# 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

**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**

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

**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 Gryspeerdt** - 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**

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

**Fei Wang** - An airborne study of the aerosol effect on the dispersion of cloud droplets in a drizzling marine stratocumulus cloud over eastern China

**Zezhen Cheng** - The abundance of internally mixed particles at a remote marine free troposphere site above the North Atlantic

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

15:46 Discussion

## Deep-Cloud Sessions

**Wednesday May 11st**

## Impacts of Marine Aerosols

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

## Convective to Global Scale

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

## TRACER

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 12nd

### Poster Session

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

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 O3 and NOx budget in southeastern China

13:40-14:30 Poster breakout groups (12 rooms)

### Discussion/ Next steps for ACPC DC

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