5th AeroCom workshop

17. - 19. October 2006 at Virginia Beach, Virginia, USA

hosted by NASA-Langley and NASA-Goddard

Context and Objectives:

The AeroCom initiative has now accomplished its first phase with a series of publications on the current status of global aerosol modeling (see references in appendix). The forcing results have been very useful to direct the upcoming IPCC fourth assessment report. The documented diversity suggests that further efforts are needed to benchmark the model results against observations in order to ultimately reduce uncertainty in aerosol impact studies on climate and health. AeroCom workshops in the past have been shown to be a good opportunity to discuss problems associated with aerosol modeling and the appropriate use of observations to benchmark model results. The workshop will provide a forum to present recent developments and an opportunity to discuss a second phase of experiments and the future use of the AeroCom database.

More specifically the objectives of the 5th AeroCom workshop are to

- Review recent modeling work and observation comparisons within AeroCom on aerosol properties and direct and indirect forcing estimates
- Discuss the use of new aerosol quality products for model evaluations, in particular the new collections of sensor data-processing (MODIS and MISR), CERES flux data, and A-train data.
- Inform each other on the use of data assimilation efforts under way to obtain improved merged data products from observations and models
- Discuss the use and development of the AeroCom tools to monitor more efficiently progress and quality of global aerosol models. Inform each other and agree upon standards to document model versions and model output

- Plan specific new experiments to understand model diversity with respect to aerosol dynamics, transport and removal processes
- Plan new experiments to establish “ensemble” products:
  - calculation of inter-hemispheric transport (together with HTAP convention)
  - establish source receptor relationships for continental scale regions
  - establish a future (emission) scenarios of aerosol fields
- Inform each other on chemical forecast efforts with respect to aerosol modeling
- Review aerosol forcing estimates and aerosol climate interaction experiments

The program has been set up to have presentations in blocks of only four each, so that with the many breaks, attention levels can remain high. In addition, panel discussions at the end of each major topic allow for extra discussion time.

5th AeroCom - workshop program

Day 1 (Oct. 17th)

Block 0 8.30-9.00

welcome, scope, (brief) review

R. Ferrare	local	15	welcome and logistics
M. Schulz	project	15	what we have achieved so far (review)

10min break

Block 1 9.10-10.50

aerosol properties –part 1 chair: J.Wilson

Topic: new products (or updates), accuracy and preparations for scale of global models

R. Ferrare	ground	20	(raman-) lidar to constrain aerosol alt. simulations
E.-J. Welton	ground	20	MicroPulse Lidar network (MPL-net)
D. Giles	ground	20	new developments in AERONET processing
G. Schuster	ground	20	BC-aerosol mass / conc. from AERONET
J. Wilson	ground	20	extinction, ssa and SU/BC ratios

20min coffee-break

Block 2 11.10-12.30

aerosol properties –part 2 chair: J.F. Leon

Topic: new products (or updates), accuracy and preparations for scale of global models

R. Kahn	satellite	20	(aerosol) air mass mapping with MISR
S. DeSouza	satellite	20	dust aerosol retrievals with AIRS
N.C. Hsu	satellite	20	"Deep Blue" for retrieving AOD over desert
R. Levy	satellite	20	MODIS collection 5 aerosol properties

60min lunch-break

Block 3 13.30-14.20

aerosol properties –part 3 chair: R. Kahn

Topic new products (or updates), accuracy issues and limitations for use in modeling

J.-F. Leon	satellite	20	aerosol remote sensing with PARASOL and A-train
D. Winker	satellite	20	CALIOP – promising global data on aerosol altitude
Z. Li (ppt)	satellite	10	GEWEX aerosol data assessment *(presented by Chin)*

Panel on Data **14.20-14.40**

what most urgent data needs in global modeling?
can we quantify accuracy and (sampling) bias issues?
how to prepare data to be applicable to (temp./spatial) scales in global modeling?

20min coffee-break

P. DeCola	sponsor	15	context in global research (GEWEX, IPCC ….)

5min break

Block 4 15.20-16.40

<u>emission data –part 1</u> chair: P.Ginoux

Topic: emission input (issues and uncertainty) emission scenarios

D. Koch	absorption	20	aerosol absorption in the context of BC emissions
T. Bond	future emiss.	20	emission inventories and scenarios
B. DeAngelo	future emiss.	20	energy modeling forum
T. Nozawa	past emissions	20	BC (black carbon)

10min break

Block 5 16:50-18:10

<u>emission data –part 2</u> chair. T. Bond

Topic: emission input (issues and uncertainty): past emission

M. Chin	past emissions	20	satellite fire data and biomass burning emission
C. Ichoku	past emissions	20	MODIS radiative power for biomass burning
P. Ginoux	past emissions	20	20th century dust emission
T. Diehl	past emissions	20	1980-2005 global aerosol emissions

10min break

Panel on AeroCom supported emission data **18:20-18:50**

updates to the existing data-base?
what new future scenarios?

…continue discussions during the evening

Day 2 (Oct 18th)

Block 6 8.30-9.40

<u>future and collaborations</u> chair: M. Schulz

Topic: where are we heading

M. Chin	transport	20	intercontinental transport
C. Textor	shell GCM	20	influences of harmonizing models (ExpA vs ExpB)
S. Doherty	organization	20	IGAC/WCRP initiative Atmos Chem. and Climate
M. Schulz	set-up	20	the next years (e.g., benchmarking, automatization, new experiments, database access, steering group formation, link to AC&C and HTAP, preparation of 5AR-IPCC)

10min break

Panel on Future Activities *(short term, in one year and in three years)* **9.50-10.50**

what can we do with data we already have: absorption, PM2.5, wet/dry dep.)
do we need to repeat (judge progress?) or fine-tune previous experiments
what new experiments (also in the context of other activities) should be pursued?
how to share the evaluation task?
what modeling output (e.g. median) should be shared with other communities?

20min coffee-break

Block 7 **11.10-12.30**

constraining modeling with data chair: S.Menon

Topic: additional insights from the use of data and/or smart data –combinations

P. Colarco	assimilation	10	MODIS, Anet, surf.data in models *(presented by Chin)*
C. Kittaka	assimilation	20	CALIPSO, HSRL, MODIS in regional.modeling
N. Loeb	multiple sat	20	cloud and aerosol relationships: MODIS, CERES
J. Quaas	multiple sat	20	MODIS and CERES for direct and indirect forcings

60min lunch-break

Block 8 **13:30-14.50**

modeling aerosol indirect effects chair: P.Collarco

Topic: modeling aerosol indirect effects

S. Menon	multiple sat	20	MODIS and AMSR-E for indirect 'clues'
J. Penner	indirect mod	20	first clues from initial studies
A. Nenes	indirect mod	20	Modeling of aerosol indirect effects in a GCM
T. Storelmvo	indirect mod	20	indirect impact involving water clouds

10-min break

Panel on modeling the aerosol indirect effect **15.00-16.00**

Where are the biggest gaps in modeling aerosol indirect effects?
Can we rank aerosol indirect effect by their importance?
Does modeling even consider all indirect effects?
Can data correlations be a constraint to modeling?
How meaningful are correlations for interactions or initiator-effect relationships?
Which aerosol processes can be tested and constrained by which data?
How to construct useful benchmark tests?

30-min coffee-break

Block 9 **16.30-18.00**

new developments in modeling chair: D.Koch

Topic: new approaches in modeling

T. Iverson +	processing	30	aerosol processing sensitivity (Oslo-CCM)
X. Liu	processing	20	aerosol processing concepts (NCAR-CAM3)
H. Bian	modular mod	20	a modular approach to understand processing

G. Mann	processing	20	aerosol processing optimization (UK-Leeds model)

conference dinner **at Il Giardino** **19.00**

Day 3 (Oct.19th)

Block 10 8.30-9.50

forcing /climate impact –part 1 chair: N.Bellouin

Topics: overview and individual impacts

M. Schulz	overview	20	aerosol impact on climate: AeroCom diversity
L. Rotstayn	indirect mod	20	Asian aerosol and rainfall in Australia
Y. Balkanski	model-result	20	dust impact (LSCE model)
A. Lauer	model-result	20	ship emission impact (ECHAM5-MADE model)

30min coffee-break

Block 11 10.20-11.50

forcing /climate impact –part 2 chair: Y.Balkanski

Topics: general results from modeling

T. Takemura	model-result	20	total aerosol impact (SPRINTARS)
P. Stier	model-result	20	aerosol absorption impact (ECHAM5-HAM model)
N. Bellouin	model-result	20	total aerosol impact (Hadley model)
Y. Ming	model-result	20	total aerosol impact (GFDL)
S. Kinne	model-result	10	discrepancy betw. data-tied estimates and modeling

10min break

Panel on simulating the aerosol impact on climate **12:00-13:00**

Have recent simulations (bc, mixing, rh) changed our view on the aerosol impact?
Do we understand discrepancies (of climate impact) to data-tied approaches?
What aerosol or environm. data are needed most, to reduce impact uncertainties?

60-min lunch-break

Block 12 14.00-15.25

related projects chair: S.Kinne

Topic: potential for collaborations

J. Crawford	project	20	POLARCAT
T. Charlock	project	20	CERES Surface and Atmosphere Radiation Budget
S. Cox	project	15	GEWEX-SRB
A.Chu	project	20	Air Quality and MODIS
S.Gong (ppt)	project	10	NARSTO *(presented by Kinne)*

5min break

Block13 15.30-16.00

wrap-up chair: M. Schulz

APPENDIX I

websites

AeroCom Website with documentation
http://nansen.ipsl.jussieu.fr/AEROCOM/

Task Force on Hemispheric Transport of Air Pollution website
http://www.htap.org/

publications

Kinne, S., M. Schulz, C. Textor, S. Guibert, Y. Balkanski, S.E. Bauer, T. Berntsen, T.F. Berglen, O. Boucher, M. Chin, W. Collins, F. Dentener, T. Diehl, R. Easter, J. Feichter, D. Fillmore, S. Ghan, P. Ginoux, S. Gong, A. Grini, J. Hendricks, M. Herzog, L. Horowitz, I. Isaksen, T. Iversen, A. Kirkevåg, S. Kloster, D. Koch, J.E. Kristjansson, M. Krol, A. Lauer, J.F. Lamarque, G. Lesins, X. Liu, U. Lohmann, V. Montanaro, G. Myhre, J. Penner, G. Pitari, S. Reddy, O. Seland, P. Stier, T. Takemura, and X. Tie: An AeroCom initial assessment optical properties in aerosol component modules of global models, ***ACP, 6,*** **1-22, 2006**

Textor, C., M. Schulz, S. Guibert, S. Kinne, Y. Balkanski, S. Bauer, T. Berntsen, T. Berglen, O. Boucher, M. Chin, F. Dentener, T. Diehl, R. Easter, H. Feichter, D. Fillmore, S. Ghan, P. Ginoux, S. Gong, A. Grini, J. Hendricks, L. Horowitz, P. Huang, I. Isaksen, T. Iversen, S. Kloster, D. Koch, A. Kirkevåg, J.E. Kristjansson, M. Krol, A. Lauer, J.F. Lamarque, X. Liu, V. Montanaro, G. Myhre, J. Penner, G. Pitari, S. Reddy, Ø. Seland, P. Stier, T. Takemura, and X. Tie: Analysis and quantification of the diversities of aerosol life cycles within AeroCom, ***ACP, 6*****, 1777-1811, 2006**

Penner, J.E., J.Quaas, T.Storelvmo, T.Takemura, O.Boucher, H.Guo, A.Kirkevag, J.E. Kristjansson and Ø. Seland, Model intercomparison of indirect aerosol effects, ***ACP, 6, 3391-3405, 2006.***

Dentener, F., S. Kinne, T. Bond, O. Boucher, J. Cofala, S. Generoso, P. Ginoux, S. Gong, J. Hoelzemann, A. Ito, L. Marelli, J. Penner, J.-P. Putaud, C. Textor, M. Schulz, G.v.d. Werf, and J. Wilson: Emissions of primary aerosol and precursor gases in the years 2000 and 1750 -prescribed data-sets for AeroCom, ***ACP*****, 6, 4321-4344, 2006**

Schulz, M., C. Textor, S. Kinne, Y. Balkanski, S. Bauer, T. Berntsen, T. Berglen, O. Boucher, F. Dentener, A. Grini, S. Guibert, T. Iversen, D. Koch, A. Kirkevåg, X. Liu, V. Montanaro, G. Myhre, J. Penner, G. Pitari, S. Reddy, Ø. Seland, P. Stier, and T. Takemura: Radiative forcing by aerosols as derived from the AeroCom present-day and pre-industrial simulations, ***ACPD*** **2006**