

## Announcement of a topic for:

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

Topic	Application of an optimal estimation method for the determination of temperature profiles during rain with the microwave radiometer HATPRO.
Release Date	30.08.2023
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Description:	<p>Microwave radiometers such as the HATPRO at LIM (LIMHAT) can be used to create temperature profiles. However, so far this only works when it is not raining. In this work, the so-called optimal estimation method will be used to derive the temperature profile during precipitation. For this purpose, only channels that pass the spectral consistency check and are therefore not disturbed by rain shall be used. In case of a disturbance also only off-zenith elevation angles should be used. As a radiative transfer model in the optimal estimation PAMTRA shall be used. Thus, it is possible to obtain consistent temperature profiles, especially during rain. The results will then be interpreted using an information content analysis.</p>
Literature:	<p>Maahn, M., Turner, D. D., Löhnert, U., Posselt, D. J., Ebell, K., Mace, G. G., and Comstock, J. M.: Optimal Estimation Retrievals and Their Uncertainties: What Every Atmospheric Scientist Should Know, Bull. Amer. Meteor. Soc., <a href="https://doi.org/10.1175/BAMS-D-19-0027.1">https://doi.org/10.1175/BAMS-D-19-0027.1</a>, 2020</p> <p>Mech, M., Maahn, M., Kneifel, S., Ori, D., Orlandi, E., Kollias, P., Schemann, V., and Crewell, S.: PAMTRA 1.0: The Passive and Active Microwave Radiative TRANSfer Tool for Simulating Radiometer and Radar Measurements of the Cloudy Atmosphere, Geosci. Model Dev., 13, 4229–4251, <a href="https://doi.org/10.5194/gmd-13-4229-2020">https://doi.org/10.5194/gmd-13-4229-2020</a>, 2020.</p> <p>Rose, T., Crewell, S., Löhnert, U., and Simmer, C.: A Network Suitable Microwave Radiometer for Operational Monitoring of the Cloudy Atmosphere, Atmos. Res., 75, 183–200, <a href="https://doi.org/10.1016/j.atmosres.2004.12.005">https://doi.org/10.1016/j.atmosres.2004.12.005</a>, 2005.</p>