Announcement of a topic for:

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

Topic	Is the Arctic Amplification making extreme Central Asian dust events more likely?
Release Date	2024/07/19
Supervisor (contact)	Prof. Dr. Ina Tegen Leibniz-Institut für Troposphärenforschung (TROPOS) ina.tegen@tropos.de
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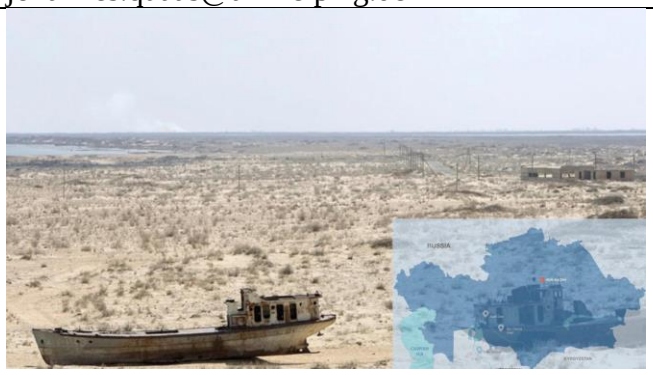
Second Reviewer	Prof. Dr. Johannes Quaas Institut für Meteorologie Universität Leipzig johannes.quaas@uni-leipzig.de
Description:	 Atmospheric dust significantly impacts the climate, and its emission from dryland areas is closely linked to global climate dynamics. Central Asia has recently experienced extreme dust storms, including events from the former Aral Sea's dried seabed. These events result from various interacting factors: anthropogenic activities increasing wind erosion, severe winter droughts over High Mountain Asia, and westerly jet stream anomalies driven by tropical and Arctic conditions. With the Arctic warming, westerly wind currents could become even more frequent in Central Asian winters. In this master's project, the links between Arctic dynamics and Central Asian dust events will be analysed and put into a long-term context. A 20-yr set of simulations of the aerosol-climate model ECHAM-HAM is available for analyses, but own model runs can also be conducted.
Literature:	Banks, J. R., Heinold, B., and Schepanski, K.: Impacts of the desiccation of the Aral Sea on the Central Asian dust life-cycle. *Journal of Geophysical Research: Atmospheres*, 127, e2022JD036618, 2022. Böö, S., Ekman, A. M. L., Svensson, G., and Devasthale, A.: Transport of Mineral Dust Into the Arctic in Two Reanalysis Datasets of Atmospheric Composition, Trellus B, 75(1), 13-32, doi:10.16993/tellusb.1866, 2023. Wendisch, M., et al.: Atmospheric and Surface Processes, and Feedback Mechanisms Determining Arctic Amplification: A Review of First Results and Prospects of the $(AC)^3$ Project, B. Am. Meteorol. Soc., doi:10.1175/BAMS-D-21-0218.1, 2023. Xin Xi, et al.: What caused the unseasonal extreme dust storm in Uzbekistan during November 2021? Environ. Res. Lett. 18 114029, doi:10.1088/1748-9326/ad02af, 2023.