22nd Annual AeroCom & 11th AeroSAT meeting

Hosted by Pacific Northwest National Laboratory

16 – 20 October 2023

Richland Riverfront Hotel, 50 Comstock St. Richland, WA 99352

Virtual participants link: Join ZoomGov Meeting

Meeting ID: 160 576 3144

Passcode: 385787

Monday, 16 October 2023

*Indicates presentation will be conducted virtually

Time	Topic	Speaker
Welcome and AeroCom Experiments Session – Moderator: Michael Schulz		
9:00	Host Welcome Remarks	Susannah Burrows, Andrew Gettleman
9:05	Welcome Remarks	Steve Gahn
9:15	Energy Exascale Earth System Model	Ruby Leung
9:40	AeroCom Introductory Remarks	Michael Schulz
9:45	Two-decadal trends and interannual variability of CO and aerosols in the UTLS and their connections to surface emissions, convective transport efficiency, and Asian summer monsoon dynamics - Report of AeroCom experiment	Mian Chin
10:00	Constraining Model Biomass Burning Source Strength and Injection Height Using Satellite Observations Project Update	Mariya Petrenko
10:15	Break, 15 Minutes & Informal Discussions, 15 minutes	
AeroCom Experiments Session – Moderator: Hongbin Yu		
10:45	Dust source attribution to the global land and ocean regions	Dongchul Kim
11:00	Derivation of a historical dust emission inventory to estimate dust radiative forcing using global aerosol models	Jasper Kok
11:15	Observationally constrained analysis of sulfur cycle in the marine atmosphere with NASA ATom measurements and AeroCom model simulations	Huisheng Bian
11:30	Cloud focused diagnostics for AeroCom simulations	Edward Gryspeerdt
11:35	Short update on AeroCom control experiment	Michael Schulz
11:40	Status of AeroCom experiments and database	Group Discussion
12:00	Working Lunch and Poster Session	
AeroCom Indirect Effect Session – Moderator: Susannah Burrows		
13:00	Correlations between cloud condensation nuclei and cloud droplet number concentrations in global models and observation	Harri Kokkola
13:15	Does the droplet number–liquid water path 'inverted v' tell us what we think it does? Causal and confounding mechanisms for observational constraints on ERFaci adjustments	Johannes Muelmenstaedt

Monday, 16 October 2023

Time	Topic	Speaker
13:30	Quantifying the Impact of Aerosols on Clouds in E3SM: Insights from a Lagrangian Framework	Matthew Christensen
13:45	Reducing Ship Emissions Accelerates Global Warming	Andrew Gettleman
14:00	Leveraging perturbed parameter ensembles to understand how aerosol-cloud-precipitation processes imprint on the global energy budget	Daniel McCoy
14:15	Evaluating Aerosols in the next UK Earth System Model	Daniel Grosvenor
14:30	Discussion	
14:45	Break, 15 Minutes & Informal Discussions, 15 minutes	
AeroCom Aerosol Modelling Session I – Moderator: Kostas Tsigaridis		
15:15	The future chemistry and climate impacts of large, fully-reusable methane-fueled rockets	Kostas Tsigaridis
15:30	Improving BC mixing state and CCN activity representation with machine learning in the Community Atmosphere Model Version 6 (CAM6)	Minghuai Wang
15:45	Aerosol radiative forcing in E3SM: improvements from aerosol wet removal treatment and parameter tuning	Yunpeng Shan
16:00	Aerosol-Induced atmospheric response through differential heating and teleconnection	Jin-Ho Yoon
16:15	Evaluation of nitrate aerosols in E3SM and comparisons with CESM and AeroCom III models	Mingxuan Wu
16:30	Discussion	
17:00	Group Networking	

Tuesday, 17 October 2023

Time	Topic	Speaker
AeroCom Aerosol Modelling Session II – Moderator: Michael Schulz		
9:00	Progress to build a Generalized Aerosol / Chemistry iNTerface (GIANT)	Michael Schulz
9:15	Discussion on GIANT and Aerosol Modelling Progress	
10:30	Break, 15 Minutes & Informal Discussions, 15 minutes	
AeroCom Short Oral Session I - Moderator: Duncan Watson-Parris		
11:00	Identifying and Reducing Uncertainties in Smoke-Stratocumulus Interactions in Multiple Climate Models in the Southeastern Atlantic Using Field Campaign Observations	Calvin Howes*
	Analyzing Earth system model sensitivity to shifts in shipping SO2 emissions	Ciara Donegan
	A global anthropogenic emissions inventory of reactive gases and aerosols (1750 – 2022): an update to the Community Emissions Data System (CEDS)	Noah Prime
	The main cloud characteristics influencing variations of solar irradiance at ground according to the ICON model, CLOUDNET and BSRN observations	Julia Shuvalova
	Global simulations of nitric acid condensation on mineral dust aerosols using parameterizations of different complexity	Ruben Sousse*
	Urban aerosol, its radiative and temperature effect using COSMO-ART model and measurements in a large megacity	Natalia Chubarova*
	Combining Earth System Modeling and Machine Learning to Investigate Volcanic Sulfate Deposition in Polar Ice Cores	Malcom Maas
	Industrial aerosols glaciate liquid-water clouds, produce snow, and reduce cloud cover	Velle Tolle*
11:30	Discussion	
12:00	Working Lunch and Poster Session	
AeroCom Aerosol Modelling Session II - Moderator: Andrew Gettleman		
13:00	New aerosol features and their coupling with atmospheric chemistry in preparing E3SM for CMIP7 and beyond	Hailong Wang
13:10	Combining physical understanding with mathematical theory to improve the numerics of process coupling in aerosol-climate models.	Hui Wan
13:20	Impact of new particle formation on the anthropogenic aerosol forcing estimate in E3SM	Kai Zhang
13:30	Quantifying structural error in aerosol properties from reduced representation of particle distributions	Laura Fierce
13:40	New SOA Treatments Within the Energy Exascale Earth System Model (E3SM): Strong Production and Sinks Govern Atmospheric SOA Distributions and Radiative Forcing	ManishKumar Shrivastava
13:50	Global Dust Cycle in the DOE E3SM version 3 (E3SMv3) Improvement in Emissions, Transport and Direct Radiative Forcing	Yan Feng

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Time	Topic	Speaker
14:00	High latitude extreme poleward aerosol transport events (Aerosol Atmospheric Rivers) in E3SM and their impacts on the Arctic climate system during the MOSAiC field campaign.	Ian Baxter
14:10	Building a suite of machine learning models to predict PM2.5 from large-scale GEOS-GOCART model simulations and apply it to real data	Tianle Yuan
14:20	Progress and challenges in simulating ice-nucleating particle concentrations for global climate models	Susannah Burrows
14:30	Break, 15 Minutes & Informal Discussions, 15 minutes	
AeroCom Short Oral Session II / Moderator: Mian Chin		
15:00	Aerosol Effects on Heating in the Asian Monsoon Tropopause Layer	Jie Gao*
	Summary of the SPARC Reanalysis Intercomparison Project Phase 1 and Plans for Phase 2: Chemical & Aerosol Reanalyses, Tropospheric Circulation, Extreme Events, and More	Jonathon Wright*
	Impacts of Anthropogenic Aerosol Emissions on the East Asian Winter Monsoon	Shenglong Zhang*
	Retrieval of high spatial resolution black carbon sources: use of the adjoint GEOS-CHEM model in conjunction with WRF-CHEM calculations to improve the emission pattern in Europe	Abhinna Kumar-Behera*
	How much of the uncertainty in black carbon ERF can be attributed to uncertainty in its refractive index?	Ruth Digby*
	Evaluation of extreme smoke plumes during 2019/2020 Australian fires and future operational applications	Caroline Poulsen*
	Illuminating darkening clouds in climate models	Naser Mahfouz
AeroCom Poster Introduction Session I / Moderator: Mian Chin		
15:30	A Strong Anthropogenic Black Carbon Forcing Constrained by Pollution Trends Over China	Yawen Liu
	Differences Between E3SM Simulated and Observationally Retrieved Aerosol-Liquid Cloud Relationships are Modulated by Cloud Adiabaticity	Adam Varble
	Aerosol evaluation must account for model-observation uncertainties	Leighton Regayre
	Shift in Peaks of PAH-Associated Health Risks from East Asia to South Asia and Africa in the Future	ManishKumar Shrivastava
	Resolving dust mineralogy in climate model: impacts on Earth's Radiation and Climate	Qianqian Song
	Uncertainties of anthropogenic aerosol emission representation and the impact on the aerosol simulation in E3SM	Taufiq Hassan
16:00	Break and Poster Viewing Session	

Wednesday, 18 October 2023

Time	Topic	Speaker
AeroCom Experiment Session II - Moderator: Duncan Watson-Parris / Michael Schulz		
9:00	AerChemMIP2: Deciphering the role of aerosols and chemically reactive gases in climate change	Duncan Watson-Parris
9:15	AeroCom phase IV – what can it be?	Kostas Tsigaridis / Michael Schulz
9:30	Discussion AeroCom + AerChemMIP experiments	
10:30	Break, 15 Minutes & Informal Discussions, 15 minutes	
AeroCom/Aerosat CCN session - Moderator: Athanasios Nenes		
11:00	Introduction	Athanasios Nenes
11:05	Reducing forcing uncertainty through improved aerosol retrievals in clean environments	Edward Gryspeerdt
11:15	Process-level model diagnostics from in situ observations of aerosol abundance, composition, and cloud activation	Christina S. McCluskey
11:30	Discussion	
12:30	Working Lunch and Poster Viewing	
AeroCom/Aerosat general session and excursion		
13:30	Enabling Aerosol-cloud interactions at GLobal convection-permitting scalES (EAGLES)	Po-Lun Ma
14:00	Load bus for OPTIONAL offsite excursion	
14:30	Tour REACH Museum	
16:30	Depart REACH Museum for group dinner at Tagaris Winery	
17:00	Group no-host dinner at Tagaris Winery	
20:00	Depart Tagaris Winery and return to Richland Riverfront Hotel	

Thursday, 19 October 2023

Time	Topic	Speaker
AeroCom/Aerosat aerosol type and profile measurement session - Moderator: Reed Espinosa		
9:00	Introduction	Reed Espinosa
9:05	ESM Process-Oriented Evaluation Using ARM Ground-Based Measurements and the Earth Model Column Collaboratory (EMC²)	Israel Silber
9:20	Overview of Atmospheric Radiation Measurement (ARM) Aerosol Measurements	John Shilling*, James Mather
9:35	Aerosol typing: updates from European and Italian initiatives	Lucia Mona, Nikos Papagiannopoulus*
9:50	Discussion	
10:30	Break, 15 Minutes & Informal Discussions, 15 minutes	
AeroCom/Aerosat Short Oral Session I - Moderator: Rob Levy		
11:00	Land Surface BRDF Dataset from Sentinel-3/OLCI for Atmospheric Studies	Pavel Litvinov
	Effect of Lockdown on Aerosol Optical Depth using Satellite (MODIS Aqua and Terra), based observation over Surat	Ranjitkumar Solanki
	Combined AOT/COT product from satellite observations	Marta Luffarelli
	On spatial scales of variation in aerosol optical depth fields	Andrew Sayer*
	CCNs and aerosols over the Eastern North Atlantic from DOE E3SM, NCAR CESM and AeroCom III models and implications for aerosol indirect forcing	Zheng Lu*
11:15	Discussion	
12:00	Working Lunch and Poster Viewing	
AeroCom/Aerosat Constraining Models Session - Moderator: Ralph Kahn, Yves Balkanski		
13:00	Introduction Constraining models	Ralph Kahn, Yves Balkanski
13:05	Evaluating and Improving GEOS aerosol simulations using ORACLES Measurements	Huisheng Bian
13:20	Using CACTI Campaign Measurements Collected in Argentina to Evaluate Global Model Aerosol Predictions	Jerome Fast
13:35	Earth System Model Aerosol-Cloud Diagnostics Package (ESMAC Diags): Evaluate Climate Models using Field Measurements from Aircraft, Ship, Surface and Satellite	Shuaiqi Tang
13:50	Discussion	
15:00	Break, 15 Minutes & Informal Discussions, 15 minutes	

Thursday, 19 October 2023

Time	Topic	Speaker
	Aerosat Poster Introduction Session I - Moderator: Steve Ghan	
15:30	Long-term, consistent, global and regional AOD climate data records: joining MODIS and VIIRS.	Robert C Levy
	Investigating the relationship between modeled PM2.5 concentrations and surface aerosol optical properties in the NASA GEOSCCM	Caterina Mogno
	Aerosol Vertical Distributions Observed with ARM Ground-based Remote Sensing Measurements	Damao Zhang
	Ground-based spectral radiation measurements with extended wavelength range for aerosol-cloud-surface studies	Evgueni Kassianov
	Thermal infrared dust optical depth and coarse-mode effective diameter over oceans retrieved from collocated MODIS and CALIOP observations	Jianyu Zheng
	Towards better MISR aerosol retrievals over land: An ensemble approach	Marcin Witek
	Expanding the coverage of MISR aerosol retrievals over shallow, turbid, and eutrophic waters	Marcin Witek, Robert Nelson
	Aerosol Data Fusion Using Maximum Likelihood Estimation and Deep Neural Network with Korean Geostationary Satellite Instruments: GEMS, AMI, and GOCI-II	Minseok Kim
	Exploring the Impact of Imperfect Particle Shape Assumptions on Synergistic Lidar and Polarimeter Aerosol Retrieval Performance	Reed Espinosa
	A Solar Zenith Angle Dependency on Passive versus LiDAR Sensor AOD Retrieval Biases	Sarah Smith
16:00	Break and Poster Viewing	

Friday, 20 October 2023

Time	Topic	Speaker
Aerosat Data records, trends, events Session - Moderator: Larisa Sogacheva		
9:00	Introduction	Larisa Sogacheva
9:05	NASA perspective on prospects for continuing the aerosol data records in upcoming years	James Gleason
9:20	Challenges in Observing, Modeling, and Forecasting the June 2023 Smoke Event over the Northeast United States	Allison Collow*
9:35	Discussion	
10:30	Break, 15 Minutes & Informal Discussions, 15 minutes	
Aerosat Lower Boundary Condition, Land Session - Moderator: Thomas Popp		
11:00	Introduction	Thomas Popp
11:05	New products of global aerosol for SLSTR and (A)ATSR (1995 - 2023)	Peter North
11:20	Discussion	
12:15	Working Lunch and Poster Viewing	
Aerosat New products/Approaches Session - Moderator: Peter North, Andrew Sayer		
14:00	Introduction	Andrew Sayer*
14:05	Merging Satellites and In-situ Observations in an Inverse Probabilistic MIE Model and Mass-Conserving Framework to Estimate Atmospheric Column BC	Jason Blake Cohen
14:15	Three-dimensional aerosol reconstruction by combined active and passive satellites	Li Pei
14:25	The multi-instrument synergy retrievals developed based on the GRASP algorithm platform	Oleg Dubovik
14:35	Intercomparison of Aerosol Optical Depths and surface particulate matter concentration from four reanalyses and their multi-reanalysis-consensus for climate studies	Peng Xian
14:45	Discussion	
AeroCom AeroSat Wrap Up Session		
15:30	AeroCom Wrap Up	Michael Schulz
15:45	AeroSat Wrap Up	Ralph Kahn, Thomas Popp, Larisa Sogacheva