

## Anmeldung eines Themas für ein/e

**Forschungsseminar**    
**Methodenseminar**    
**Masterarbeit**  (bitte eines oder mehrere ankreuzen)

topic date	Sublimational fragmentation of rimed ice particles – a laboratory study to quantify ice multiplication 29.09.2023
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Kurzbeschreibung:	In mixed phase clouds ice multiplication leads to up to four orders of magnitude higher ice particle number concentrations compared to those of ice nucleating particles [4]. Different Secondary Ice Production (SIP) mechanisms have been described which potentially lead to higher ice crystal number concentrations [5]. One of these proposed and controversy-discussed SIP mechanism is the sublimational fragmentation of large ice particles under subsaturated conditions with respect to ice [2, 5]. Only a very few experiments exist on which the state-of-the-art parameterizations are based [1-3, 6]. To study the potential relevance of sublimational fragmentation of rimed ice particles, the number and size of secondarily produced ice particles need to be determined. In the course of a literature review, the fundamental principles of fragmentation of ice particles due to sublimation are worked out, its potential relevance is discussed. The main part includes carrying out experiments using an existing experimental set-up and the interpretation of results in context of atmospheric relevance.
Literatur:	<ol style="list-style-type: none"> <li>Bacon, N.J., et al., <i>Breakup of levitated frost particles</i>, 1998, <i>Journal of Geophysical Research-Atmospheres</i>, DOI: 10.1029/98jd01162.</li> <li>Deshmukh, A., et al., <i>New Empirical Formulation for the Sublimational Breakup of Graupel and Dendritic Snow</i>, 2022, <i>Journal of the Atmospheric Sciences</i>, DOI: <a href="https://doi.org/10.1175/JAS-D-20-0275.1">https://doi.org/10.1175/JAS-D-20-0275.1</a>.</li> <li>Dong, Y.Y., R.G. Oraltay, and J. Hallett, <i>Ice particle generation during evaporation</i>, 1994, <i>Atmospheric Research</i>, DOI: 10.1016/0169-8095(94)90050-7.</li> <li>Field, P.R., et al., <i>Chapter 7: Secondary ice production: Current state of the science and recommendations for the future</i>, in <i>Ice formation and evolution in clouds and precipitation : Measurement and modeling challenges</i>. 2017, AMS. p. 7.1-7.20 (Online: 6 April 2017).</li> <li>Korolev, A. and T. Leisner, <i>Review of experimental studies of secondary ice production</i>, 2020, <i>Atmospheric Chemistry and Physics</i>, DOI: 10.5194/acp-20-11767-2020.</li> <li>Oraltay, R.G. and J. Hallett, <i>Evaporation and Melting of Ice Crystals: A Laboratory Study</i>, 1989, <i>Atmospheric Research</i>, DOI: 10.1016/0169-8095(89)90044-6.</li> </ol>