

## Announcement of a topic for:

**Seminar Research**    
**Seminar Methods**    
**Master Theses**  (please mark one or more)

Topic	Trade-wind cumulus in a warming climate
Release Date	15 July 2024
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Description:	<p>Shallow trade-wind cumulus clouds occur over the warm subtropical Atlantic and the Caribbean under large-scale subsidence. They are affected by processes on different scales that govern their abundance and size. Their average cloud cover varies between 5% and 30% (Mieslinger et al., 2019) and their cooling radiative effect is estimated as <math>-4.6 \text{ Wm}^{-2}</math> (Hirsch et al., 2015). Shallow trade-wind cumulus cloud cover and the resulting radiative effect in a warming climate is mostly unquantified and forms the focus of this work.</p> <p>The CLAAS-2 (Benas et al., 2017) data set will be used to characterize trade-wind cumulus clouds over the subtropical ocean (Seelig et al., 2021). The data set starts in 2004 so that cloud properties can be studied on a climate-relevant time scale. The interpretation of cloud observations will be supported by the use of ERA5 reanalysis data.</p>
Literature:	<p>Benas, N., Finkensieper, S., Stengel, M., van Zadelhoff, G.-J., Hanschmann, T., Hollmann, R., and Meirink, J. F.: The MSG-SEVIRI-based cloud property data record CLAAS-2, Earth Syst. Sci. Data, 9, <a href="https://doi.org/10.5194/essd-9-415-2017">https://doi.org/10.5194/essd-9-415-2017</a>, 2017.</p> <p>Hirsch, E., Koren, I., Altaratz, O., and Agassi, E.: On the properties and radiative effects of small convective clouds during the eastern Mediterranean summer, Environ. Res. Lett., 10, <a href="https://doi.org/10.1088/1748-9326/10/4/044006">https://doi.org/10.1088/1748-9326/10/4/044006</a>, 2015.</p> <p>Mieslinger, T., Horváth, Á., Buehler, S. A., and Sakradzija, M.: The dependence of shallow cumulus macrophysical properties on large-scale meteorology as observed in ASTER imagery, J. Geophys. Res., 124, <a href="https://doi.org/10.1029/2019JD030768">https://doi.org/10.1029/2019JD030768</a>, 2019.</p> <p>Seelig, T., Deneke, H., Quaas, J., and Tesche, M.: Life cycle of shallow marine cumulus clouds from geostationary satellite observations, J. Geophys. Res., 126, <a href="https://doi.org/10.1029/2021JD035577">https://doi.org/10.1029/2021JD035577</a>, 2021.</p>