

**Review of “Secondary Ice Production - No Evidence of Efficient Rime-Splintering Mechanism”  
by Seidel, et al.**

**Overview:** Despite the significance of secondary ice production (SIP) for the formation of ice in the atmosphere, it remains one of the most mysterious microphysical processes. SIP’s sensitivity to environmental conditions creates a great challenge for conducting laboratory studies on this process. Most of the laboratory investigations of SIP mechanisms were conducted from the 1960s to the 1980s. These studies yielded a broad range of differing results. The ambiguity of the outcomes of the past lab studies, in many ways, hindered the implementation of different SIP mechanisms in cloud and climate simulations.

The present work is focused on the studies of the SIP process due to the rime-splintering (Hallett-Mossop, HM) mechanism. Historically, the rime-splintering HM mechanism was considered a major SIP process, and for the last forty years, numerical simulations of clouds attributed the origin of secondary ice particles solely to the HM process. The rate of SIP due to the HM process was based on several Hallett and Mossop laboratory studies published primarily in the 1970s. The efficiency of the SIP HM process was found to be relatively high, i.e., ~300 secondary ice particles per 1mg of rime at -5C. The present study showed production rate of nearly zero secondary ice particles due to the HM process. This is an extremely important result for the cloud modeling community and for cloud physics in general.

I thoroughly reviewed the manuscript and did not find anything that would be worth criticism or modification in the existing text. The authors designed a comprehensive laboratory setup using modern technology for IR and high-speed video monitoring of the interaction of the supercooled droplet flow with the rimer. The analysis of different effects, such as collision rates, droplet freezing time, Schumann-Ludlam limit, etc., described in five Appendices, are much appreciated, and they answered many questions about the lab setup.

**Recommendation:** In my opinion, the paper can be accepted for publication as is, and due to its great importance, it should be published as soon as possible. I also sincerely hope that moving forward, the authors will continue lab studies of the HM process and, introduce rimer rotation, and explore the effect of humidity on SIP.

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