Meteorologisk institutt

AeroCom

AeroCom workshop introduction

Michael Schulz
Norwegian Meteorological Institute

Meteorologisk institutt

AeroCom

Recent papers from AeroCom

Ongoing activities

AeroCom database and web interface

Ongoing work at MetNo

Workshop Programme

2015 PAPERS FROM AEROCOM

Meteorologisk institutt

AeroCom

Pan, X., et al.: *A multi-model evaluation of aerosols over South Asia: Common problems and possible causes*, Atmos. Chem. Phys. Discuss., 14, 19095-19147, doi:10.5194/acpd-14-19095-2014, 2014.

Lacagnina Carlo et al.*, Aerosol Single Scattering Albedo over the global oceans: comparing PARASOL retrievals with AERONET, OMI and AeroCom models estimates*, JGR 2015 accepted.

Kipling, Z., et al : *What controls the vertical distribution of aerosol? Relationships between process sensitivity in HadGEM3–UKCA and inter-model variation from AeroCom Phase II*, Atmos. Chem. Phys. Discuss., 15, 25933-25980, doi:10.5194/acpd-15-25933-2015, 2015.

Kristiansen, N. I. et al. *Evaluation of observed and modelled aerosol lifetimes using radioactive tracers of opportunity and an ensemble of 19 global models*, Atmos. Chem. Phys. Discuss., 15, 24513-24585, doi:10.5194/acpd-15-24513-2015, 2015.

+++???

Ongoing activities

AeroCom phase III experiments

https://wiki.met.no/aerocom/phase3-experiments

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AeroCom

In-situ Measurement Comparison

Contact: Betsy Andrews (NOAA/ESRL/GMD), Betsy.Andrews@noaa.gov

Experiment Description INSITU_AeroComPIII_description.pdf

List of stations with in-situ measurements to be used in comparison pr

Modeller commitments (updated as commitments are made): SPEvAq2fmtCzHIjFWnoTmKsthUhU/edit?usp=sharing

Follow project progress here: https://docs.google.com/document/d/1buqxPbJ7DhWrwBUgTGV8b47HWAzaeyTTeSzViq8Fo4M/edit?usp=sharing

Tools to extract station data at station locations from mod

ncl: https://github.com/kaizhangpnl/sample_insitu kin

https://docs.google.com/document/d/1buqxPbJ7DhWrwBUgTGV8b47HWAzaeyTTeSzViq8Fo4M/edit?usp=sharing

See Betsy's talk

Nitrate comparison

Contact: Huisheng Bian (GSFC/NASA, JCET/UMBC), Huisheng.Bian@nasa.gov

Experiment Description File

NH3 Emissions from Geia file

File name convention Nitrate Filename Protocol File

Essential nitrate variables file

See Huisheng's talk

Biomass Burning emissions experiments

Contact: Mariya Petrenko (NASA GSFC, USA; ORAU, USA), mariya.m.petrenko@nasa.gov

Experiment Description (updated November 26, 2014) File

Model output file naming convention (September 11, 2014) File

Variable names for model output (highlighted in blue/cyan; October 16

See Mariya's talk

HTAP 2 experiments

Contact: Mian Chin (NASA) mian.chin@nasa.gov; Michael Schulz (MetNo) michael.schulz@met.no

AeroCom specific experiment description for HTAP2 File

HTAP2 experiment description HTAP website

See Mian's talk

Aerosol Lifetime experiments, Fukushima tracers

Model output Specifications

See Ninas draft on ACPD

AeroCom phase III experiments

https://wiki.met.no/aerocom/phase3-experiments

AeroCom Control 2015

Contact: Michael Schulz (MetNo), michael.schulz@met.no

Experiment Description and motivation:

The model versions used for the different experiments are often not easily comparable. New model versions should be documented regularly to establish a state of the art comparison yearly. For this purpose AeroCom offers a semi-automatic platform with visualization via the AeroCom webinterface. Evaluation with surface observations and Aeronet observations will complete the documentation of emissions, re

Deadline for model submissions to be anlaysed before the Frascati
instructions below.

Experiment name: AP3-CTRL2015

Output requested (2D fields, Monthly averages, preferably year 2010 meteorology):
EMI Emissions: BC, OA, SO2, DMS, NOx, VOC, DUST, SS
LOAD Column Loads: BC, OA, SO4, NO3, DUST, SS
SCONC Surface concentrations: BC, OA, SO4, NO3, DUST, SS
DEP Total Deposition: BC, OA, SO4, NO3, DUST, SS
OD550 Aerosol optical depth @550nm: AER, OA, SO4, NO3, DUST, SS

The directory /media/scratch/incoming/AEROCOM-P3-AUTO-UPLOAD allows for automatic incorporation into the AeroCom database and workup. Uploaded files are processed automatically by the AeroCom tools and transfered into the AeroCom phase III data directory.

If correct in format and with correct filenames, results uploaded here will be processed over night and appear after few days as image catalogue on http://aerocom.met.no/cgi-bin/aerocom/surfobs_annualrs.pl?PROJECT=AEROCOM&MODELLIST=AEROCOM-Phase-III

Short Recipe (Long version: https://wiki.met.no/aerocom/data_submission)

1) Name files according to HTAPII/AeroComPhaseIII standards. One file per year and variable
aerocom3_<ModelName>_<ExperimentName>_<VariableName>_<VerticalCoordinateType>_<Period>_<Frequency>.nc
for example
aerocom3_GOCART-AP3-CTRL2015_od550aer_Column_2010_monthly.nc

2) Check for cf compliance some files (http://aerocom-test.met.no/upload)

3a) obtain account on aerocom-users server
3) create directory on aerocom-users server:
/media/scratch/incoming/AEROCOM_AUTO_UPLOAD/{MODELNAME}/renamed/
Use exactly the same model name as used for file names. Attention to lower&upper case!!

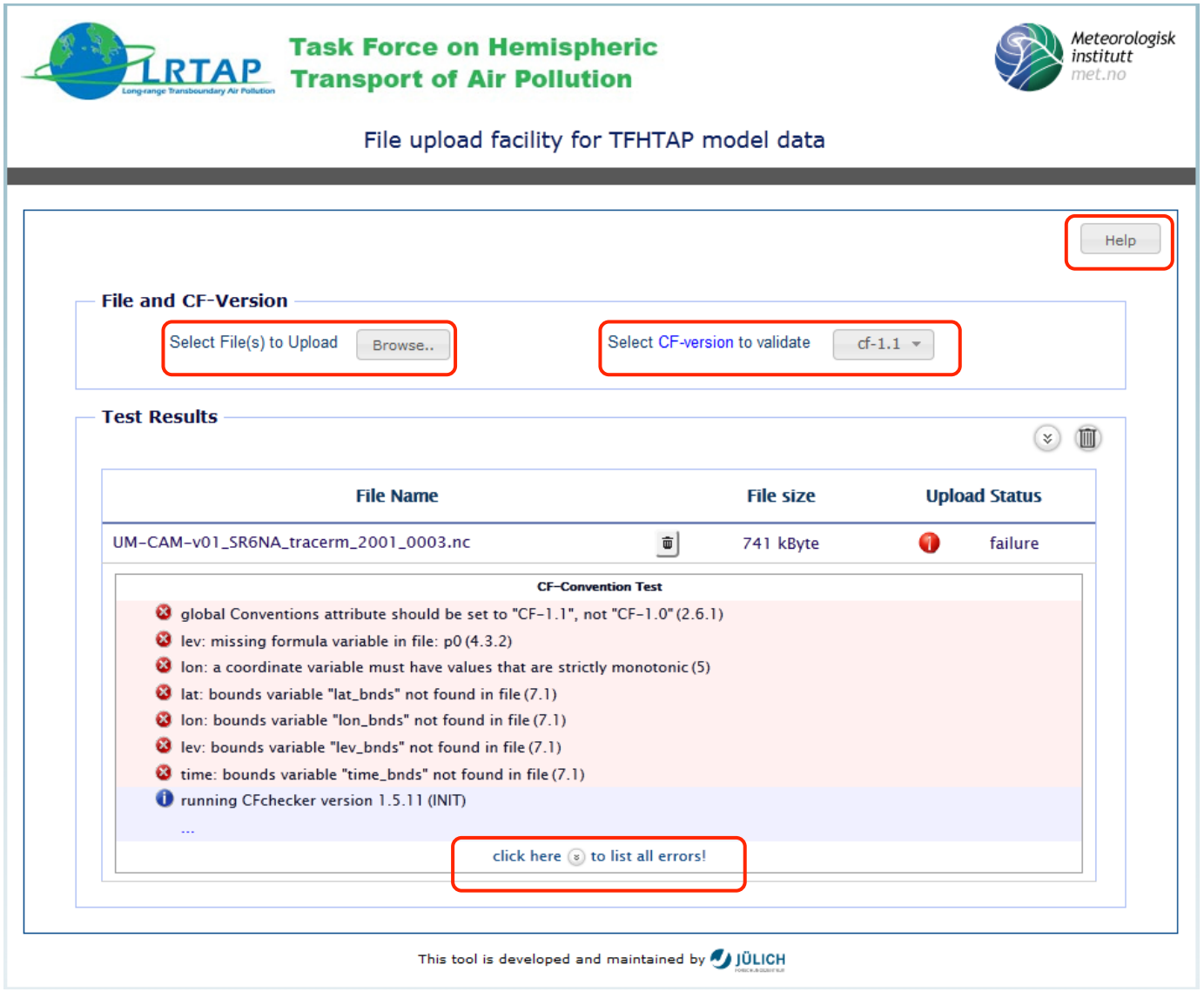
4) Put files directly into this "renamed" directory.

See this and Michael's talk

More initiatives will be proposed during this workshop On Size evaluations, Perturbations, Semi-direct effect, Satellite data evaluation, …

Formatting ?? Has improved !!

http://aerocom-test.met.no/upload



AeroCom database and web interface

New Features of AEROCOM web interface

http://aerocom.met.no/cgi-bin/aerocom/surfobs_annualrs.pl

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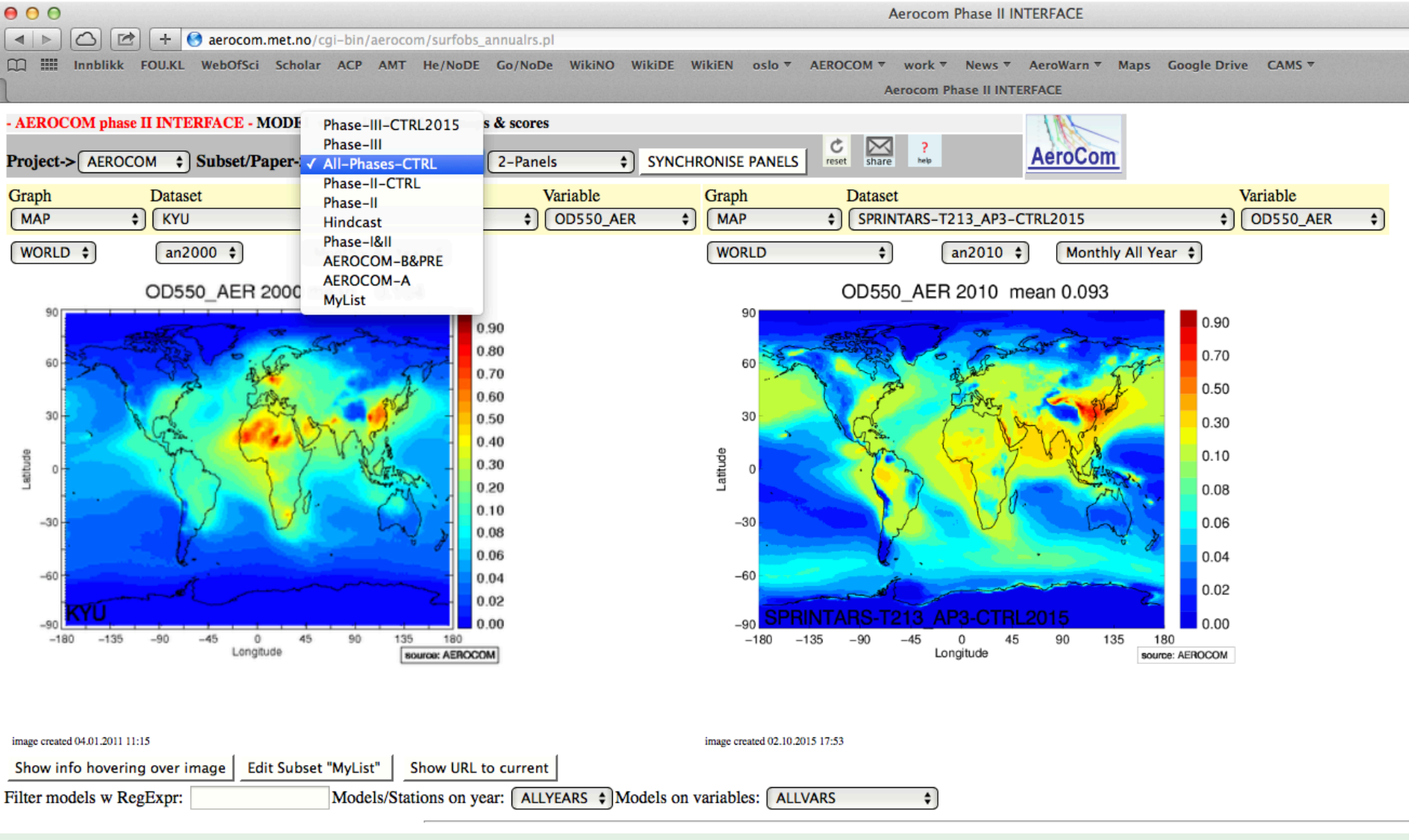
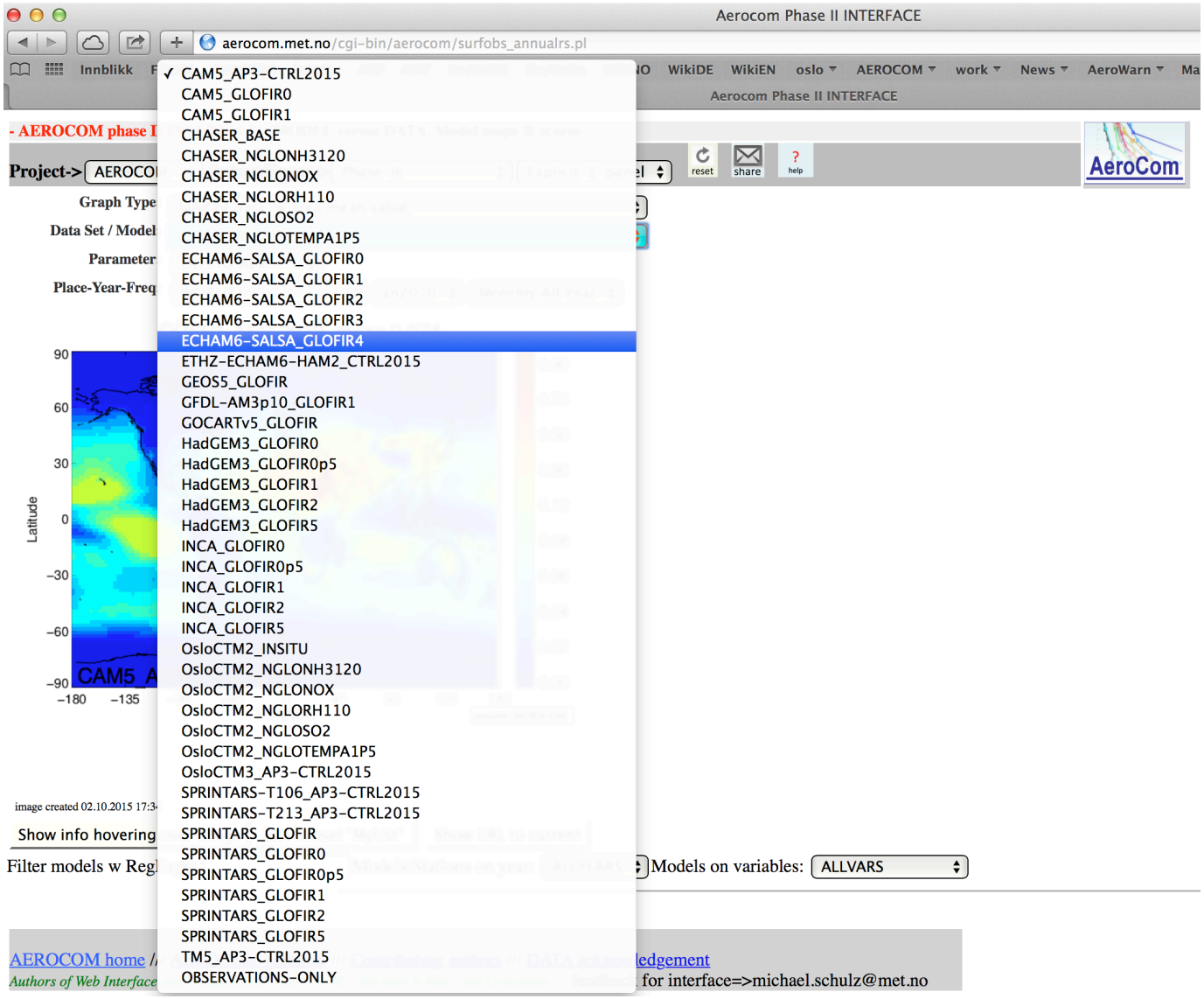
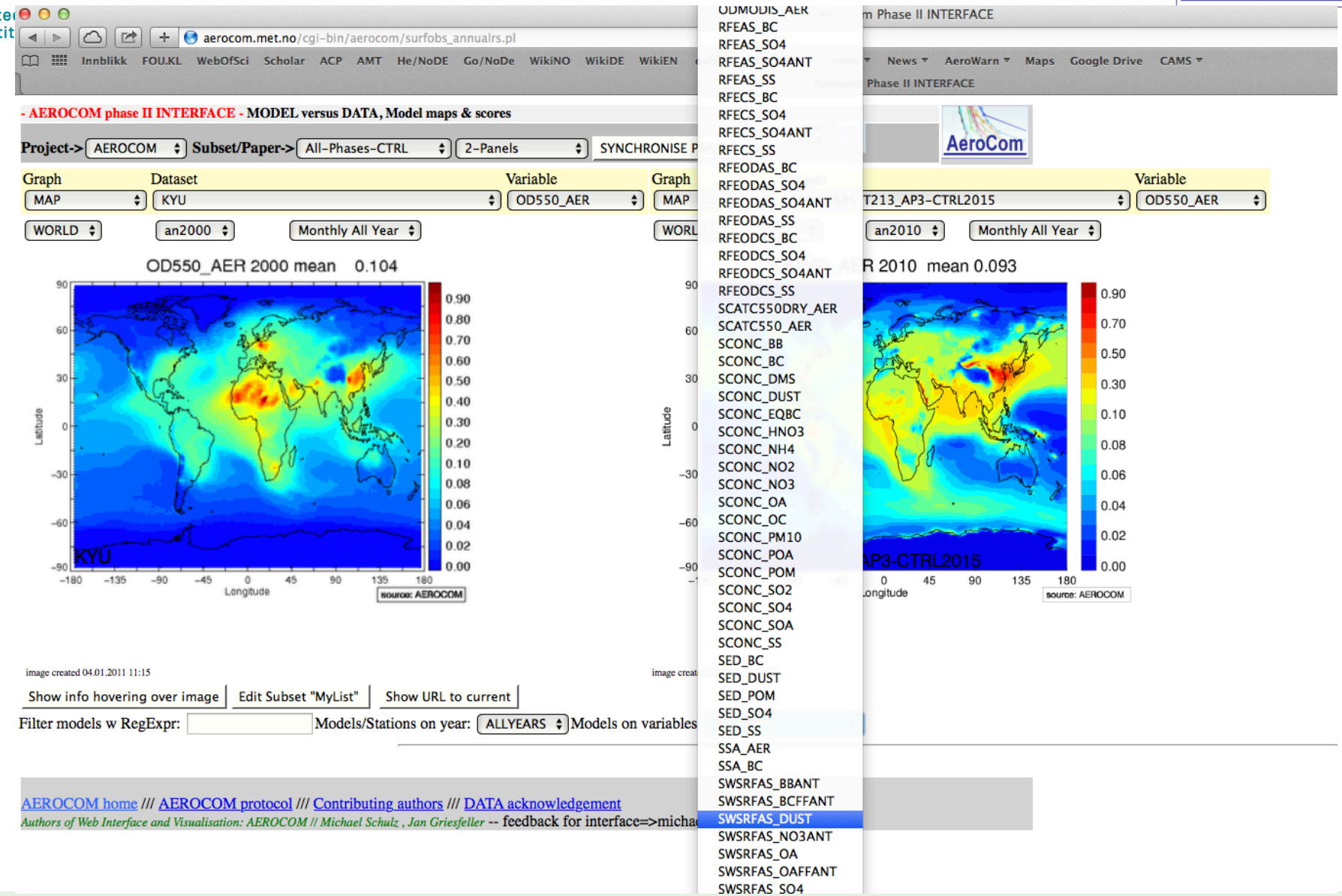


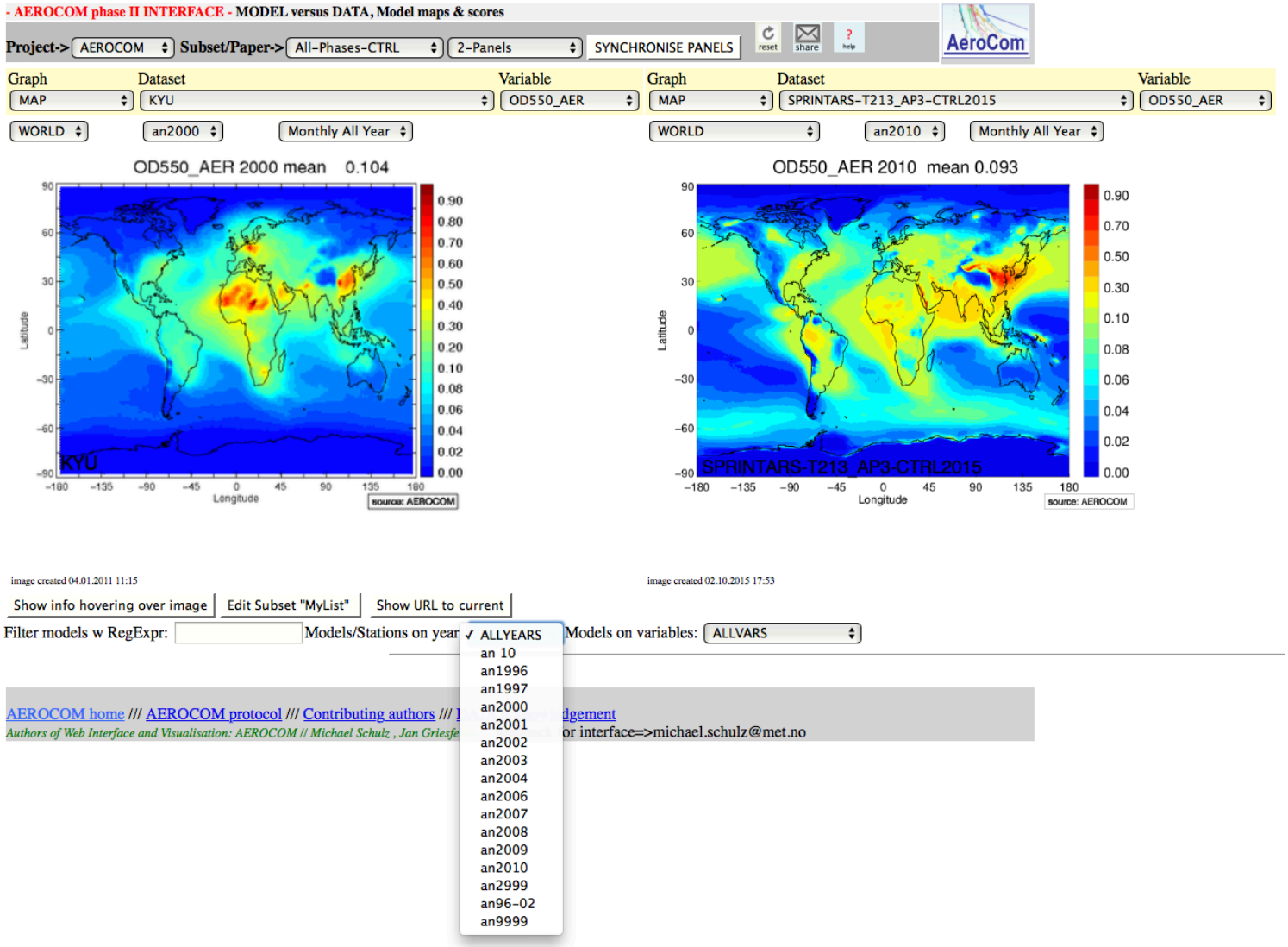
How to find your way through?



Filter on model names – years - variables



See all available years for all models in list



Model filter example: showing all "CAM" models in All-Phases-CTRL

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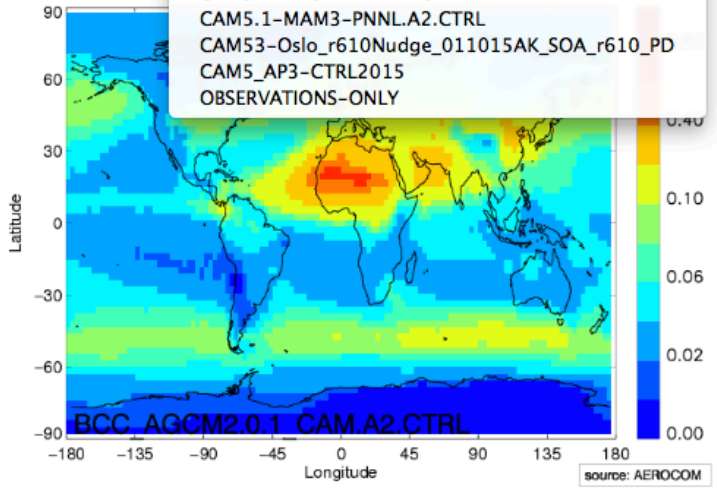
AeroCom

- AEROCOM phase II INTERFACE - MODEL versus DATA, Model maps & scores

Project-> AEROCOM Subset/Paper-> All-Phases-CTRL 2-Panels SYNCHRONISE PANELS reset share help

AeroCom

Graph	Dataset	Variable	Graph	Dataset	Variable
MAP	✓ BCC_AGCM2.0.1_CAM.A2.CTRL	OD550_AER	MAP	BCC_AGCM2.0.1_CAM.A2.CTRL	OD550_AER
WORLD	CAM		WORLD	an2006	Monthly All Year
	CAM4-Oslo-Vcmip5.A2.CTRL				
	CAM4-Oslo.A2.CTRL				
	CAM5-MAM3-PNNL.A2.CTRL				
	CAM5.1-MAM3-PNNL.A2.CTRL				
	CAM53-Oslo_r610Nudge_011015AK_SOA_r610_PD				
	CAM5_AP3-CTRL2015				
	OBSERVATIONS-ONLY				



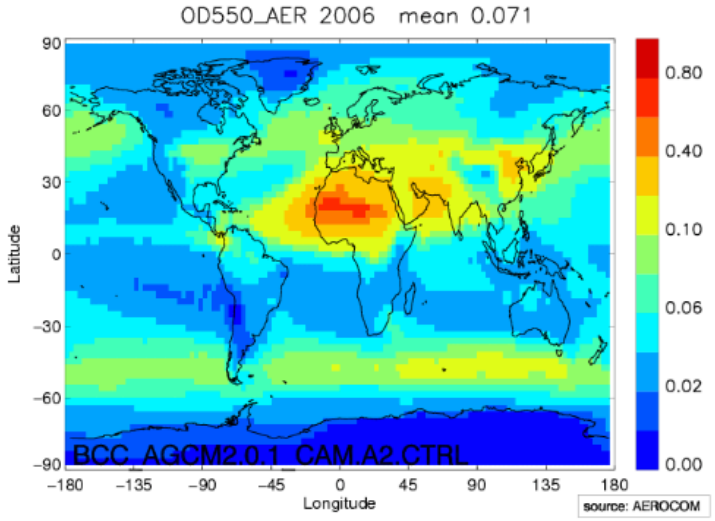


image created 06.11.2014 12:55

image created 06.11.2014 12:55

Show info hovering over image | Edit Subset "MyList" | Show URL to current

Filter models w RegExpr: CAM Models/Stations on year: ALLYEARS Models on variables: ALLVARS

AEROCOM home /// AEROCOM protocol /// Contributing authors /// DATA acknowledgement

Authors of Web Interface and Visualisation: AEROCOM // Michael Schulz , Jan Griesfeller -- feedback for interface=>michael.schulz@met.no

Share current URL to interface, link to help wiki
see all observations available
check out different network variants

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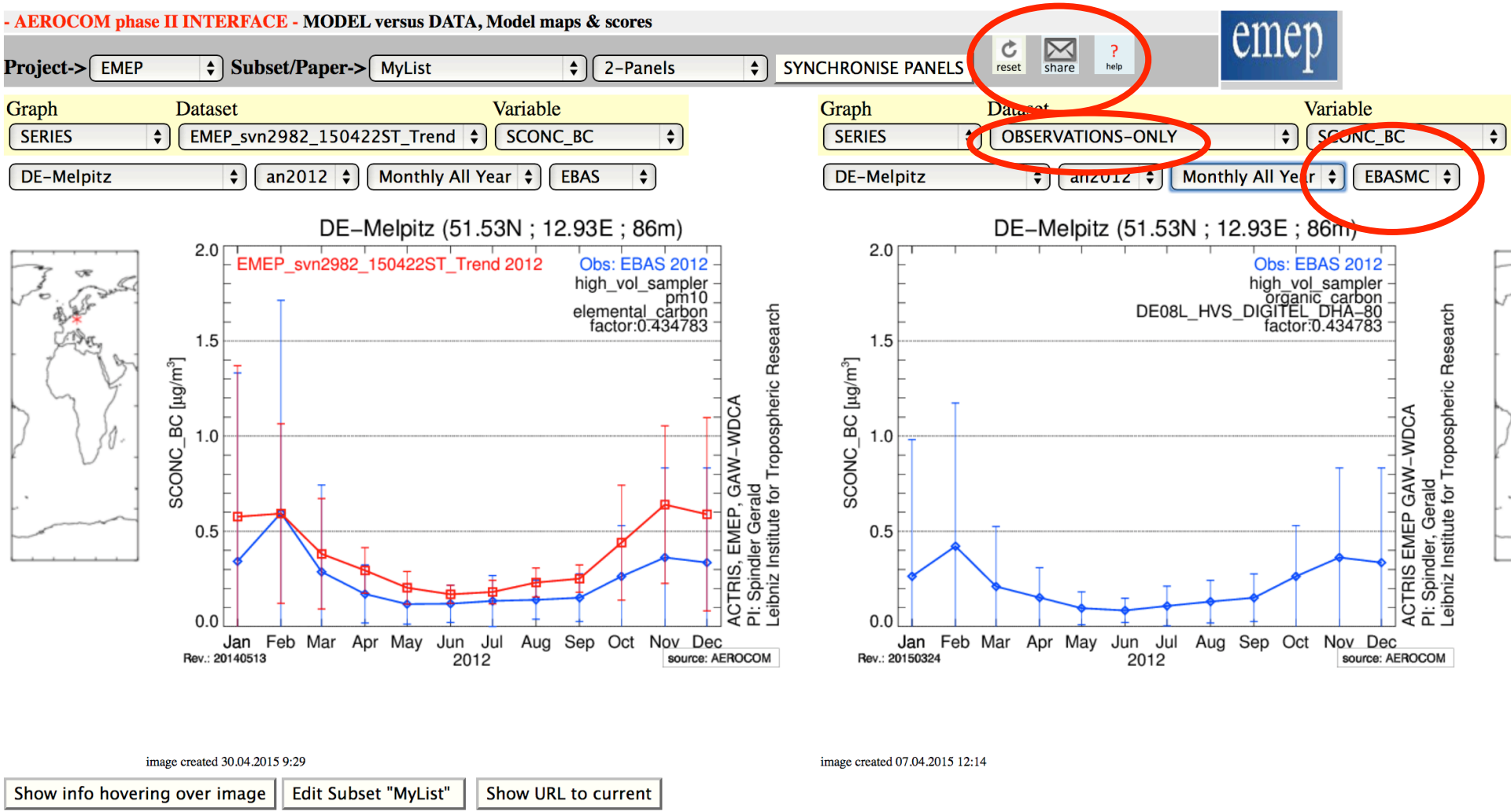
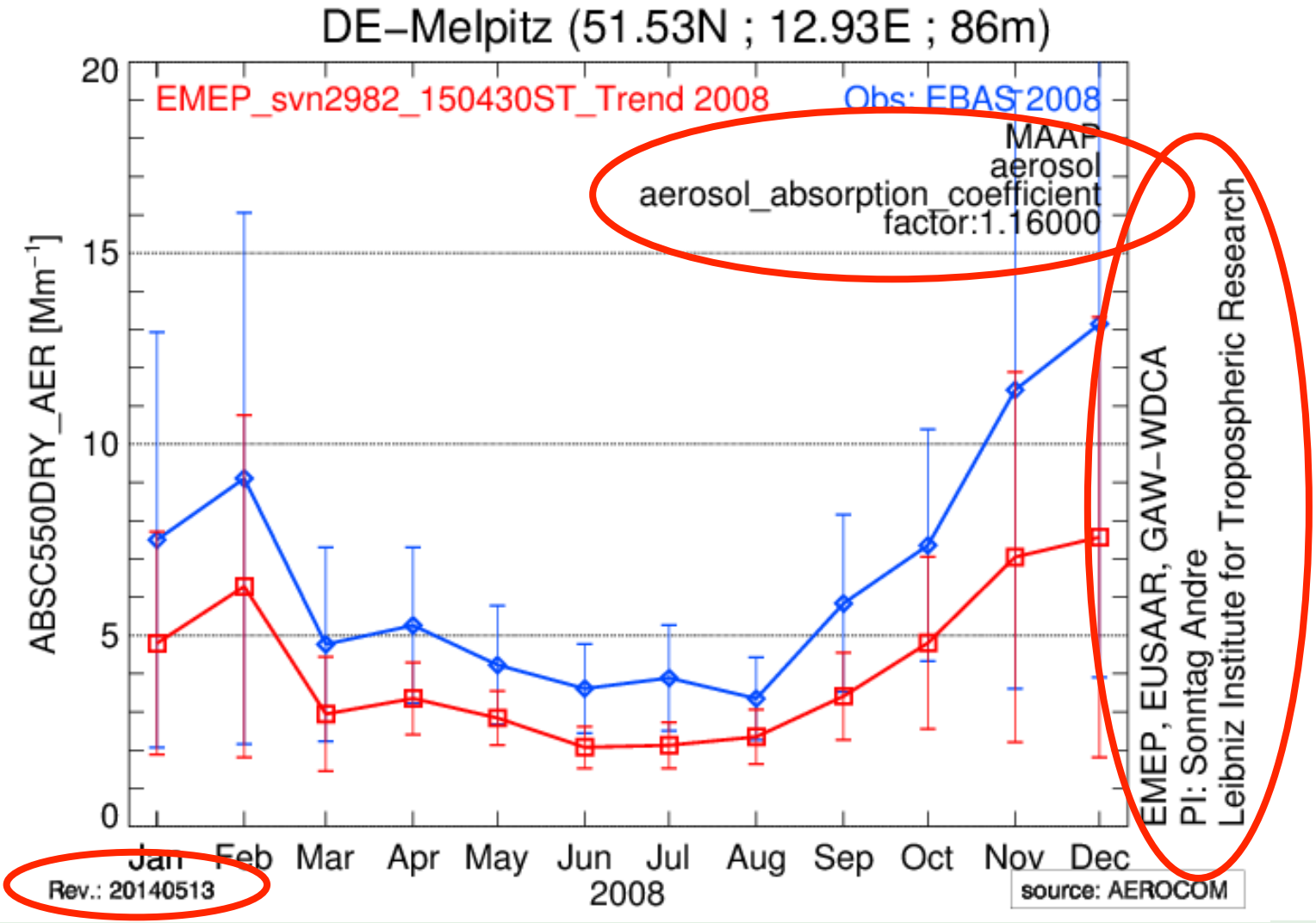


Documentation of instruments, PIs, Institutes, Networks, Revision of data set…..



Ongoing work at MetNo

Preliminary workup based on AeroCom database

My excuses for model result misinterpretation

Looking into three generations of control experiments

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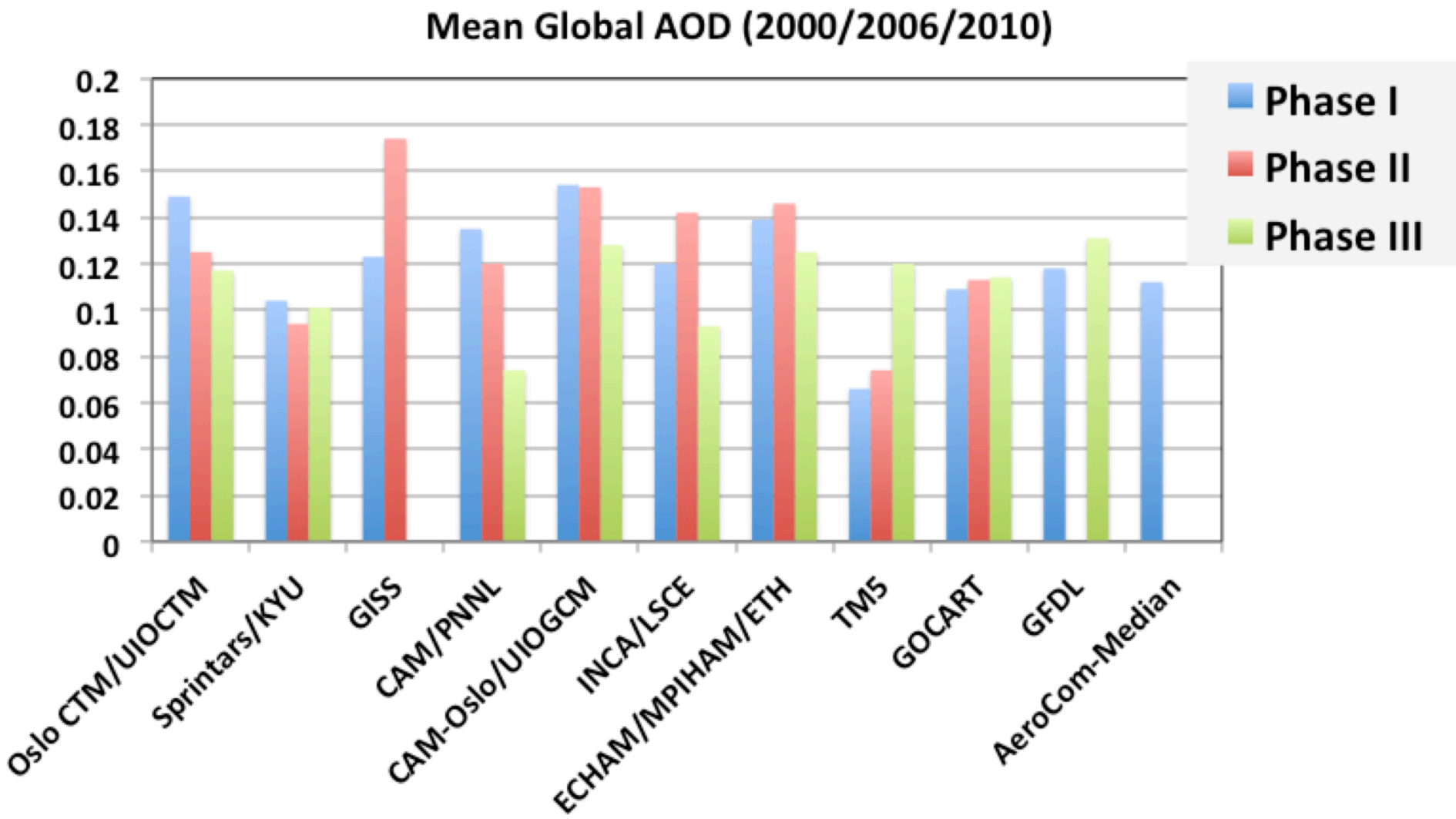
AeroCom

Phase I

Phase II

Phase III

	Black Carbon				Dust		Sea salt		Total Aerosol	
units >	Days	TG	ugm-3	TG/ugm-3 Ratio LOAD-SCONC	Days	TG	Days	TG	1	1
Model	LT BC	Load BC	SCONC_BC		LT Dust	Load Dust	LT SS	Load SS	RMS OD550	Mean OD550
Oslo CTM/UIOCTM	6.39	0.38	0.13	2.86	5.09	21.91	0.36	9.17	0.13	0.15
Sprintars/KYU	7.08	0.37	0.41	0.90	1.59	17.36	0.69	7.34	0.14	0.10
GISS	7.79	0.23	0.17	1.37	7.04	29.05	1.07	6.32	0.14	0.12
CAM/PNNL	6.04	0.19			3.91	22.14	0.27	10.89	0.13	0.14
CAM-Oslo/UIOGCM			0.16						0.29	0.15
INCA/LSCE	7.14	0.22	0.12	1.86	6.46	20.48	0.30	18.19	0.18	0.12
ECHAM/MPIHAM	5.33	0.11	0.11	0.99	4.55	8.27	0.76	10.50	0.16	0.14
TM5	5.83	0.12	0.15	0.78	2.02	9.31	0.29	6.39	0.16	0.07
GOCART	7.26	0.27	0.16	1.74	3.44	29.75	0.50	13.27	0.14	0.11
GFDL	8.57	0.26			3.28	21.28			0.13	0.12
AeroCom-Median	7.27	0.18	0.13	1.37	5.44	15.89	0.36	6.06	0.09	0.11
Oslo CTM	6.03	0.13	0.09	1.38					0.15	0.13
Sprintars v384	6.69	0.15	0.19	0.81	1.97	13.22	0.28	2.02	0.18	0.09
GISS-Matrix	3.48	0.07	0.11	0.64	5.89	24.91	0.55	5.38	0.16	0.17
CAM5-MAM3	3.88	0.08	0.09	0.94	2.45	21.05	0.69	18.87	0.17	0.12
CAM-Oslo	8.27	0.24	0.10	2.42	2.60	11.72	0.28	4.91	0.13	0.15
INCA	7.10	0.15	0.12	1.28	5.42	22.71	0.27	17.85	0.20	0.14
ECHAM	5.51	0.12	0.14	0.88	4.87	10.52	0.95	12.86	0.12	0.15
TM5	6.89	0.15	0.13	1.16	2.78	13.25	0.33	6.19	0.15	0.07
GOCART			0.10						0.13	0.11
GFDL										
AeroCom-Median										
Oslo CTM	4.13	0.11	0.18	0.61	2.80	14.15	0.21	5.39	0.14	0.12
Sprintars	10.48	0.23	0.12	1.92	2.06	15.55	0.27	3.71	0.15	0.10
GISS										
CAM	12.79	0.08			2.80	25.09		9.91	0.19	0.07
CAM-Oslo	4.59	0.10	0.08	1.22	1.72	19.87	0.85	5.16	0.27	0.13
INCA			0.10						0.19	0.09
ECHAM/ETH	6.69	0.13	0.11	1.17	4.96	13.34	0.61	10.80	0.21	0.13
TM5	8.49	0.19	0.12	1.57	3.81	11.49	0.40	7.40	0.13	0.12
GOCART			0.22		4.03	32.33	0.60	13.83	0.12	0.11
GFDL									0.16	0.13
AeroCom-Median										


Mean Global AOD (2000/2006/2010)
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Phase I
Phase II
Phase III
Oslo CTM/UIOCTM
Sprintars/KYU
GISS
CAM/PNNL
CAM-Oslo/UIOGCM
INCA/LSCE
ECHAM/MPIHAM/ETH
TM5
GOCART
GFDL
AeroCom-Median

Looking into three generations of control experiments

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AeroCom

	Dust		Sea salt		Total Aerosol	
	Days	TG	Days	TG	1	1
	LT Dust	Load Dust	LT SS	Load SS	RMS OD550	Mean OD550
Rel Stdev phase I	44%	37%	54%	39%	30%	21%
Rel Stdev phase II	44%	35%	55%	69%	17%	24%
Rel Stdev phase III	36%	40%	49%	45%	27%	17%

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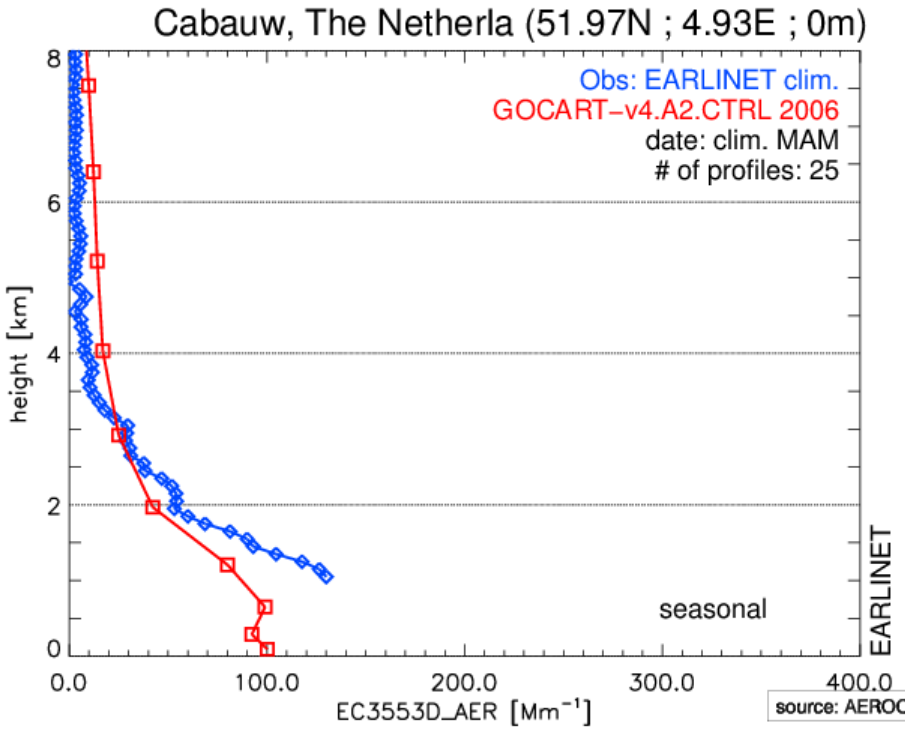
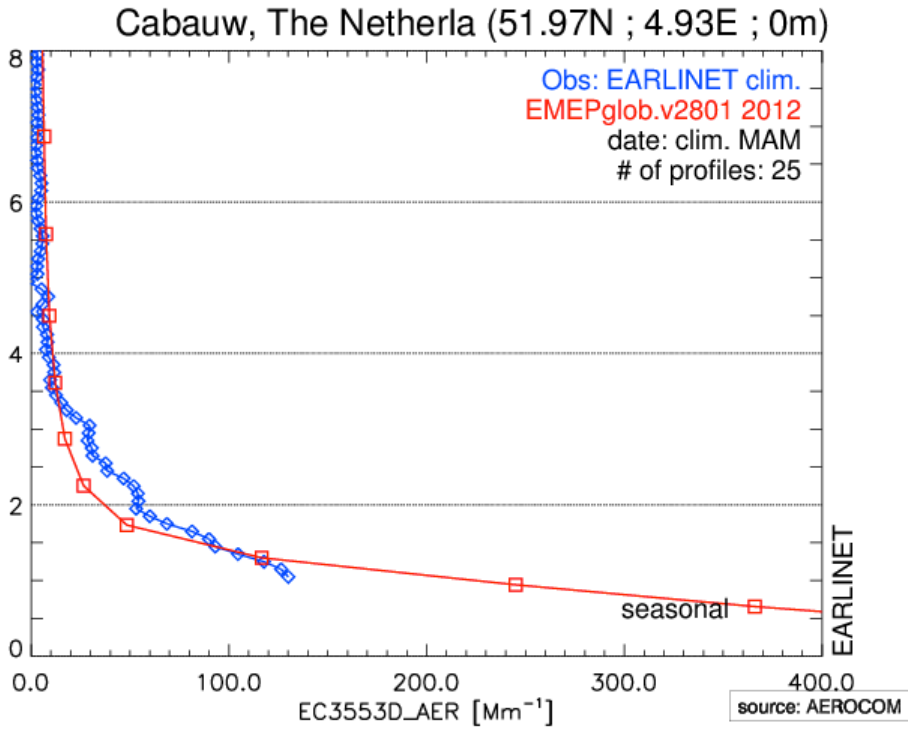
Other ongoing validation work

Comparison to Earlinet lidar climatology

Upper tropospheric aerosol background?





Better link of maps, data and trends
Soon for more variables plus models

http://aerocom.met.no/trends/station-trends.html

Courtesy Augustin Mortier / Met.No

Programme of 14th Aerocom workshop

14th AeroCom workshop 2015
AerChemMIP/CCMI/AeroCom/AeroSat joint meeting

Meteorologisk institutt

AeroCom

5.10. – 9.10.
Frascati, Italy

Monday	Tuesday	Wednesday	Thursday	Friday
AeroCom	AeroCom	AerChemMIP	AeroCom…..AEROSAT CCMI	CCMI

Host ESA, Simon Pinnock (AeroCom, AerChemMIP, Aerosat)
Host CNR, Federico Fierli (CCMI)

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Monday, October 5, 2015 *AeroCom*

AeroCom

8:00 – 9:30	**AeroCom/AeroSAT registration**		
	(50 Euro workshop fee will be collected at registration)		
	time to **hang-up posters** and to mingle		
9:30 – 11:00	**SESSION 1**	**ESA / AeroCom welcome and dust**	
	tbd.	**10min**	*ESA welcome*
	M. Schulz	**20min**	*AeroCom welcome*
	H. Yu	**20min**	*Simulated Trans-Atlantic Dust vs CALIPSO and ground data*
	P. Ginoux	**10min**	*Proposal: Anthropogenic dust experiment*
11:00 – 11:45	coffee-break (extended to **hang-up posters**)		
			chair: ***???***
11:45 – 13.15	**SESSION 2**	**vertical distribution**	
	R. Ferrare	**20min**	*Comparisons of Airborne HSRL and Modeled Aerosol Profiles*
	S. Schwarz	**10min**	*Measurements of black carbon vertical profiles versus modeling*
	M. Val Martin	**10min**	*A fire emission plume injection height parameterization*
	P.L. Ma	**10min**	*Proposal: A New Aerosol Lidar Simulator for Climate Models*
	P. Stier	**10min**	*Satellite simulators for AeroCom exercises*
	discussions		
13:15 – 14:30	lunch		
			chair: ***???***
14:30 – 16:00	**SESSION 3**	**biomass and nitrate**	
	M. Petrenko	**20min**	*AeroCom Biomass Exp: Constraining emission with satellite data*
	X. Liu	**20min**	*Impacts of S. Afr wildfire aerosols on SE Atlantic stratocumulus*
	H. Bian	**20min**	*AeroCom Phase III Nitrate experiment: preliminary analysis*
	F. Paulot	**10min**	*Proposal: Sensitivity of nitrate aerosols to emissions/chemistry*
	discussions		
16:00 – 16:30	coffee-break		
			chair: ***???***
16:30 – 17:30	**SESSION 4**	**other model-observation intercomparisons**	
	B. Andrews	**20min**	*AeroCom INSITU: in-situ obs at surface vs model simulations*
	M. Chin	**10min**	*Results from AeroCom III/HTAP2 model experiments*
	M. Chin	**10min**	*Proposal of UTLS aerosol analysis*
	discussions		
17:30 – 19:00	ESA sponsored **ICE-breaker** and **poster viewing**		

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Tuesday, October 6, 2015 *AeroCom*

AeroCom

chair: ???

8:45 – 10:45 **poster introductions**

short oral introduction of each poster
(max 2 slides / max 2 minutes) *in alphabetic order*

10:45 – 11:45 coffee-break + **poster viewing**

chair: ???

11:45 – 13.15 **SESSION 5** **radiative forcing**

B. Samset	**20min**	*Humidity: Comparisons to obs and radiative forcing impacts*
P. Stier	**10min**	*Radiative Forcing WG & Exp. on Aerosol Effects on Convection*
G. Myhre	**10min**	*AeroCom semi-direct aerosol effect intercomparison exercise*
K. Carslaw	**10min**	*Proposal: statistical approach to quantify model uncertainty*
L. Lee	**10min**	*Proposal: multi-model perturbed parameter ensemble (MMPPE)*

discussions

13:15 – 14:30 lunch

chair: ???

14:30 – 15:00 **T. Popp** **20min** **ESA's aerosol CCI initiative**

15:00 – 16:00 **poster viewing time** / relax + coffee

chair: ???

16:00 – 17.30 **SESSION 6** **indirect effects**

M. Schulz	**10min**	*Control exercise to monitor model development*
J. Quaas	**10min**	*The Aerosols-Clouds-Precipitation-and-Climate (ACPC) initiative*
A. Gettelman	**20min**	*Tropospheric Volcanic Aerosols and Climate: impacts for testing*
S. Ghan	**10min**	*update on indirect effect working group*

discussions

19:00 – dinner at Vecchia Frasca, Frascati

Via G. Buttarelli, 12

O the circle O marks the location of the daily bus pick-up / drop off

Wednesday, October 7, 2015 *AerChemMIP*

chair: ???

8:30 - 9:00 **AerChemMIP registration and poster viewing**
*(**no fee** will be collected for this day)*

9:00 - 10:20 **SESSION 7** **AerChemMIP background**
ESA-official *welcome*
V. Eyring *CMIP 6 goals and status*
Schulz, Collins, Lamarque *overview of AerChemMIP*
P. Forster *RFMIP*

10:00 – 11:00 **ALL** *discussions with AerChemMIP chairs*

11:00 – 11:30 coffee-break

chair: ???

11:30 – 12.15 **SESSION 8** **emission (input)**
S.Smith *historical and future emissions*
M.Hegglin *tropospheric and stratospheric ozone data*

12:15 – 12:45 **ALL** *needed model input - discussions with AerChemMIP chairs*

12:45 – 13.15 **SESSION 9** **aerosol forcing fields (input)**
G.Myhre *AeroCom2 Model Median data-sets*
S.Fiedler *Aerosol Plume climatology (MACv2-SP)*

13:20 – 14:30 lunch

14:30 – 15:30 **SESSION 10** **AerChemMIP simulation plan**
ALL *experiments and diagnostics - discussion with AerChemMIP chairs*

15:30 – 16:00 coffee

chair: ???

16:00 – 17.30 **SESSION 11** **AerChemMIP science talks (12 +3 min)**
M. Bollasina *Atmospheric circulation as mediator of aerosol-driven climate impacts*
C. Randles *MERRA Version 2: the Goddard aerosol reanalysis 1979 to present*
A. Voulgarakis *Local and remote climate effects of regional pollutant emissions*
K. Bowman *Emergent constraints in chemistry-climate interactions*
T. Shepherd *The climate impact of changes in halocarbons and CO2 in tropical UTLS*
C. Timmreck *Coordinated climate response for stratospheric aerosol*

17:30 – 19:00 ESA sponsored **ICE-breaker** and **poster viewing**

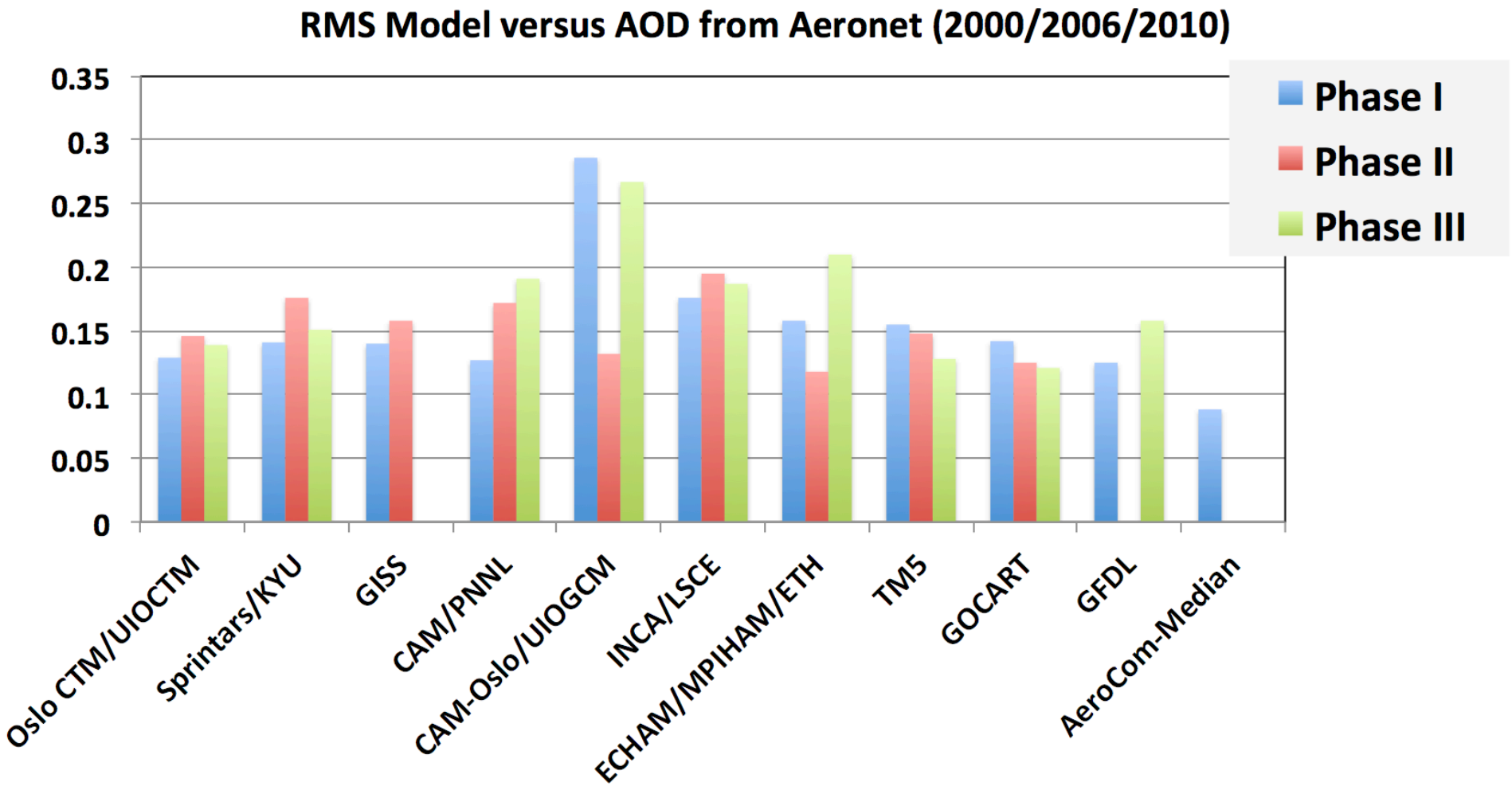
AeroCom Scientific Committee

Task: Reflect on and Recommend an AeroCom work plan
Produce a written recommendation at each AeroCom workshop on how to go on, Track and review progress in AeroCom working groups

Members – Appointed each year anew at AeroCom workshop

Proposed members
Working group leaders, Model representatives, Co-Chairs
Nitrate *Bian* / BB *Petrenko* / Dust *Balkanski* / Microphysics *Mann*
Aerosol Cloud Interactions *Ghan, Liu*
Direct radiative forcing *Myhre, Samset*
GCMs Takemura CTMs *Chin*
COSP simulator *Stier* / Satellite data *Kahn, Holzer-Popp*
Aircraft simulator *Schwarz, Stier, Chen*
Surface data *Ogren, Schulz* / Co-chairs *Schulz, Kinne, Chin*

Challenge: To improve (most) models



The CTRL 2016 experiment

Rewarding the best OD550 performing **model team**
With Two Bottles of Champagne (chinese and french)

Requirement :
Simulation of daily AOD in 2010
and its speciation (BC, SO4, DUST, OA, SS, Rest)
Submission 15. September 2016

Funding: Crowdsourcing campaign soon to be launched

Jury: MMS+SSC

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Acknowledgement
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Thanks for your attention !