Betreuer (mit Kontaktdaten)	Dr. Maximilian Maahn Institut für Meteorologie, Room 7 Stephanstr. 3, 04103 Leipzig Tel. 0341 97 32853 maximilian.maahn@uni-leipzig.de
ggf. weitere Kontaktperson	
Gutachter	Prof. Dr. Johannes Quaas johannes.quaas@uni-leipzig.de
Kurzbeschreibung:	Cumulus clouds have a life cycle consisting a growth phase, a stable mature phase and a dissipation phase. Being able to observe the current developmental phase is important for identifying the dominant cloud processes and for understanding the cloud's interaction with the environment. A couple of studies looked into developing methods for observing cloud clocks (see below), but they either were based on model simulations or used tropical data sets. In this study, the candidate will test and evaluate the proposed methods based on cloud observations obtained at a mid-latitude site (e.g. from TROPOS LACROS). Basic coding skills are required when the candidate will learn methods for analyzing big data sets with Python.

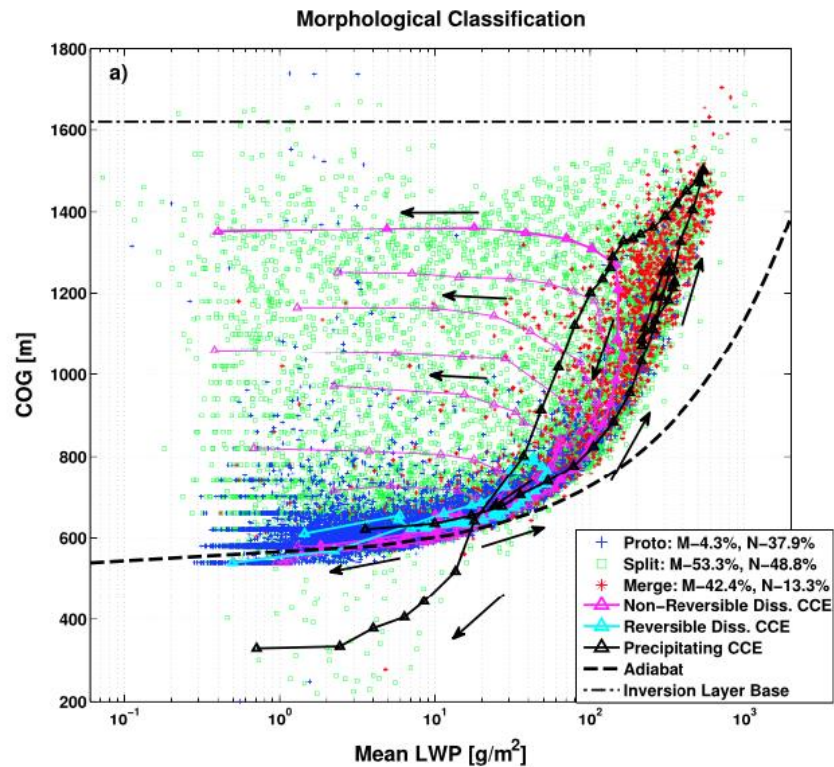


Figure: Approach developed by Heiblum et al. (2016). They showed that shallow marine cumulus clouds follow a distinct path (arrows) when plotting height integrated liquid water path (LWP) vs. the cloud center of gravity (COG). Note how dissipating (pink) and precipitating (black) clouds follow different paths.

Please get in touch with me if you have further questions!

Literatur:

- Cecchini, M. A., M. A. F. S. Dias, L. A. T. Machado, C. A. M. Rodriguez, and T. Biscaro, 2020: Macrophysical and Microphysical Characteristics of Convective Rain Cells Observed During SOS-CHUVA. *J. Geophys. Res. Atmos.*, 125, e2019JD031187, doi:[10.1029/2019JD031187](https://doi.org/10.1029/2019JD031187).
- Heiblum, R. H., O. Altaratz, I. Koren, G. Feingold, A. B. Kostinski, A. P. Khain, M. Ovchinnikov, E. Fredj, G. Dagan, L. Pinto, R. Yaish, and Q. Chen, 2016: Characterization of cumulus cloud fields using trajectories in the center of gravity versus water mass phase space: 1. Cloud tracking and phase space description. *J. Geophys. Res. Atmos.*, 121, 2015JD024186, doi:[10.1002/2015JD024186](https://doi.org/10.1002/2015JD024186).
- Witte, M. K., P. Y. Chuang, and G. Feingold, 2014: On clocks and clouds. *Atmos. Chem. Phys.*, 14, 6729–6738, doi:[10.5194/acp-14-6729-2014](https://doi.org/10.5194/acp-14-6729-2014).