



Eidgenössische Technische Hochschule Zürich
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Post-doctoral position at ETH – Zurich Atmospheric Physics group in Ice Nucleation starting February 2018

The atmospheric physics group at the Institute for Atmospheric and Climate Sciences at ETH Zurich (IAC-ETH) invites applications for a one-year post-doctoral fellowship integrated into an SNSF (Swiss National Science Foundation) project entitled “*Elucidating Atmospheric Ice Nucleation Mechanisms*”. Depending on the funding availability and performance of candidate, funding for a second year could be secured. The project aims at investigating heterogeneous ice nucleation mechanisms via laboratory studies. In the ice nucleation laboratory at ETH (<http://www.iac.ethz.ch/group/atmospheric-physics/lab-and-field-group.html>) we have a variety of ice nucleating particle counters, aerosol instruments, mass spectrometers, and optical detection devices for aerosols and cloud hydrometeors.

Within the project, the impact of particle morphology such as pores on ice nucleation mechanisms has been investigated and is currently ongoing. The current work aims at investigating and challenging the relevance of the mechanism, deposition ice nucleation, as a process that results in ice forming directly from the vapor phase, by considering that liquid water trapped in pore like features on particles with a “favorable” morphology is the likely pathway. In connection to understanding ice nucleation pathways, the post-doctoral project will aim to understand if the condensation freezing mechanism (heterogeneous nucleation of water and ice at sub-zero temperatures) can be used as a proxy for immersion freezing (heterogeneous freezing of supercooled droplets which formed at $T > 273$ K). Can instruments that measure condensation freezing mimic heterogeneous immersion freezing? A positive answer to this question forms the hypothesis of the project, with the theoretical framework that the nucleation of ice should overcome the same activation barrier in both processes, i.e. from the liquid phase.

The goal is to use well defined and characterized aerosol proxies in a set of laboratory experiments to conduct explicit immersion freezing and condensation freezing experiments, and perform a systematic comparison of these two experimental systems and results thereof via, nucleation rates, ice crystal size distributions and growth rates. Techniques that will be important and involved are: operation of flow systems, aerosol sizing and counting instruments, optical detection systems with depolarization and aerosol re-suspension and generation methods.

The successful candidate in addition to holding a PhD in aerosol and/or atmospheric sciences, should have experience in aerosol **and/or** ice nucleation research and should be familiar with the atmospheric aerosol chemistry/physics field. Data analysis in Igor, MATLAB or similar software is highly desired, and some knowledge of LabVIEW would be an asset, but not necessary. Applications will be accepted until position is filled. To apply, please send a CV, list of publications and conferences and a cover letter to zamin.kanji@env.ethz.ch.

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