**Title:** Workshop on Scientific Directions for Cloud Chamber Research

**Date:** July 13-14, 2024 (Prior to International Conf on Clouds and Precipitation)

**Venue:** National Institute for Meteorological Sciences (NIMS), 33 Seohobukro, Seogwiposi, Jeju, South Korea

**Sponsors:** International Commission on Clouds and Precipitation (ICCP) and IUGG

**Organizers:** Joo Wan Cha (jwcha@korea.kr), Ottmar Moehler (ottmar.moehler@kit.edu), Raymond Shaw (rashaw@mtu.edu)

**Scientific objective and scope of the meeting**

The motivation for the meeting is to bring the community together to discuss recent progress and future opportunities for research involving cloud chambers. This will include discussion of recent and future chamber designs, aerosol/cloud measurement methods for cloud chamber research, and modeling studies related to cloud chamber research. After reaching a peak in the 1970s and 1980s, there was a steady decline in the number of scientifically-active cloud chamber facilities. In recent years, however, several facilities have been upgraded and built, and there are active plans for the development of additional facilities. Cloud chambers allow for the investigation of fundamental aerosol and cloud microphysical processes, specifically those related to the interactions of multiple particles (i.e., not single-particle experiments). For example, there has been significant recent interest in using cloud chambers for investigations of processes related to geoengineering involving clouds. There also has been significant progress in modeling such as large eddy simulation of cloud processes in laboratory chambers.

The workshop will allow participants to learn about the most recent scientific research from existing cloud chamber laboratories around the world. Advances in computational studies of cloud chamber processes will also be presented, including results from the mixed-phase cloud Pi Chamber case wrapped up during the International Cloud Modeling Workshop held the previous week. There will be an opportunity to see plans for new chambers either being built or envisioned for the near future. The first day of the workshop will include a tour of the new NIMS cloud chamber research facility. The morning of the first day will be held jointly with the Cloud Probe Workshop and will include presentations of recent advances in cloud chamber instrumentation. The workshop will conclude with discussion of scientific opportunities and the future of cloud chamber research, as well as a summary of key workshop outcomes and plans for future interactions.
Agenda

Saturday July 13

8:30 to 9:00    Arrival, checkin

9:00 to 9:30    Introduction, Scope, and Workshop Goals (Focus on Scientific Opportunities)

9:30 to 11:00   New Developments and Concepts for Cloud Chamber Instrumentation (*in combination with Cloud Probe Workshop*)

                    Darrel Baumgardner (15 minutes + discussion)
                    Matt Freer (10 minutes + discussion)
                    Alexei Korolev (15 minutes + discussion)
                    Zeen Zhu (15 minutes + discussion)

11:00 to 11:15   Break

11:15 to 12:00   NIMS Cloud Chamber Tour (Group 1, including Cloud Probe Workshop participants)

12:00 to 13:00   Lunch Break

13:00 to 13:45   NIMS Cloud Chamber Tour (Group 2)

14:00 to 15:30   Recent Scientific Results from Established Cloud Chamber Laboratories

                    Joo Wan Cha - NIMS (15 minutes + discussion)
                    Ottmar Moehler - AIDA (15 minutes + discussion)
                    Masataka Murakami - MRI (15 minutes + discussion)
                    Dennis Niedermeier - LACIS-T (15 minutes + discussion)

15:30 to 16:00   Break

16:00 to 17:30   Recent Scientific Results from Established Cloud Chamber Laboratories, continued
Ping Tian - BACIC (15 minutes + discussion)
Raymond Shaw - Pi Chamber (15 minutes + discussion)
General Discussion

Sunday July 14

9:00 to 11:00  Progress in Cloud Chamber Modeling
Sisi Chen - ICMW case (15 min + discussion)
Steve Krueger - ODT/EMPM/theory (15 min + discussion)
Ottmar Moehler - KIT modeling efforts (15 min + discussion)
Silvio Schmalfuss - OpenFOAM with aerosols and droplets (15 min + discussion)
Fan Yang - LES of convection-cloud chamber (15 min + discussion)

11:00 to 11:30  Break

11:30 to 12:30  New Cloud Chamber Developments and Concepts - Brief, informal presentations (2-3 slides + discussion)
Ottmar Moehler - KIT developments, including ACTRIS infrastructure network
Mikhail Ovchinnikov - ACDC2
Seong Soo Yum - KIST
Others who wish to participate

12:30 to 13:30  Group Discussion on Scientific Opportunities – The Future of Cloud Chamber Research; Summary of Workshop Outcomes, Plans for Future Interactions