21th AeroCom workshop &

co-organizers: Michael Schulz / Stefan Kinne / Mian Chin / Kostas Tsigaridis / Bjørn Hallvard Samset / Duncan Watson-Parris / Gunnar Myhre / Yves Balkanski

10th AeroSAT workshop

co-organizers: Thomas Popp / Ralph Kahn / Larisa Sogacheva / Andy Sayer

October 10 – 14, 2022

in OSLO, Norway

hosted by Michael Schulz (Met-NO) and Gunnar Myhre (CICERO)

Workshop place: Toppsenter at Forskningsparken, Oslo, Norway

meeting will be also a **hybrid meeting** to allow external participation via the web
(remote access details are sent Oct 4 by email to registered participants)

Registration fee

For in person participation please pay 500 NOK (ca 50 Euro) with credit card
on the following website by 30 September:
https://www.deltager.no/event/aerocom2022

Presentations

Format of presentations

Orals: 10-15 the complete talk plus 5 minutes discussion (check session) *in **pdf format widescreen 16x9***
Oral presenters must be on-site, if you are not able to come in person, send an email to Michael/Stefan asap

Posters ('short orals')   a 5-minute oral summary plus 2 minutes discussion (max 5 slides) *pdf format widescreen 16x9*
Poster format for on-site presentation DIN A0 : 120cm (H) by 80cm (W)
Posters on site can be on display the whole week !
Note that online and remote short oral presentations are in different sessions (see programme)
See info on remote presenting of short oral below

Upload of presentations

Upload of pdf for all presentations requested by Oct 4 are (to share content prior to the meeting)
All presentations (oral or 5-slide poster summaries) should be accessible prior to the workshops.
… have your contribution(s) sent to **stefan.kinne@mpimet.mpg.de**
                              (if files are larger than the e-mail permitted size, please upload on anonymous ftp
                               ftp.zmaw.de, cd incoming, mkdir aerocom, cd aerocom, mput 'file', send Stefan a note)
          pdfs (once received) will be made available via
          ftp: ftp-projects.mpimet.mpg.de/aerocom/virtual2022/*

-   **naming convention for your uploaded workshop presentation(s):**
    AA2022_session#_order#_lastname/initial.pdf   session # [oral: 01, 02 … . 12; short oral ('poster'): S1, S2, … S5]
                                                  order #   [as listed in the program below]
       o   *examples:*   *AA2022_S3_2_PoppT.pdf*   *the 2nd element in the short (-oral) session S3 by T.Popp*
                             AA2022_01_4_ChinM.pdf   *the 4th element in the oral session 01 by M.Chin*

Remote participation

Remote logistics Info will be distributed by Oct 4 to registered participants
zoom-meeting-link (for on-line participation) will open ca 30 min before the start of each session
Raise hand if you want to comment or put a question, moderators pick questions.
Online commenting and workshop notes will be kept via board.net (see links distributed Oct 4th)
remote poster presenters should be on zoom to present their submitted slides at the scheduled time
remote poster presenters are invited IN ADDITION and if desired to *provide an extra video link (teams, zoom, webex*
recommended) on how to contact them for further discussion (please provide video link info on workshop notes boardnet)

Day 1   Monday, October 10, 2022

AEROCOM/AEROSAT session 01   introduction   10:00-11:00   **Balkanski**
     10:00 Myhre, Gunnar   Logistics
     10:10 Kahn, Ralph   AEROSAT summary
     10:30 Schulz, Michael   20 years of AeroCom

AEROCOM session 02   modeling   11:00-12:20   **Chin**
     11:00 Lee, Huikyo   Evaluating spatial structures of aerosols simulated by the AeroCom models
     11:20 Samset, Bjorn   A strong potential role of aerosol absorption in historical precipitation change
     11:40 Tsigaridis, Kostas   Simulating volcanoes of all scales with GISS ModelE
     12:00 Gonçalves, María   Assessment of modeled dust mineralogy with multiple Earth System Models

       LUNCH   12:20-13:30

AEROCOM session 03   experiments   13:30-14:50   **Tsigaridis**
     13:30 Chin, Mian   Progress and updated results of the AeroCom UTLS+ACAM experiment
     13:50 Yu, Hongbin   Updates on AeroCom Phase III analyses of dust cycle and trans-Atlantic dust deposition
     14:10 Kim, Dongchul   Assessment of dust source attribution to the global land and ocean regions

       BREAK   14:30-15:00

remote SHORT (-oral) session S1   (11 posters - late, US)   15:00-16:50   **Kinne**
     Watson-Parris, Duncan **(-1)**   Multi-model Perturbed Parameter Experiment update
     Jordan, George **(-1)**   *VolcACI: A Natural Experiment to Improve Aerosol-Cloud Interactions in Models*
     Kayetha, Vinay **(-6)**   *UV-VIS Spectral aerosol absorption dataset derived from AERONET-OMI-MODIS synergy*
     Clifton, Olivia **(-6)**   *Quantifying the influence of mechanistic representation and uncertainty in particle dry deposition on air pollution and climate*
     Bian, Huisheng **(-6)**   *Investigation of aer. hygroscopicity using multi-campaign multi-sensor NASA aircraft data*
     Pan, Xiaohua **(-6)**   *Update on AeroCom Biomass Burning Emission Injection Height experiment (BBEIH)*
     Pan, Xiaohua **(-6)**   *NASA MERRA-2 Reanalysis Products: Data and Tools for Aerosol and Air Quality Studies*
     Ahsan, Hamza **(-9)**   *Results from Emissions-MIP—a Climate and Chemistry Model Intercomparison Project*
     Suchyta, Harrison **(-9)**   *Emissions-MIP Phase 1b - a Climate and Chemistry Model Intercomparison Project*
     Hoesly, Rachel **(-9)**   *A global anthropogenic emissions inventory of reactive gases and aerosols (1750 – 2021)*
     Prime, Noah **(-9)**   *Introducing Point Source Time Series Data into the Community Emissions Data System*

       ICE BREAKER at the toppsenter   17:00-19:00

Day 2   Tuesday, October 11, 2022

remote SHORT (-oral) session S2   **(6 posters - early: Asia, Aus, Jap)**   8:30-9:00   **Samset**

     Robbins, Daniel **(+10)**   *Improving Satellite Aerosol Retrievals During Extreme Fire Events in Australia*
     Yu, Yan **(+8)**   *Enhanced dust emission following large wildfires due to vegetation disturbance*
     Takemura, Toshihiko **(+9)**   *North Atlantic Warming Hole by reducing anthropogenic aerosols*
     Wang, Zhili **(+8)**   *Incorrect Asian aerosols affecting attribution/projection of reg. climate change in CMIP6*
     Devi, Archana **(+4)**   *Global maps of aerosol single scattering albedo using combined CERES-MODIS retrievals*
     Xue, Yong **(+8)**   *Global and Hourly Data of Aerosol Properties over Land from Geostationary Satellites*

onsite SHORT (-oral) session S3   **(9 posters)**   9:00-10:10   **Kinne**

     DeLessio, Maegan   *Initial results and evaluation of brown carbon representation in GISS ModelE*
     Ginoux, Paul   *Sensitivity of dust modeling to anthropogenic emission factors using GFDL ESM4*
     Henkes, Alice   *Hemispheric Contrast of the Anthrop-Aerosol-Cloud Interaction in ICON-A-HAM2.3 Model*
     Kinne, Stefan   *The MACv3 aerosol climatology*
     Kwakye, Samuel   *Analysis of insect concentrations using Weather radar echoes classification*
     Miinalainen, Tuuli   *Analyzing climate and air quality from aerosol mitigation in India using ECHAM-HAMMOZ*
     Rosenfeld, Daniel   *Underappreciated Contrasting Large Effects of Fine and Coarse (salt) Aerosols on Clouds*
     Schepanski, Kerstin   *Environmental changes on dust emission: towards a time-varying modeling approach*
     Haugvaldstad, Ove   *Decomposing radiative effects by mineral dust aerosols in CMIP6 models*

     BREAK   10:10-10:40

AEROCOM session 04   **ground-observations**   10:40-11:20   **Yu**

     10:40 Aoki, Kazuma   Variability of aerosol optical properties by long-term ground/ship measurements
     11:00 Smirnov, Alexander   Maritime Aerosol Network of AERONET - an international collabor. effort

AEROCOM session 05   **more observations**   11:20-12:00   **Myhre**

     11:20 Digby, Ruth   Observational constraints on CMIP6 aerosol sensitivity from the COVID-19 lockdowns
     11:40 Schutgens, Nick   Modeled relationships and satellite obs. to constrain aerosols in biomass burning regions
     (for Zhong, Qirui)

     LUNCH   12:00-13:00

AEROCOM session 06   **RT modeling**   13:00–15:30   **Schulz**

     13:00 Skeie, Ragnhild   Aerosol Radiative Forcing in the AeroCom historical experiment
     13:20 Kok, Jasper   Radiative forcing due to historical increase in desert dust
     13:40 Kinne, Stefan   MACv3 associated aerosol radiative effects
     14:00-14:20   *small break*
     14:20 Wilcox, Laura   Anthropogenic aerosol forcing in the 1850–1985 strengthening of the AMOC in CMIP6
     14:40 Allen, Robert   Shortwave absorption by methane mutes its (IR) warming effects
     15:00 Schulz, Michael   Introduction to late afternoon program

     BREAK   15:30-16:00

AEROCOM poster viewing session   16:00-19:00
AEROCOM late afternoon breakout sessions   17:00-19:00
Time slot is for joint intensive discussions, so far planned in parallel 1) "modular modeling via a GIANT general aerosol chemistry interface and other approaches (Jeff + Michael)" **and 2)** "retrieval assumptions & constraining aerosol properties" (Greg+Yves) **Other topics** important for AeroCom/Aerosat are welcome, please write to Michael. More description in final programme

…for those who want, we gather in a pub

Further info on Tuesday/Thursday late afternoon AeroCom breakout sessions
On-site break out rooms to be announced during the meeting
Zoom link for meeting will be used for remote access through breakout sessions
See remote logistics sheet send out separately

Tuesday 17-19 and Thursday 17-19

Sessions:

1) What makes aerosol modeling so hard? Is **code modularity** the answer?
   (on site moderator Michael, remote co-organiser Jeff, Matt, Alma)
2) Commissions on **constraining aerosol properties** and calculating optics
   (on site moderator: Yves and Greg)
3) Other suggestions???

Session 1: **Code modularity**
Overarching questions
What is so hard in coding and evaluating aerosol models? (Roundtable)
How have community members tried to separate aerosol code from host models?
Interventions from participants (2-5 slides each)

What would be the benefits of interchangeable aerosol modules (or parts of them)?
What is the best way to go forward? Technically? Organisationally? Goals?
What can you/your group contribute to code exchange / better interfaces / configurability / coding recommendations

Session 2: **Constraining aerosol properties**
Four Overarching questions:
1- Aerosol type versus aerosol species - How do we bridge the gap? What approaches exist, what needs to be done?
Moderator: *Greg Schuster*

2- Sampling aerosols versus simulating aerosols - How does one link measurements with the average concentration of let's say a 1°x1° model gridbox?
Moderator: tbd

3- Aerosol hygroscopicity - Old versus new approaches. What has evolved in recent years in our understanding of hygroscopicity?
Moderator: tbd

4- Aerosol trends - What are the Aerocom experiments telling us and how do they improve our understanding of aerosol trends?
Moderator: *tbd*

Day 3 **Wednesday, October 12, 2022**

AEROCOM / AEROSAT session 07   Aerosol-cloud interaction   9:00-10:20   Rosenfield (Lufarelli)

  9:00 Lohmann, Ulrike   Ice clouds: how satellite retrieved ice-cloud properties respond to aerosol perturbations?
  9:20 Arola, Antti   Aerosol effects on clouds concealed by cloud heterogeneity and satellite retrieval errors
  9:40 Povey, Adam (for Gryspeerdt)   The impact of cloud and aerosol retrieval biases on forcing constraints
  10:00 Jia, Hailing   What can we learn about aerosol-cloud interactions from decadal trends?

                BREAK   10:20-10:50

  10:50 van Diedenhoven, Bastiaan   An observational study on the vertical development of shallow cumulus
                 and congestus clouds and its sensitivity to aerosol concentrations
  11:10 Zhang, Kai   On the regional differences in cloud and precipitation responses to anthropogenic
                aerosol perturbations through fast processes

invited presentation: **Trude STORELVMO**   11:30-12:20
                "Aerosols in IPCC AR6
                 - rationale for the assessment and remaining knowledge gaps"

                LUNCH   12:20-13:30

AEROCOM / AEROSAT joint excursion   15:00 - 17:00
(Munch Museum visit https://www.munchmuseet.no/en/)

Bus transport from Munch Museum to restaurant   17:30
2 Busses start in front of Munch museum

AEROCOM / AEROSAT joint dinner   18:30-21:30
Grefsenkollen restaurant

Bus transport back to central station   21:30

Day 4   Thursday, October 13, 2022

invited presentation: **Hilde FAGERLI**   9:00-9:30
            "Science underpinning of air quality policy in past and future Europe"

AEROCOM / AEROSAT session 08   **air quality**   9:30-10:50   **Kahn (Povey)**
    9:30 Veihelmann, Ben   CEOS-AC PM2.5 whitepaper: Challenges in deriving PM air quality from satellites
    9:40 Chin, Mian   Towards using GEO-LEO satellite observations for air quality research and application
    9:50 *discussion*:   trends, perspectives, new opportunities for using satellite data for air quality applications

            BREAK   10:50-11:20

AEROSAT session 09   **retrieval evolution**   11:20-12:50   **Chimot (Sawyer)**
    11:20 Dubovik/tbd   GRASP (retrieval) overview presentation
    11:30 Witek, Marcin   Increasing the accuracy of MISR AOD retrievals over land at high aerosol loading
    11:40 *discussion:*   trends, perspectives, new opportunities for retrievals: multi-angle polarimeters,
                    synergistic products, retrievals for extreme cases, geostationary satellites

            LUNCH   12:50-14:00

onsite SHORT (-oral) session S4   **(10 posters)**   14:00-15:20   **Popp**
    Dubovik, Oleg   *Aerosols from multi-angular satellite obs: perspectives, practical advancements*
    Litvinov, Pavel   *Synergetic GRASP retrievals for enhancement of aerosol and surface* characterization
    Chimot, Julien   *OSSAR-CS3 - Two years of (pre)operational NRT (Near Real Time) Copernicus Sentinel-3*
                    aerosols, Lessons learned and new developments for the next 2 years
    Kolmonen, Pekka   *Investigating dual-view aerosol retrievals using machine learning*
    Lipponen, Antti   *NOvel cOmputational methoDs for reLiablE SAteLlite-based Air quality Data*
    Pearson, Kevin   *New products of global aerosol for Sentinel-3, continuity ERS-2 and ENVISAT results*
    Chen, Cheng   *Global aerosol absorption constrained by multi-angular polarimetric remote sensing*
    Shi, Yingxi   *Investigating the spatial and temporal limitations of satellite characterization of wildfire*
                    smoke using satellite and airborne imagers during FIREX-AQ
    Povey, Adam   *The statistical distribution of aerosol optical depth*
    Kim, Dongchul   *Multi-model comparison of dust optical depth at 10 um over the Northern Atlantic Ocean*

            BREAK   15:20-15:50

remote SHORT(-oral) session S5   **(6 posters - normal, EU)**   15:50-16:30   **Kahn**
    Jafariserajehlou, Soheila **(0)**   *The latest updates of Polar Multi-sensor Aerosol product (PMAp)*
    Garrigues, Sebastien **(-1)**   *Assimilation of multi-satellite aerosol optical depth (AOD) in the CAMS Monitor Service*
    Hasekamp, Otto **(0)**   *Constraining aerosol properties using polarimetric satellite observations*
    Mallet, Marc **(0)**   *Climate models underrepresent SE-Atlantic 'warming' from Central Africa biomass-burning*
    Ferrare, Richard **(-6)**   *Aerosol Humidification Observed by the Airborne High Spectral Resolution Lidar-2*
    Herrera, Milagros **(0)**   *A comprehensive analysis of dynamic error estimates provided by GRASP algorithm*

    16:20 Michael Schulz   Introduction to late afternoon program

AEROCOM poster viewing session   16:30-19:00

AEROCOM/AEROSAT late afternoon session   17:00-19:00
    continued discussions / new general topics / eventually follow up from tuesday evening discussions

Day 5   Friday, October 14, 2022

AEROCOM / AEROSAT session O10   **constraining models**   8:30-10:10   **Chin (Griesfeller)**

8:30 Popp, Thomas	The CCI simple 4-components approach: strengths, limitations, possible improvements
8:40 Kahn, Ralph	Constraints on Wildfire Smoke Source Strength, Injection Height, and Particle Evolution
8:50 Schuster, Greg	Models, In situ, and Remote sensing of Aerosols (MIRA)
9:00 *discussion*:	trends, perspectives, new opportunities for constraining retrieval-models and global modeling, three-way approach for use/considerations of aerosol typing

        BREAK   10:10-10:40

AEROSAT session O11   **climate data records**   10:40-11:30   **Popp (Witek)**

10:40 Sawyer, Virginia	20 years of Aqua and AeroCom: regional aerosol trends, time series for MODIS and VIIRS
10:50 Sogacheva, Larisa	Towards harmonization of the ATSR and SLSTR AOD CDRs
11:00 Fougnie, Bertrand	EUMETSAT's 13-year PMAp CDR
11:10 *discussion*:	trends, perspectives, new opportunities for consistent long-term data records

        LUNCH   11:40-12:40

AEROSAT session O12   **cloud masking**   12:40-14:00   **Sogacheva (Lee)**

12:40 Mei, Linlu (**remote**)	Introduction to issues with cloud masking
12:50 Luffarelli, Marta	Aerosol retrieval in presence of clouds
13:00 *discussion*:	trends, perspectives, new opportunities for dealing with clouds, probabilistic and synergetic approaches

AEROCOM/AEROSAT session O13   **outlook**   14:00-15:00

14:00 Schulz, Michael	AeroCom outlook (including feedback from rapporteurs)
14:30 Popp, Thomas	AeroSat outlook (including feedback from rapporteurs)