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Dissertation topic:

Tvorba oblačných kapek v nenasycené a přesycené vodní páře (czech)

Formation of cloud droplets in unsaturated and supersaturated water vapor (english)

Brief description of the dissertation:

The primary goal of my work is to advance the understanding of aerosol–cloud interactions, with a particular focus on the processes governing cloud droplet activation and aerosol hygroscopicity under varying atmospheric vapor conditions. By investigating how changes in water vapor availability, supersaturation, and environmental thermodynamic states influence aerosol growth and activation into cloud droplets, this research aims to clarify the mechanisms that control cloud formation and microphysical properties. The study is conducted at the regional background site in Košetice, where detailed analyses of aerosol chemical composition and source-related clustering are used to characterize aerosol populations and their variability under representative continental background conditions. Integrating chemical and source information with cloud-relevant aerosol properties enables a more comprehensive assessment of cloud condensation nuclei (CCN) activity. Improving the representation of these processes will contribute to more accurate parameterizations in cloud and climate models, thereby reducing uncertainties in predictions of cloud formation, cloud radiative effects, and aerosol–climate feedbacks.

Date of commencement of studies, year: October 2024