International Cloud Modeling Workshop (ICMW) 2020

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Workshop on Eulerian vs. Lagrangian methods for cloud microphysics, Cracow, Poland

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Overview

- WWW (What, when and where)
- ICMW history
- ICMW 2020 Cases

WWW

- What is the ICMW?
 - International Cloud Modeling Workshops are traditionally held every four years, in the (time and space) vicinity of the ICCP (the 1st one was an exception).
 - Used to have WMO sponsorship but it stopped in 2016.
 - The emphasis is on cloud microphysics (weather modification background).
 - Specific cases are selected and run before the workshop and results are discussed at the workshop.
 - A report from the workshop is typically presented at the ICCP.
- When is the next ICMW?
 - The week before ICCP from July 27 to 31 in 2020.
- Where is the next ICMW?
 - The next ICMW will be held at the Indian Institute of Tropical Meteorology (IITM) in Pune, India.

ICMW history

- 1st 1985, Irsee, Germany
- 2nd 1988, Toulouse, France (before 10th ICCP in Bad Homburg, Germany)
- 3rd 1992, Toronto, Canada (before 11th ICCP in Montreal, Canada)
- 4th 1996, Clermont-Ferrand, France (before 12th ICCP in Zurich, Switzerland)
- 5th 2000, Glenwood Springs, CO, USA (before 13th ICCP in Reno, NV, USA)
- 6th 2004, Hamburg, Germany (before 14th ICCP in Bologna, Italy)
- 7th 2008, Cozumel, Mexico (after 15th ICCP in Cancun, Mexico)
- 8th 2012, Warsaw, Poland (before 16th ICCP in Lepzig, Germany)
- 9th 2016, Exeter, UK (before 17th ICCP in Manchester, UK)
- 10th 2020, Pune, India (before 18th ICCP in Pune, India)





Exeter, UK, 18 – 22 July 2016

Cases

- Case 1: Cumulus congestus LES case simulated by both the Eulerian bin and Lagrangian microphysics schemes.
- Case 2: Pi chamber warm-cloud case simulated by both the LES and DNS with the Eulerian bin and Lagrangian microphysics schemes.
- Case 3: Fog case from Indian Winter Fog EXperiment (WiFEX).
- Case 4: Monsoon case from Indian Cloud Aerosol Interaction and Precipitation Enhancement EXperiment (CAIPEEX).
- Case 5: Case from the COnvective Precipitation Experiment (COPE) investigating the mid-to-high-level shear impact on precipitation types.
- Case 6: Case from the Remote sensing of Electrification, Lightning, And Mesoscale/microscale Processes with Adaptive Ground Observations (RELAMPAGO) focusing on hail.
- Case 7: Case from the Seeded and Natural Orographic Wintertime Clouds: The Idaho Experiment (SNOWIE) on orographic precipitation.

- Case leaders: Shin-ichiro Shima, Noemi Sarkadi, Lulin Xue and ...
- Single warm-phase cloud similar to Lasher-Trapp et al. 2005.
- Compare the Eulerian and Lagrangian methods for microphysics on cloud and rain formation and development
- 2D and 3D idealized simulations with ensemble
- One to two potential soundings (one from UAE)

- Small Cumulus Microphysics Study (SCMS) test case
- SCALE-SDM 3D simulations with different grid spacing and super droplets
- 10 X 10 X 8 km³ and 2 h simulation time





Some recommendations

- The focus is on the comparison under turbulent flow
 - Special attention to droplet size distribution (num concentration, mean radius, spectrum width)
 - Bulk schemes are also welcome
 - 3D would be too demanding. We prepare 2D setup, but strongly encourage people to conduct 3D.
- Ensemble of simulations is needed to evaluate the fluctuation
 - Prepare one to two soundings
 - Change the aerosol number concentration to control precipitation
 - We already have the SDM result. Will simulate the case with UPNB soon.
 - If needed, let us consider using the same dynamical core
 - If needed, let us consider providing prescribed turbulent flow field

- Case leaders: Sisi Chen, Steve Krueger, and ...
- Pi chamber warm-phase cloud experiments
- LES, DNS, maybe lower order models too
- Compare the Eulerian and Lagrangian methods for microphysics on cloud droplet size distribution evolution under lab environment

- Case leaders: Sachin Ghude, maybe Andrian Hill, Ian Boutle, and ...
- Winter Fog Experiment case (Fog, haze, smog...)
- LES, NWP idealized and real case simulations
- Compare aerosol-cloud or chemistry-cloud interaction to observations using different approaches

- Case leaders: Gayatri M. Urankar, Sudarsan Bera Cat, and ...
- Cloud Aerosol Interaction and Precipitation Enhancement Experiment case
- NWP idealized and/or real case simulations
- Compare aerosol-cloud-precipitation interaction to observations using different approaches

- Case leaders: Sonia Lasher-Trapp, and ...
- COnvective Precipitation Experiment case
- Idealized 3D simulations of a convective cloud impacted by mid-high-level shear
- Compare simulated cloud structure and precipitation types using different approaches

- Case leaders: Kristen Rasmussen, Greg Thompson, and ...
- Remote sensing of Electrification, Lightning, And Mesoscale/microscale Processes with Adaptive Ground Observations case
- 3D idealized and/or real case simulations of a hail storm
- Compare storm structure, hail amount and size distribution to observations using different approaches

- Case leaders: Anders Jensen, Sarah Tessendorf, and ...
- Seeded and Natural Orographic Wintertime Clouds: The Idaho Experiment case
- 2D idealized and 3D real case simulations of an orographic snow case
- Compare cloud phase partition, microphysical properties and precipitation to observations using different approaches