

Announcement of a topic for:

Seminar Research	x
Seminar Methods	x
Master Theses	x

Topic	Dusty Cirrus: Evaluating the new parameterization of the ‘dominant aerosol–cloud–radiation effect of mineral dust over Europe’ with lidar and radar
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Description:	<p>Saharan dust has direct and indirect effects on the radiation budget of the Earth’s surface. Recently, a study of Axel Seifert identified dust effects on the formation of large-scale cirrus cloud covers as the dominant aerosol–cloud–radiation effect of mineral dust over Europe [1]. Only by means of a novel parameterization, which considers the role of dust as ice nucleating particles, ICON simulations conducted by [1] were able to reproduce observed cirrus cloud fields in the presence of high amounts of Saharan dust.</p> <p>Within this Research Seminar and associated Master’s Thesis, the student will familiarize with the phenomenon of dusty cirrus and the novel parameterization, which was developed for the ICON model of DWD[1]. The main practical part will be related to an evaluation of the existing dusty cirrus simulations from [1] based on ground-based radar and lidar observations. Such observations are available at TROPOS for different European sites, such as Leipzig and Cyprus.</p> <p>In collaboration with Axel Seifert from DWD, the remote-sensing observations will be used to interpret and evaluate the dusty cirrus parameterization.</p>
Literature:	<p>[1] Seifert, A., et al.: Aerosol–cloud–radiation interaction during Saharan dust episodes: the dusty cirrus puzzle, Atmos. Chem. Phys., 23, 6409–6430, https://doi.org/10.5194/acp-23-6409-2023 , 2023.</p> <p>[2] Seifert, P., et al., Saharan dust and heterogeneous ice formation: Eleven years of cloud observations at a central European EARLINET site, J. Geophys. Res., 115, D20201, https://doi.org/10.1029/2009JD013222, 2010.</p> <p>[3] Weger, M., et al: The impact of mineral dust on cloud formation during the Saharan dust event in April 2014 over Europe, Atmos. Chem. Phys., 18, 17545–17572, https://doi.org/10.5194/acp-18-17545-2018, 2018.</p> <p>[4] Griesche, H. 2016. Evaluation of the effect of mineral dust aerosol on the forecast skill of numerical weather prediction models based on remote sensing observations, Universität Leipzig, (M.Sc.) (PDF)</p>