

Aerosols, Clouds, Precipitation and Climate (ACPC) Workshop
Virtual meeting, 9-13 May, 2022, 13:00-16:00 UTC

Low-Cloud Sessions

Monday May 9th

13:00 Introduction: Logistics

Session I (Jan Kazil, Alyson Douglas)

10 minutes talks + 2 minutes Q/A

13:05 **Sandip Pal** - Connecting dots among synoptic controls, aerosol transport and local meteorological conditions favoring cloud formation

13:17 **Rachel Sansom** - Exploring a Stratocumulus-to-Cumulus Transition: A Perturbed Parameter Ensemble of Large-Eddy Simulations

13:29 **Zhibo Zhang** - Understanding the microphysical control and spatial-temporal variability of warm rain probability using CloudSat and MODIS observations

13:41 **Xin Lu** - Adiabatic fraction of global marine boundary layer clouds decreases with temperature and height above cloud base

13:53 **Zhoukun Liu** - Constraining the parameterization of autoconversion in marine stratocumulus by observations of their breakup due to precipitation

14:05 **Tianning Su** - Aerosol-boundary layer interactions modulate the entrainment process

14:17 **Xiaoli Zhou** - Observational estimate of stratocumulus susceptibility across timescales

14:29 **Fan Liu** - Contrasting Large Effects of Fine and Coarse Aerosols on Warm Rain from Marine Clouds

14:41 Break

Poster Presentations (Andrew Gettelman)

14:56 Introduce Posters 1 minute 1-slide each

Jan Kazil - The Response of Cloud Organization and Cloud Feedback in the Sugar-to-Flower Transition to 21st Century Climate Change

Mark Miller - Cumulus Coupled Stratocumulus and Marine Boundary Layer Convective Complexes over the Summertime Eastern North Atlantic Ocean

Youtong Zheng - Idealized large-eddy simulations of stratocumulus advecting over cold water

Nurun Nahar Lata - Vertical Gradient of Size-Resolved Aerosol Composition over the Arctic

Neelam Malap - Entrainment rates in the continental shallow cumulus using the Large Eddy Simulation and in situ measurements

Guoyong Wen - Simulation of ARM's Shortwave Spectrometer Observed Zenith Radiance in Cloud, Aerosol and Humidity Fields

Z. Li and T. Su - New remote sensing methods to determine PBL depth and coupling of continental clouds with surface from lidar

Jianhao Zhang - Distinctive regional meteorological influences on low cloud albedo susceptibility over global marine stratocumulus regions

Xin Wang - Hidden Large Aerosol-driven Cloud Cover Effect over High-latitude Ocean

Kohei Yamasaki - Adjustments of mixed-phase clouds to aerosol injections in an LES model

Paloma Borque - Role of different factors in continental warm rain rate intensity during the CACTI field campaign

Roland Schrodner - Application of the spectral cloud microphysics model COSMO-SPECS for sensitivity studies in real mixed-phase cloud scenarios

15:16 **Poster breakout groups (12 rooms)**

15:46 Discussion

Tuesday May 10th

Session 2 (Steve Krueger, Tianle Yuan)

10 minutes talks + 2 minutes Q/A

13:00 **Graham Feingold** - A Research Roadmap for Marine Cloud Brightening

13:12 **Velle Toll** - Temporal evolution of polluted cloud tracks

13:24 **Daniel Grosvenor** - High resolution simulations of Hawaiian volcanic emissions interacting with clouds reveal a strong role for island orography

13:36 **Duncan Watson-Parris** - Shipping regulations lead to large reduction in cloud perturbations

13:48 **Tianle Yuan** - Observational Evidence of Strong Forcing from Aerosol Effect on Low Cloud Coverage

13:00 **Peter Manshausen** - Invisible Ship Tracks as Opportunistic Experiments for Aerosol Cloud Interactions

- 14:12 **Ed Gryspeerd** - Short timescale cloud development to constrain aerosol-cloud interactions in liquid clouds
- 14:24 **Mahnoosh-Haghighatnasab** - Impact of Holuhraun volcano aerosols on clouds in cloud-system resolving simulations
- 14:36 Break

Poster Presentations (Matt Christensen)

- 14:56 Introduce Posters 1 minute 1-slide each

Je-Yun Chun - Microphysical, macrophysical and radiative responses of subtropical marine clouds to aerosol injections

Pornampai Narenpitak - The Response of Cloud Organization in the Sugar-to-Flower Transition to Diurnal Cycle and Mineral Dust

Yang Cao - Emission reductions significantly reduce the hemispheric contrast in cloud droplet number concentration in recent two decades

Hao Wang - Response of LWP to aerosol in CAM6 with improved subgrid cloud water variance

Ehsan Erfani - Sensitivity of low marine clouds to aerosol perturbations

Hailing Jia - Addressing the difficulties in quantifying the Twomey effect for marine warm clouds from multi-sensor satellite observations and reanalysis

Alyson Douglas - Introducing a standard dataset of warm clouds in the southeast Pacific to compare ACI methodologies

Michael Diamond - Deepening-warming or drizzle-depletion? An LES intercomparison of the subtropical stratocumulus-to-cumulus transition in the presence of smoke

Manisha Mehra - Black carbon present in fine and coarse aerosols in the Houston shipping channel during TRACER-AQ

Shreya Joshi - Light absorbing aerosol-cloud interactions

- 15:16 **Poster breakout groups (10 rooms)**

- 15:46 Discussion

Deep-Cloud Sessions

Wednesday May 11th

Session I: Impacts of Marine Aerosols (Mike Jensen, Guy Dagan, William Jones)

13:00 2-min introduction

10 minutes talks + 2 minutes Q/A

13:02 **Lauren Zamora and Ralph Kahn** - Aerosols, especially from marine sources, affect deep convective cloud prevalence

13:14 **Zengxin Pan** - Coarse Sea Spray Inhibits Thunderstorm

13:26 **Jiwen Fan** - Impacts of ice-nucleating particles from marine aerosols on mixed-phase orographic clouds during 2015 ACAPEX field campaign

13:38 **Edward Mansell** - Simulated Shipping Lane Aerosol Effects with Explicit Electrification

13:50 Break

Session II: Convective to Global Scale (Jiwen Fan, Sean Freeman, Lin Lin)

14:00 2-min introduction

10 minutes talks + 2 minutes Q/A

14:02 **Guy Dagan** - Strong coupling between aerosol effect on sub-tropical and tropical clouds

14:14 **Gayatri Kulkarni** - How robust is aerosol invigoration effect over the Indian subcontinent?

14:26 **William Jones** - The Lifecycle of Deep Convective Cores and their Associated Anvil Clouds Observed by GOES-16 ABI over North America

14:38 **Sonia Lasher-Trapp** - Investigating the Effects of CCN on the Timing of Convective Cold Pool Initiation During CACTI

14:50 Break

Session III: TRACER (Die Wang, Mike Jensen, Yuwei Zhang)

15:00 2-min introduction

10 minutes talks + 2 minutes Q/A

15:02 **Kristofer S Tuftedal** - Radar Climatologies of Tracked Shallow and Deep Convective Cells in the Greater Houston, Texas Region

15:14 **Sean Freeman** - Fast Tracking of Clouds and Storms in 2D and 3D Model and Observational Data

15:26 **Maria Zawadowicz** - Chemistry of nonrefractory submicron aerosol in urban industrialized Texas: first results from TRACER

15:38 **Rusen Oktem** - Stereo Camera Observations during TRACER

15:50 Day 1 wrap-up

Thursday May 12th

Poster Session (Mike Jensen, Jiwen Fan)

3 minute lightning talks, 1 slide, followed by 1-hour Zoom session

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| 13:00 | 2-min introduction |
| 13:02 | Daniel Rosenfeld - Comparably large and contrasting effects of fine and coarse marine aerosols on clouds from stratocumulus to thunderstorms |
| 13:05 | Yuwei Zhang - Impact of wildfire aerosols and new particle formation on Amazon convective clouds in dry season |
| 13:08 | Ross Herbert - Long-term observations of widespread smoke-cloud interactions over the Amazon |
| 13:11 | Mariko Oue - Examining Impacts of Aerosols on Convective Cell Properties Using Cloud Resolving Model Simulations, Radar Simulator, and Cell Tracking |
| 13:14 | Stephen Saleeby - Model Intercomparison of Aerosol Influence on Microphysical Processes in Deep Convection |
| 13:17 | Michael Jensen - Update on the TRACER field campaign and review of first light data |
| 13:20 | Jianhua Yin - Full-tracking Algorithm for Convective Thunderstorm System from Initiation to Complete Dissipation |
| 13:23 | Chuanfeng Zhao - Distinct impacts on convective precipitation time by different types of aerosols |
| 13:26 | Lin Lin - Improvements to convective cloud microphysics parameterizations and their climate impacts in NCAR CAM5 |
| 13:29 | Mika Vogt - Absorbing aerosol choices influence precipitation changes across future scenarios |
| 13:32 | Qian Chen - The impacts of convection on aerosols scavenging and regeneration processes |
| 13:35 | Xin Zhang - Influence of convection on the upper tropospheric O ₃ and NO _x budget in southeastern China |
| 13:40-14:30 | Poster breakout groups (12 rooms) |

Discussion/ Next steps for ACPC DC

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| 14:40-15:10 | Jiwen/Sue - TRACER Modeling group activities + Discussion |
| 15:10-16:00 | Jiwen/Mike - ACPC direction/next steps, interesting/outstanding issues raised + Wrap up |

The ACPC 2022 Workshop Organizing Committee

Daniel Rosenfeld, Minghuai Wang, Matthew Christensen, Andrew Gettleman, Michael Jensen, Jiwen Fan