Karlsruher Institut für Technologie

KIT-Fakultät für Physik

3. November 2022

Einladung zum Physikalischen Kolloquium

11.11.2022 **James King, Université de Montréal**

»Modelling mineral aerosol emissions from cold climates: Challenges from a warm desert framework«

Einführung: M. Klose

Abstract: Mineral aerosols emitted in high latitude regions can substantially impact radiative forcing, biogeochemical cycling of metals, and local air quality. These mineral dust emissions produce some of the largest dust fluxes and are attributed to a deposition feature that can be several hundred meters thick (loess) as a relic of past climatic change. In the present climate, pro-glacial processes are globally reduced compared to the last glacial maximum and concentrated at higher latitudes, but contribute a non-negligible proportion of the global dust budget albeit with large uncertainty. Current estimates of dust production from high-latitudes is from a combination of few field studies (remote locations), poor satellite retrieval (high cloud cover and time of pass), and limited knowledge on the processes that augment the timing and production of dust emissions in these regions.
As there exists little research on mineral dust emissions in high latitude regions, we have performed a study of the physico-chemical properties of mineral dust actively emitted from a sub-Arctic proglacial dust source. Moreover, a recent change in the river hydrology from rapid glacier retreat has left this watershed without its major tributary, similar to what we can expect from the impacts of climate change in other regions. Specific differences from these dust emissions from cold climates can be highlighted when compared to those from warmer regions. Notably, temporally averaged particle size distributions of dust aerosols were very fine as compared to those measured at more well characterized, low-latitude dust sources. Mineralogy of the dust aerosols are comprised primarily clay mineral aggregates with little quartz, while elemental composition was enriched in trace metals as compared to dust deposition, bulk soil samples, and the fine soil fractions (d < 53 µm). Lastly, thermal drainage winds imposed by the presence of glaciers in the valleys above the source region dominate local winds and magnify or even override synoptically driven winds.

Der Vortrag findet um **15:45 Uhr im Otto-Lehmann-Hörsaal**, Physik-Flachbau (Geb. 30.22), statt.

Zusätzlich wird der Vortrag im Livestream angeboten:

https://kit-lecture.zoom.us/j/69545658653
Meeting ID: 695 4565 8653
Passcode: 738512

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