Meteorologisk institutt

AeroCom

AeroCom achievements and goals of this workshop

Michael Schulz

Outline

- *Science*
- *Organisation*
- *Web Interface*
- *Goals*

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AeroCom

AeroCom – science

Joint AeroCom papers achieved in 2014

- Organic aerosols …. Kostas Tsigaridis
  ACP accepted
- Black Carbon on snow ---- Chaoyi Jiao
  ACP *14* (5), 2399-2417.
- Size distribution :::: Graham Mann et al
  ACP 14 (9), 4679-4713.
- Dust over the Atlantic ==== Dongchul Kim et al
  JGR *119* (10), 6259-6277.

In preparation:

Kristiansen, see poster and presentation

Koffi, draft distributed

Sulphate life cycle AeroCom I and II
Schulz et al. ACP 2007 ; Myhre et al. ACP 2013

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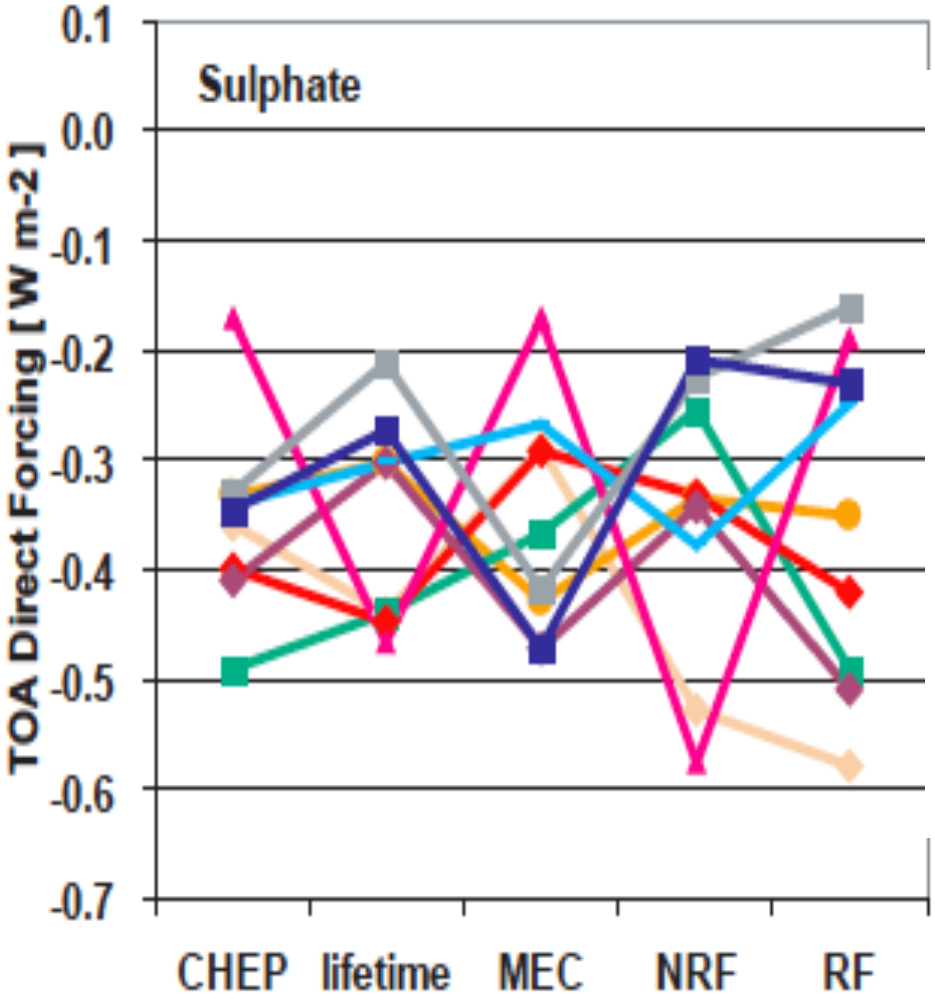
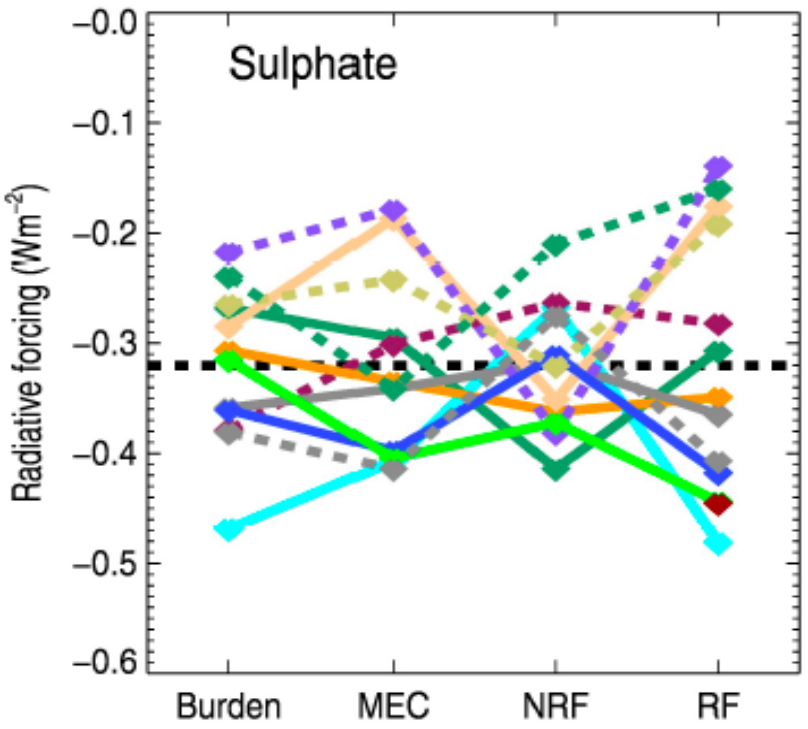


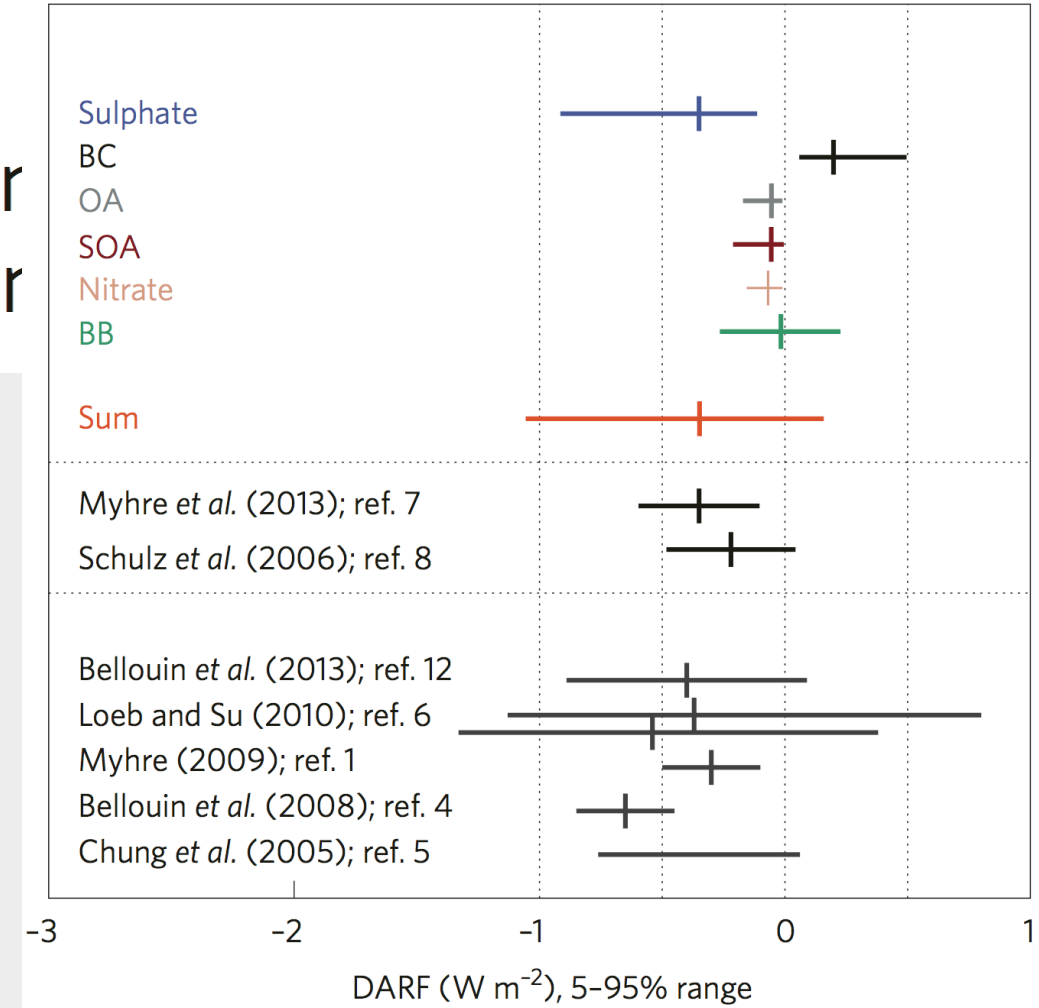


Samset et al.,
Nature Climat Change, 2014, *4* (4), 230-232

opinion & comment

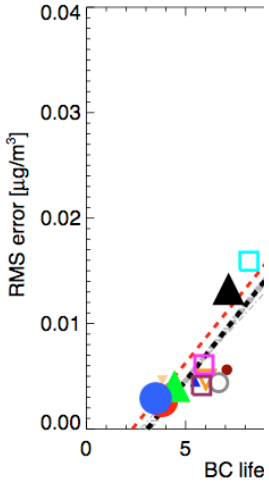
CORRESPONDENCE:

Upward adjustmer
radiative forcing ur

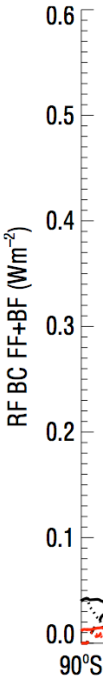


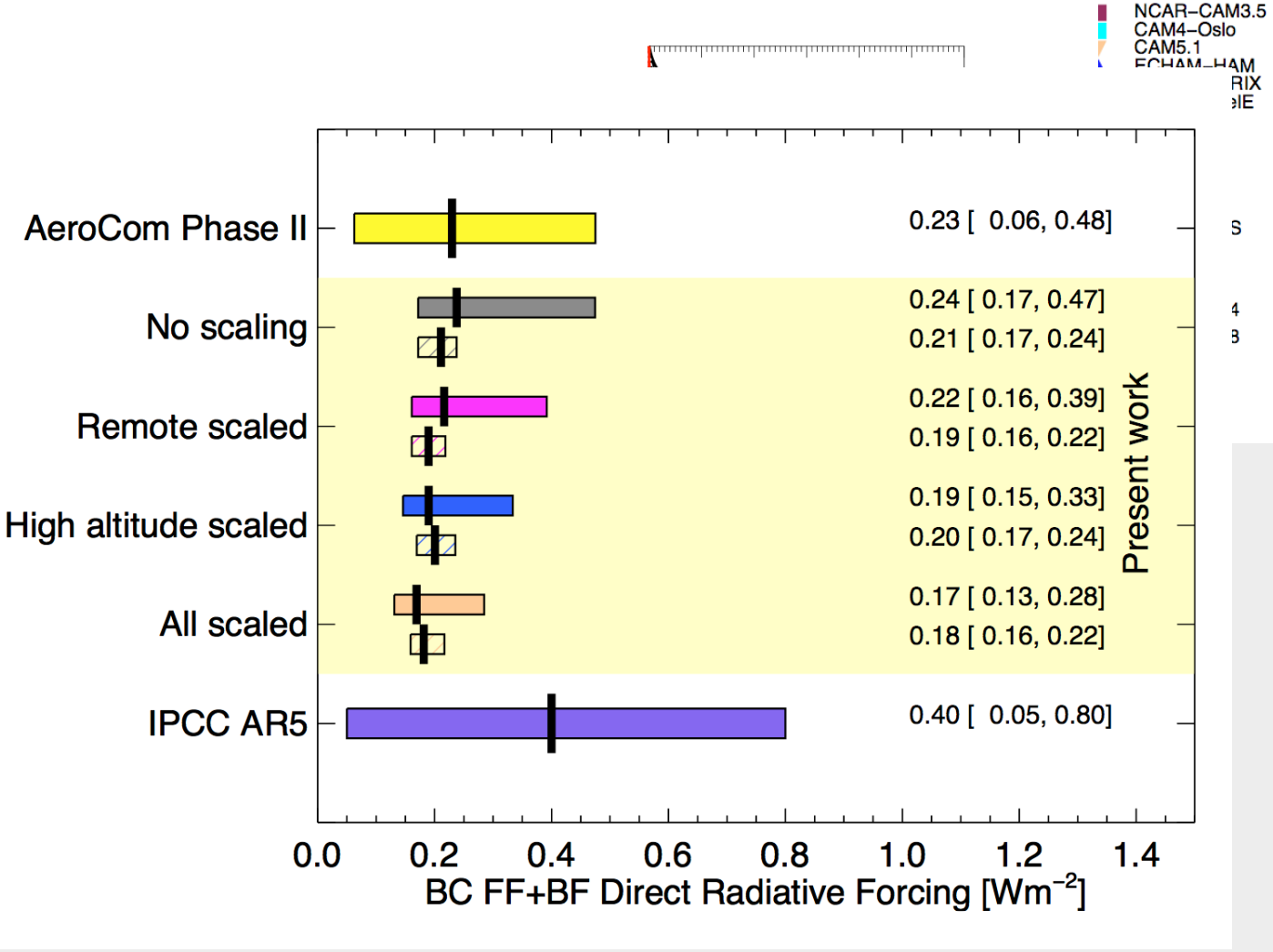
Atmos. Chem. Phys. Discuss., 14, 20083–20115, 2014
www.atmos-chem-phys-discuss.net/14/20083/2014/
doi:10.5194/acpd-14-20083-2014

Atmospheric Chemistry and Physics Discussions
Open Access



K. Tsigaridis , and K.





Evaluating the vertical distribution of the aerosol Koffi et al. in preparation, 2014

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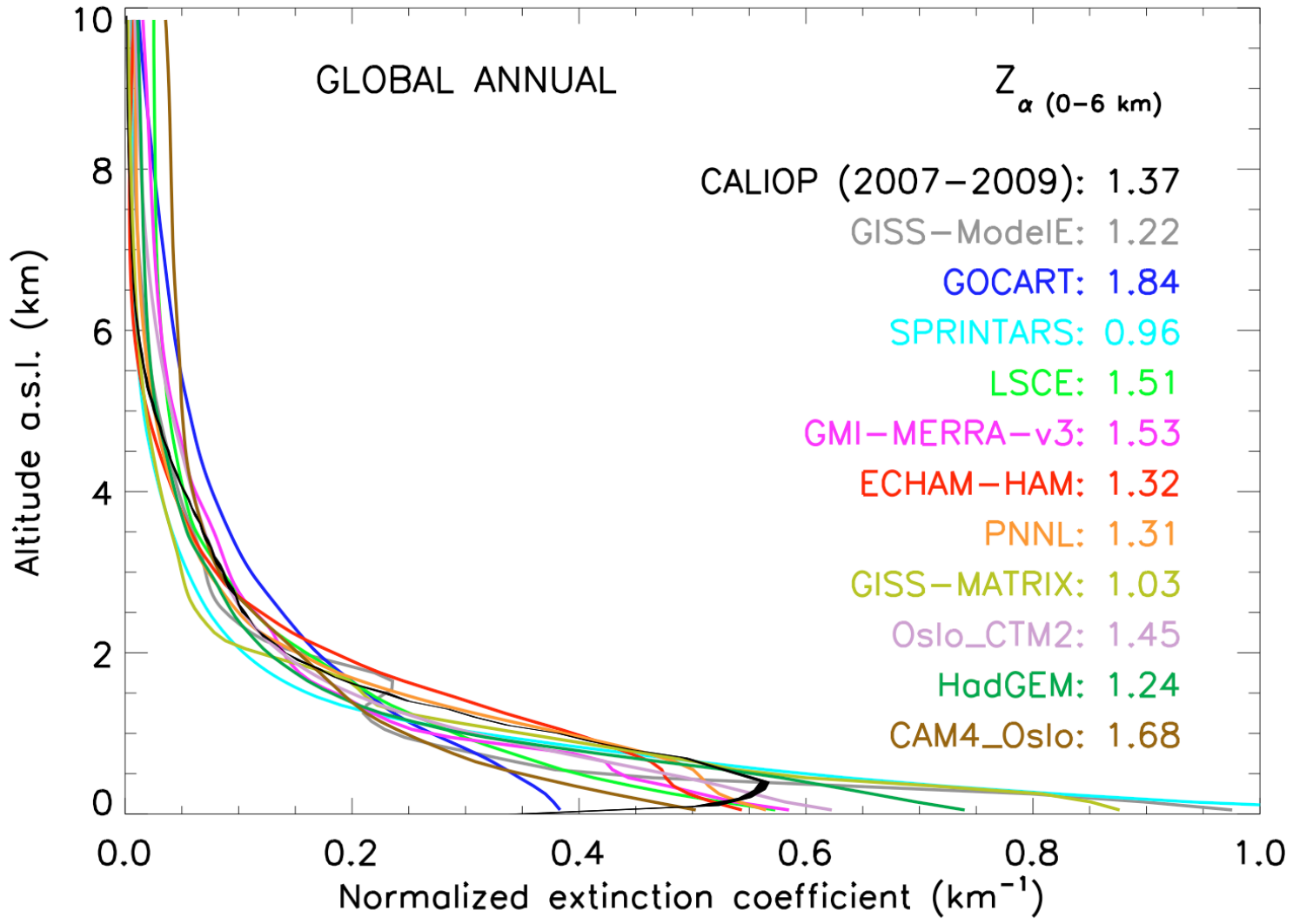

Earlinet climatology constructed w AeroCom tools example EMEP model validation

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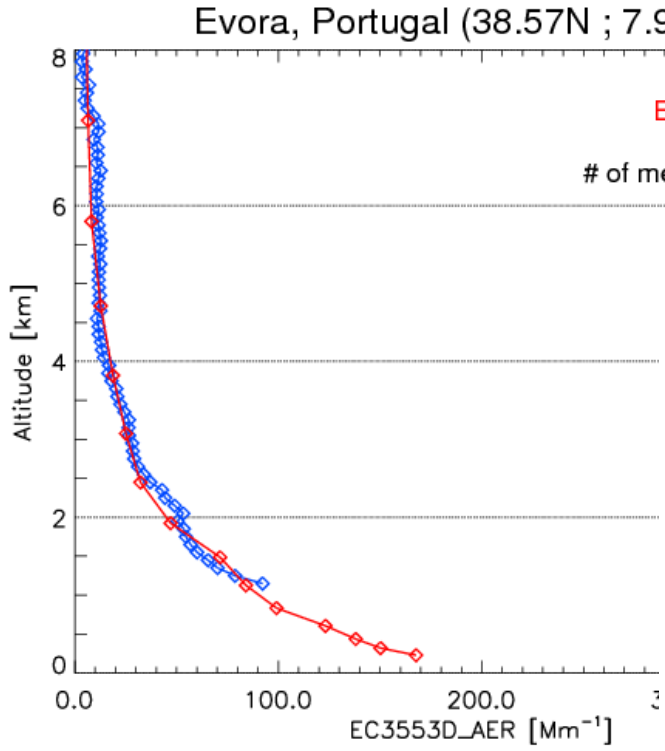
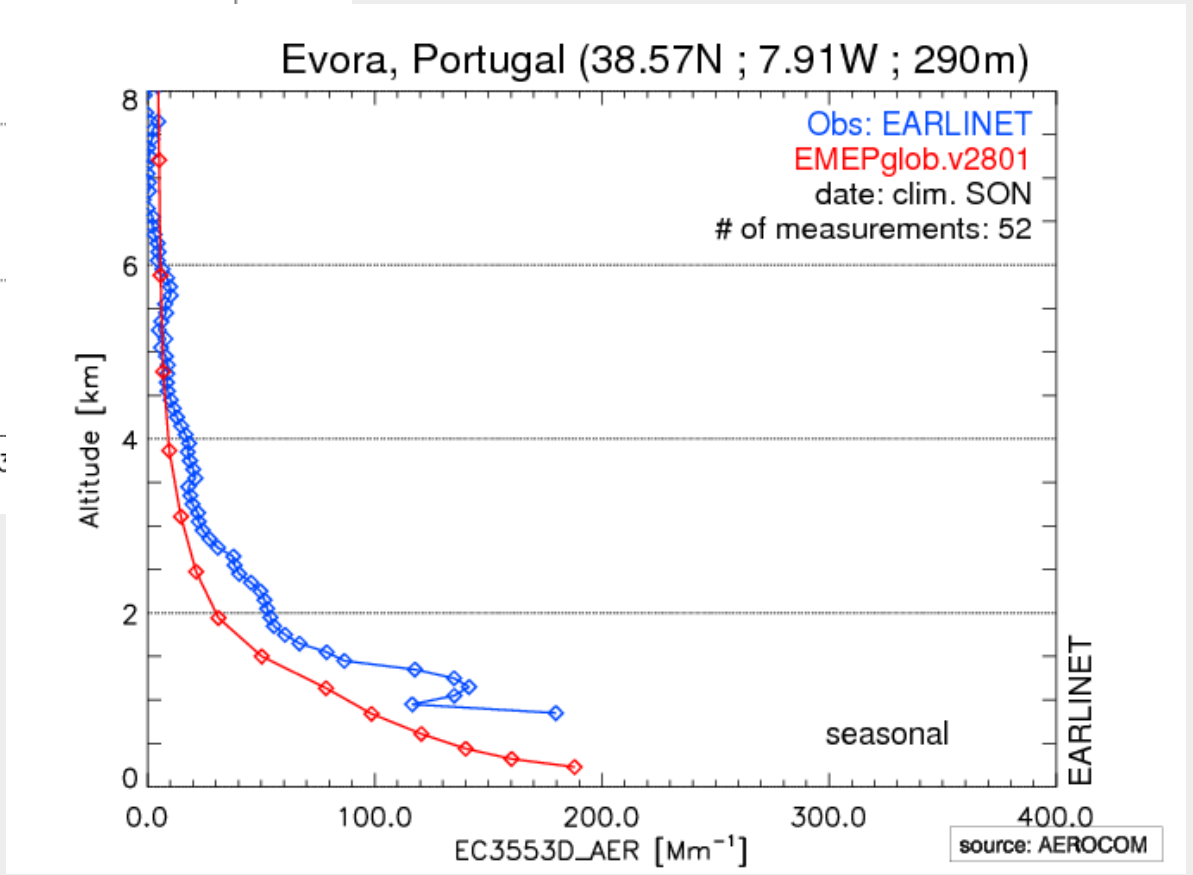
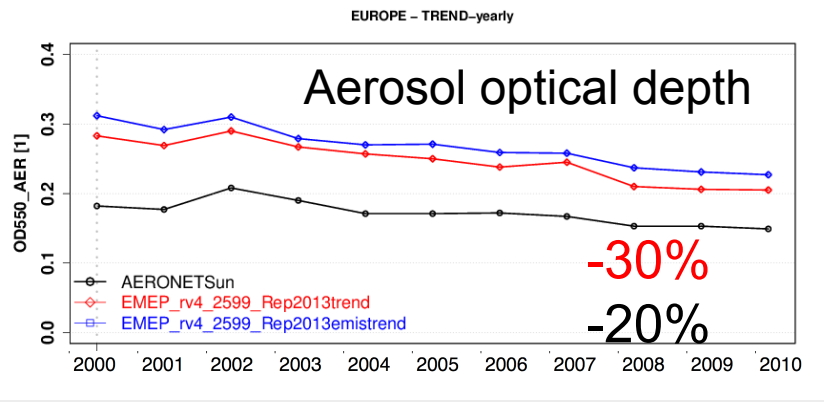
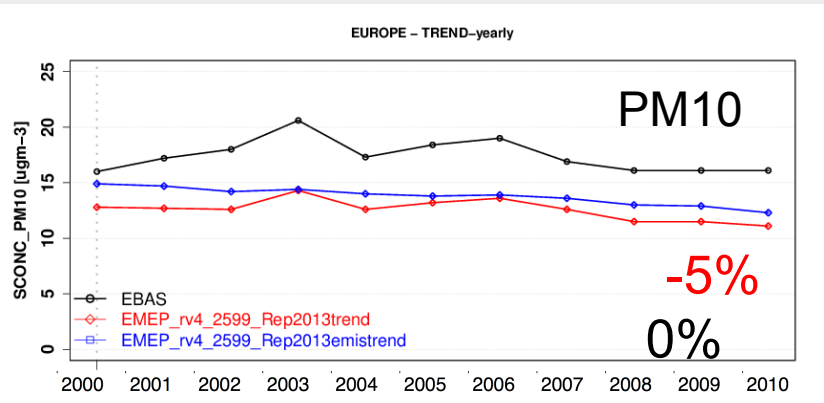


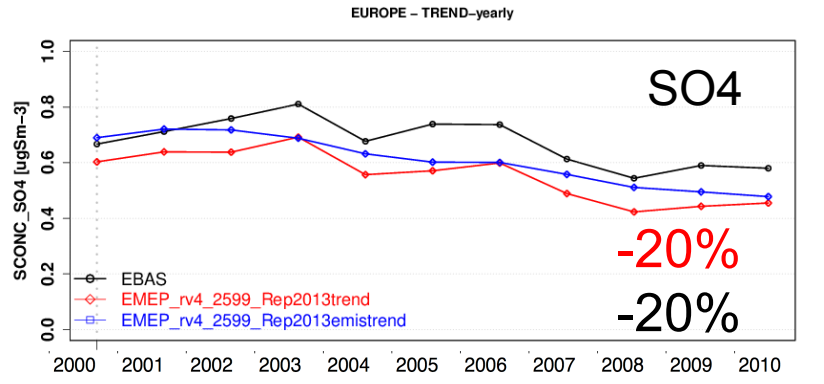


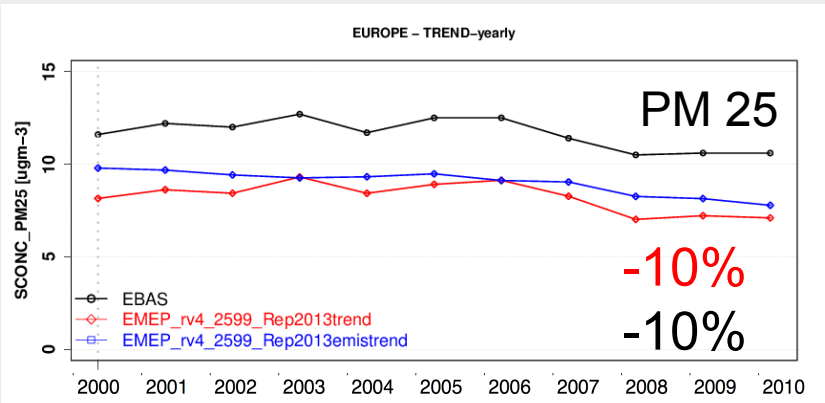
Is our trend understanding consistent? EMEP model versus EBAS/NILU database 2000-2011

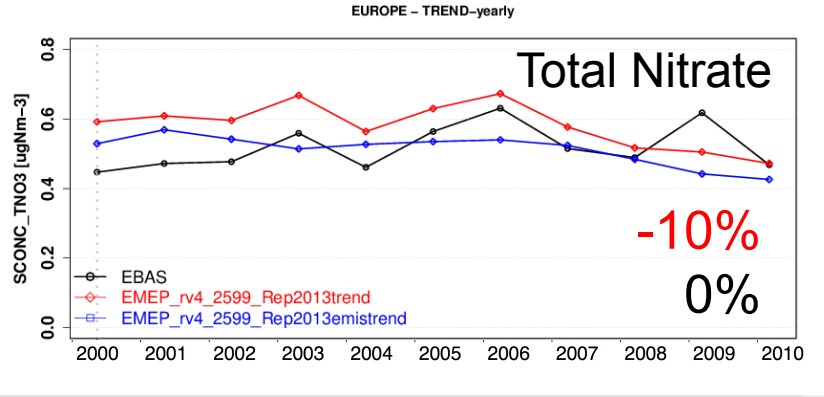


EMEP Trend run
Emission varying, meteo 2011
Observations









Trend anaylsis: Using the full Aeronet network versus long-term operating Aeronet sites

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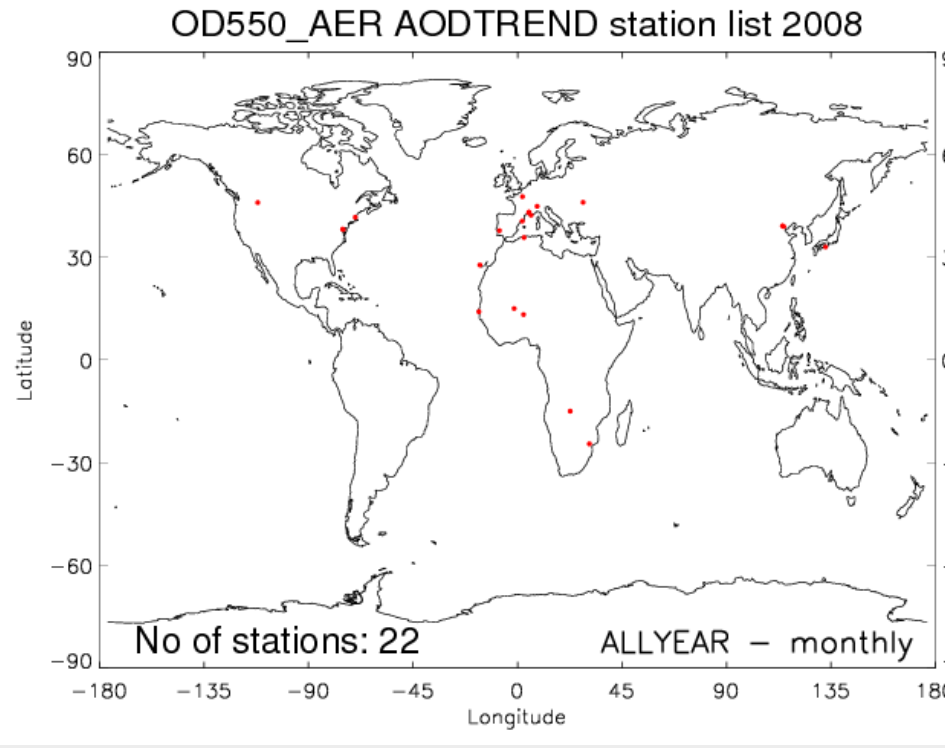
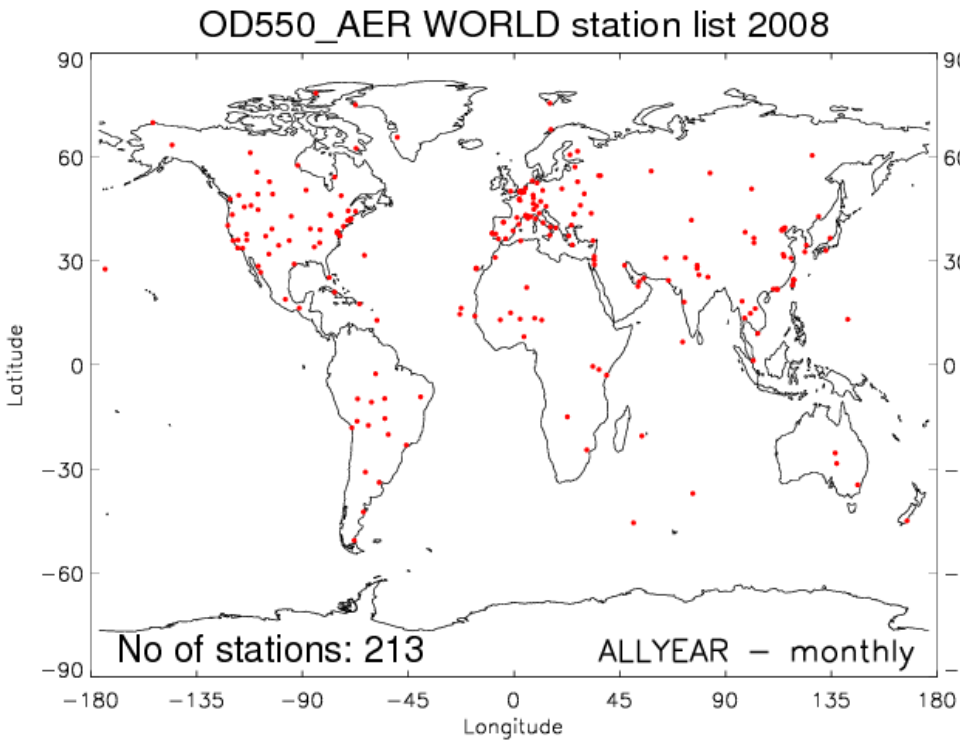


Selected sites



All sites

Trends @ Aeronet Sites globally
Aeronet versus MACC model reanalysis

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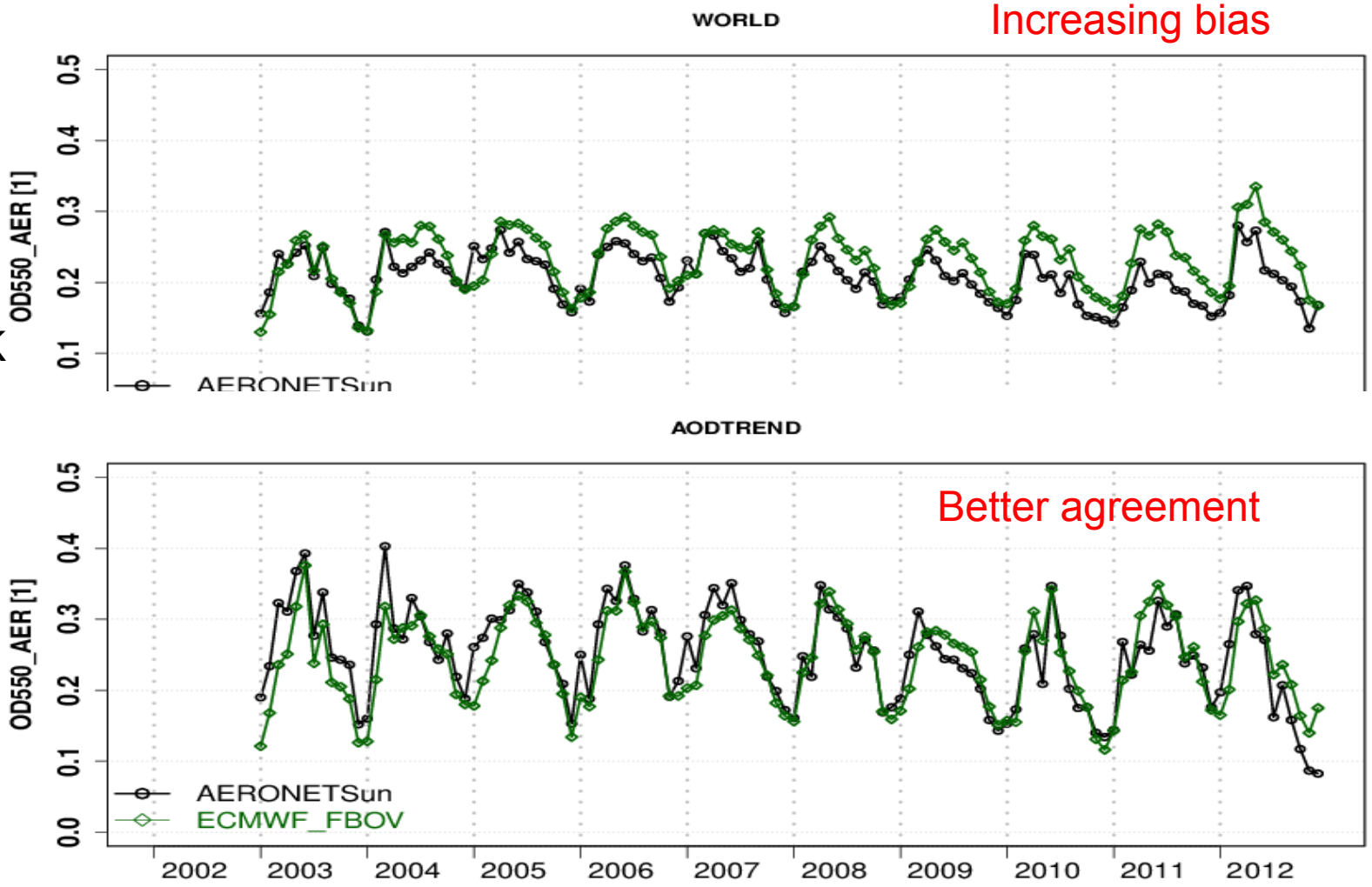
Using ALL AERONET NETWORK

Using 22 LONG operating AERONET SITES



Elemental Carbon (thermo-optical analysis) Trend analysis attempt with EMEP model

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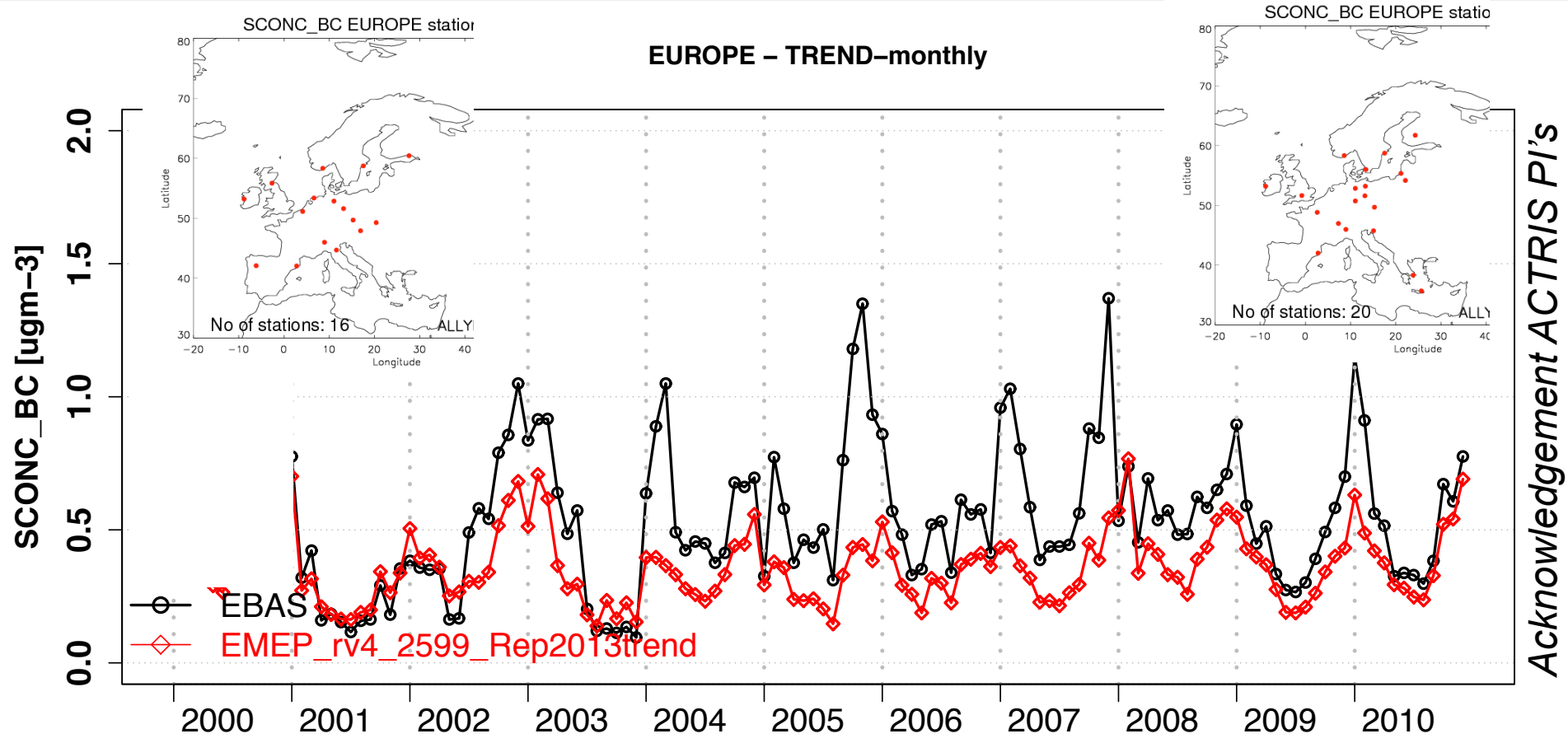
ACTRiS



*Observations > Model*10 have been removed*

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AeroCom

AeroCom – organising science

AeroCom database infrastructure

- New manual for data submission
  https://wiki.met.no/aerocom/data_submission
- 130 users have account on aerocom-users.met.no
- Disk area growing to host HTAP and AeroCom phase III (now ca 30 TB available)
- WCS server is working in principal
  http://wcs-test.met.no/static/index.html
  Needs to be filled with content, thredds server planned
- Web interface has now high-quality images, more metadata from netcdf global attributes, faster reaction, subsets introduced

AeroCom phase III experiments => https://wiki.met.no/aerocom/phase3-experiments

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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 aerocom_bbexperiment_proposed_v2.docx

Biomass Burning emissions experiments

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

Experiment Description (updated June 18 2014) File

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

Variable names for model output (highlighted in blue/cyan; Septmebr 11, 2014) File

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

Aerosol Lifetime experiments, Fukushima tracers

Model output Specifications

+ Indirect effect experiment

CF-Checker and Range test tool is online aerocom-test.met.no

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File and CF-Version

Select File(s) to Upload [Browse..] Select CF-version to validate [cf-1.5]

Test Results

File Name	File size	Upload Status
ta_HTAP2-monthly_RAQMS_r1i1p1_201001-201001.nc	5623 kByte	failure

CF-Convention Test - Select CF-version cf-1.5 if CF convention version error appears

- global Conventions attribute should be set to "CF-1.5", not "CF-1.6" (2.6.1)
- lev: standard_name 'general_atmosphere_hybrid_sigma_pressure_coordinate' does not exist in standard name table (3.3)
- lev_bnds: standard_name 'general_atmosphere_hybrid_sigma_pressure_coordinate' does not exist in standard name table (3.3)
- pint: standard_name 'interface_pressure' does not exist in standard name table (3.3)
- lev: standard_name "general_atmosphere_hybrid_sigma_pressure_coordinate" does not allow formula_terms (4.3.2)
- lev_bnds: formula_terms attribute only allowed on coordinate variables (4.3.2)
- pint: variable dimension "lat" refers to horizontal dimension, it should have a cell_methods entry covering this dimension (7.3)
- pint: variable dimension "lon" refers to horizontal dimension, it should have a cell_methods entry covering this dimension (7.3)
- ps: variable dimension "lat" refers to horizontal dimension, it should have a cell_methods entry covering this dimension (7.3)
- ps: variable dimension "lon" refers to horizontal dimension, it should have a cell_methods entry covering this dimension (7.3)
- running CFchecker version 1.5.18 (INIT)
- checking compliance with convention CF-1.5 (INIT)
- using standard name table version: 26, last modified: 2013-11-08T06:09:34Z (INIT)
- using area type table version: 2, date: 10 July 2013 (INIT)
- variable "a" does not contain units attribute (3.1)
- variable "b" does not contain units attribute (3.1)
- variable "b_bnds" does not contain units attribute (3.1)
- variable "a_bnds" does not contain units attribute (3.1)

Variable Data Range Test for HTAP and AeroCom

- lon_bnds range is out of bounds. Data values should be in range of [-180.0,360.0]
- pint: undefined variable for range test

md5: 34c8441e01846e4faf8434ab5747d36b

click here to collapse errors!

New experiments should always have

- **ONE CONTROL experiment** for all new model versions participating in any experiment
- Allows check of improvement over time
- Basic diagnostics of emissions, loads, surface concentrations, optical properties
  give quick feedback on model quality

- **THE FILENAME**

{project}_{model}_{modelversion}_{exp}_{var}_{collection}_{year}_{time frequency}.nc

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AerChemMIP

A joint initiative of

ccmi
chemistry-climate model initiative

AeroCom

- Co-chairs
  Michael Schulz (Norway) - Jean-François Lamarque (USA)

- Main contributors to discussions (**so far**)
- Bill Collins (UK), Veronika Eyring (D) Gunnar Myhre (Norway)
- Steve Smith (US) Olivier Boucher (France) Michaela Hegglin (UK) Drew Shindell (USA) Michael Prather (US) Piers Forster (UK)
- Fiona O'Connor (UK) Susanne Bauer/Kostas Tsigaridis (US) Toshi Takemura (JP) Paul Ginoux (US)

Eos, Vol. 95, No. 9, 4 March 2014

EOS

EOS, TRANSACTIONS, AMERICAN GEOPHYSICAL UNION

VOLUME 95 NUMBER 9

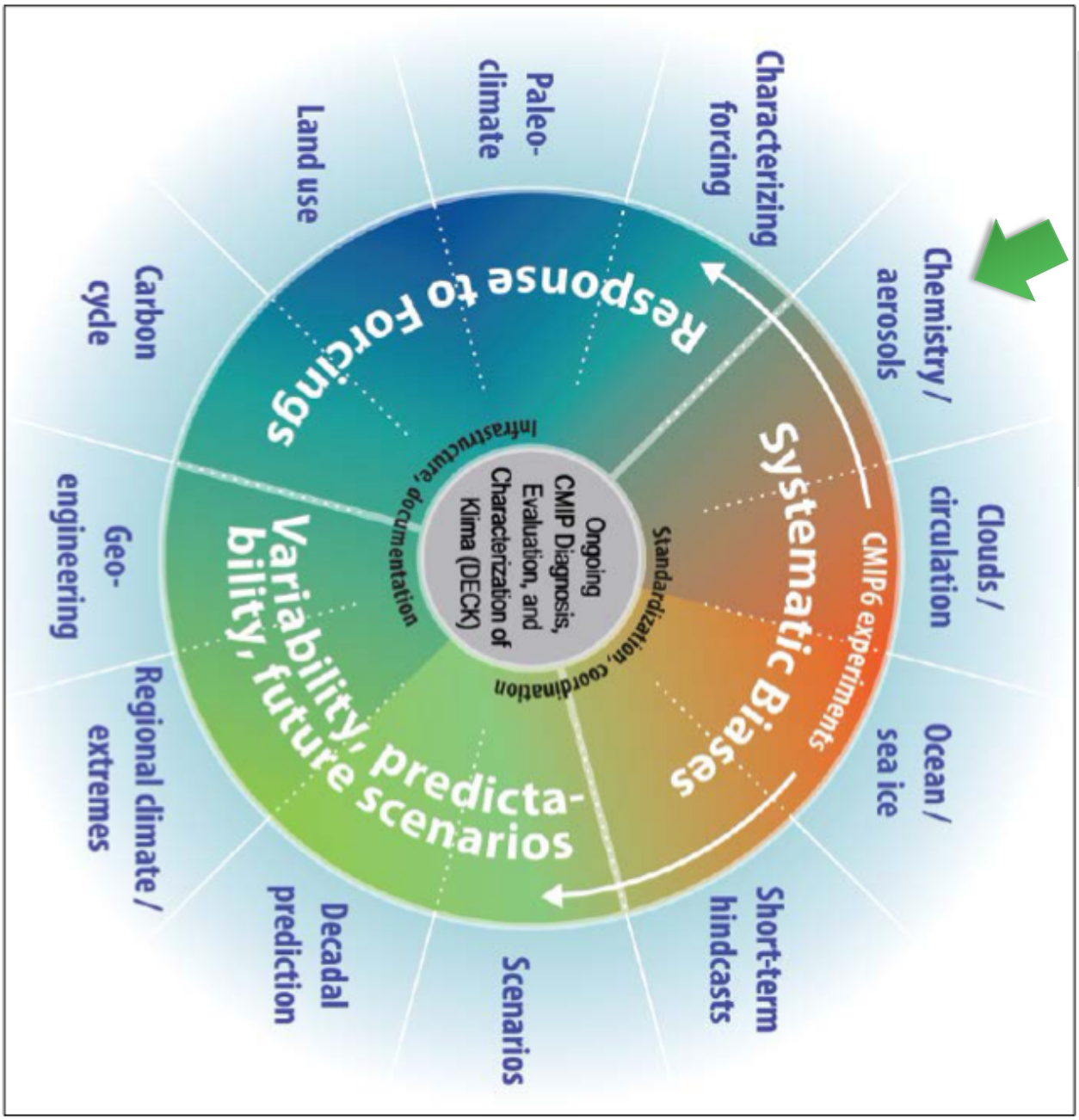
4 March 2014

PAGES 77–84

Climate Model Intercomparisons: Preparing for the Next Phase

climate variability, climate predictability, and uncertainties in scenarios?

Within this scientific framework, a more distributed organization for CMIP6 than in previous phases of CMIP is proposed. This would



AerChemMIP

Motivation for having AerChemMIP

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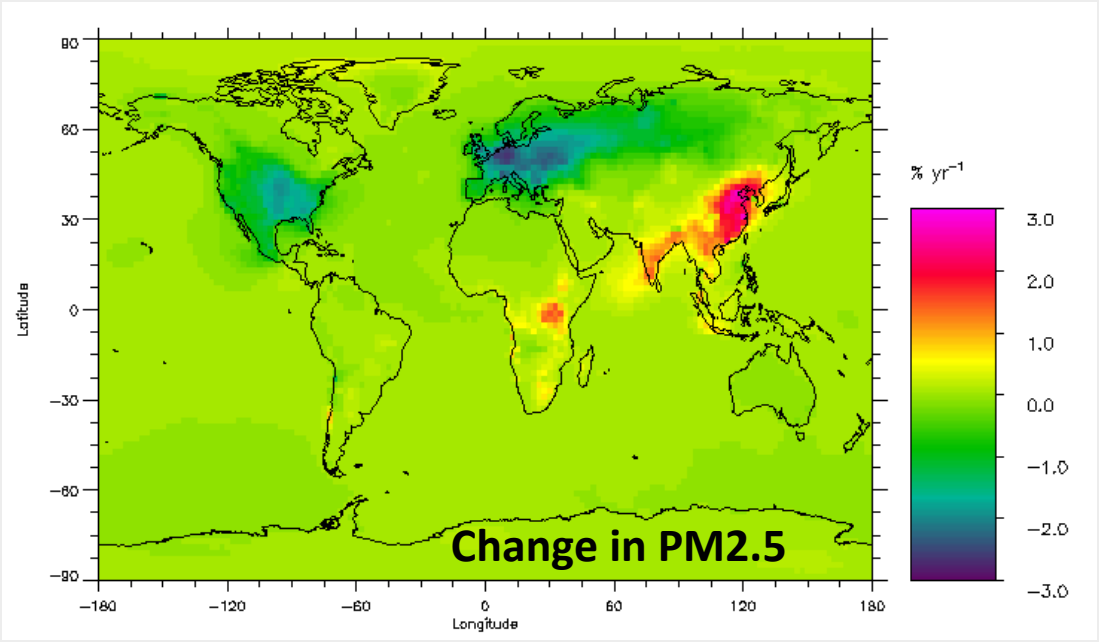
- Address shortcomings of CMIP5 with respect to composition&forcing&response (mostly aerosols and ozone)
- Interactive chemistry and aerosol is state-of-the-art in many climate models… What are the effects on climate?

More on Thursday afternoon
Slides send around today

Need to orga

- Define cor
  composition/forcing/response evaluation
- Identify science questions of relevance to CMIP6 and define the associated simulations
- Provide single entity based on AeroCom and CCMI to interact with other CMIP6 contributors on emissions, interactions and forcing estimates.

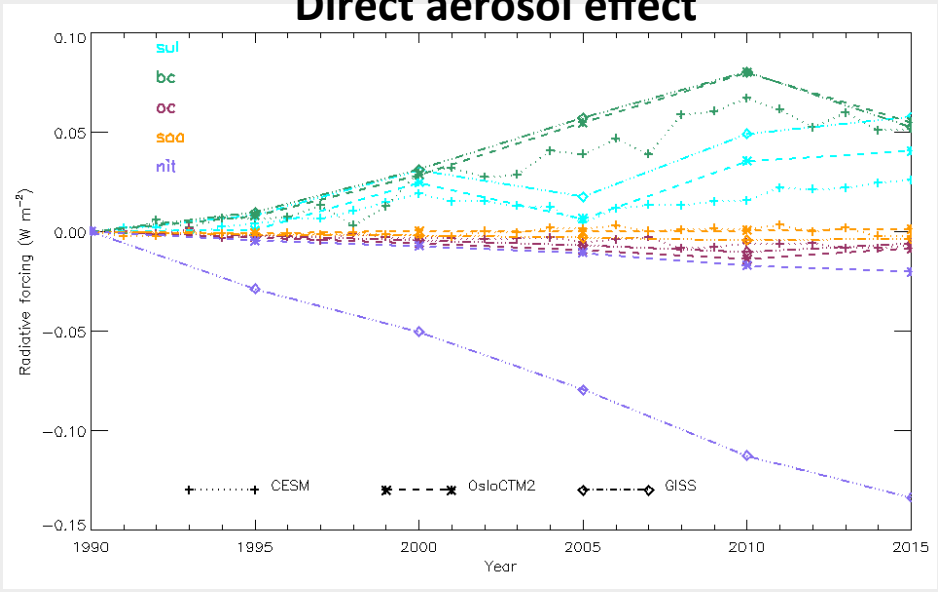


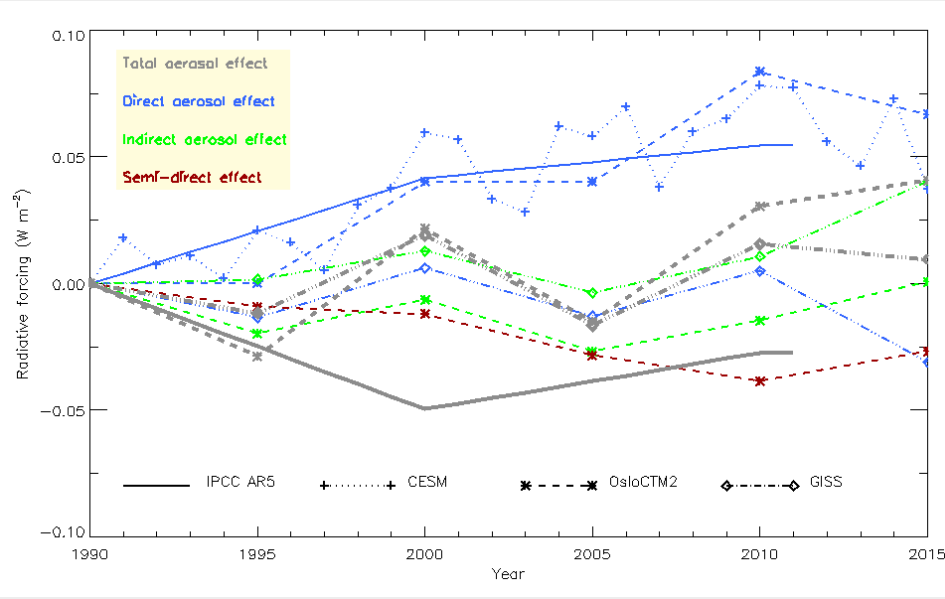
Eclipse simulations of aerosol forcing 1990-2015 based on new emission data

-Simulations completed in 4 models

-Additional 4 models are currently running the simulations

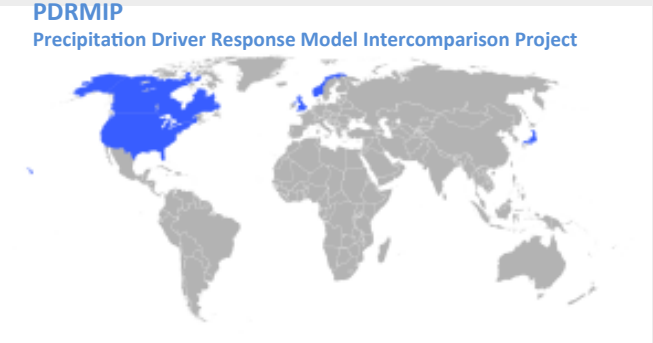
Direct aerosol effect





PDRMIP

Precipitation Driver Response Model Intercomparison Project



•PDRMIP will compare the precipitation response to various climate drivers, across models. Analyses planned include a better understanding of the drivers' importance for inter-model differences in precipitation changes, energy budget analysis and extremes related to precipitation.

•PDRMIP is a new climate model intercomparison initiative, and was launched in Oslo in November 2013. Currently the PDRMIP simulations are run by seven climate modelling groups, and more modelling groups are encouraged to participate!

•PDRMIP has applied to be a CMIP6-Endorsed MIP

Confirmed participating models:

- National Center for Atmospheric Research (NCAR) Community Earth System Model CESM1
- Hadley Center Climate Model HadGEM2 & HadGEM3
- Goddard Institute for Space Studies (GISS) ModelE
- SPRINTARS
- IPSL-CM5
- NorESM

Participants and collaborators of PDRMIP:

Dr. Gunnar Myhre, Dr. Bjørn H. Samset, Dr. Øivind Hodnebrog and Dr. Jana Sillmann (CICERO, Norway), Prof. Piers M. Forster (University of Leeds, UK), Dr. Drew T. Shindell (NASA GISS, USA), Dr. Toshihiko Takemura (Kyushu University, Japan), Dr. Jimy Dudhia (NCAR, USA), Dr. Olivier Boucher (CNRS, France), Dr. Francis Zwiers (PCIC, Canada), Dr. Slava Kharin (CCCma, Canada), Dr. Jean-François Lamarque (NCAR, USA), Dr. Dirk Olivié (Norway), Dr. Alf Kirkevåg (Norway), Dr. Michael Schulz (Norway), Dr. Apostolos Voulgarakis (UK)

Contact gunnar.myhre@cicero.oslo.no if you want to participate

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AeroCom

AeroCom web interface

- - *news from MetNo*

-- some new features

AeroCom web interface

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

Project-> AEROCOM | Subset/Paper-> AEROCOM Phase II CTRL | Explicit-1-panel | URL LINK to current

AeroCom

Graph Type: Map of data (w area mean value)

Data Set / Model: CAM4-Oslo-Vcmip5.A2.CTRL

Parameter: LOAD_BC

Place-Year-Freq: WORLD | an9999 | Annual Average

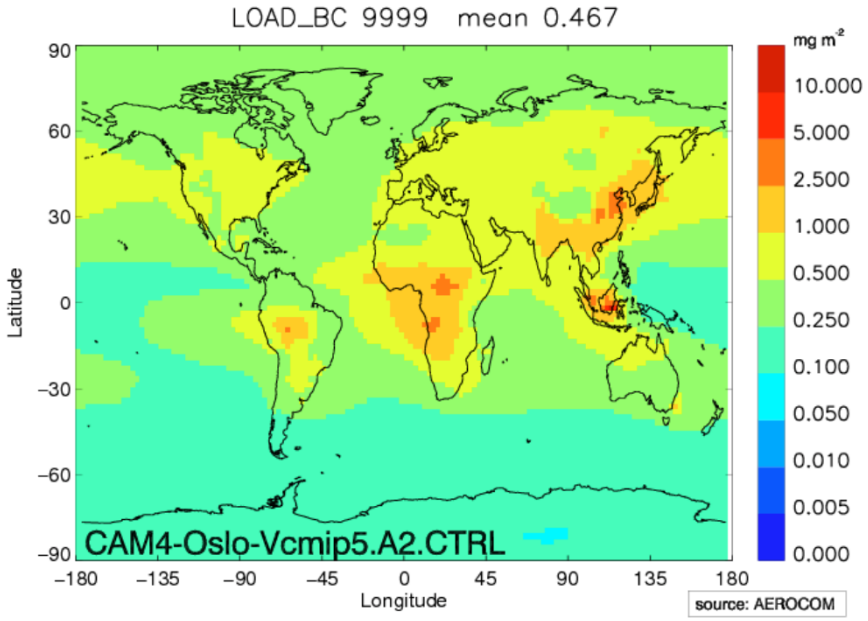

image created 27.03.2014 9:37

Hide info hovering over image | Edit Subset "MyList"

Menu abbrevations
Long explanatory text appears

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

Project-> AEROCOM **Subset/Paper->** AEROCOM Phase II CTRL | Explicit-1-panel | URL LINK to current

AeroCom

Graph Type: Gridded Map of Correlation against gridded aggregated mont

Data Set / Model: CAM4-Oslo-Vcmip5.A2.CTRL

Parameter: ABS550_AER

Place-Year-Freq: WORLD | an9999 | Annual Average

Reference: AERONETSky

Reference dataset and eventually year / Aeronet Level 2, workup by Stefan Kinne

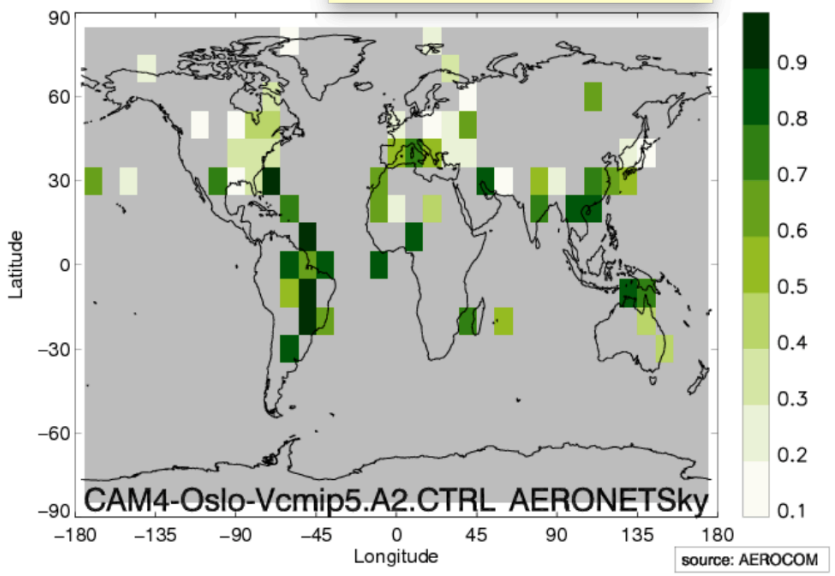

image created 27.03.2014 18: 7

Hide info hovering over image | Edit Subset "MyList"

Which model is it? Which version? From whom? Global netCDF attributes for each dataset "appear"

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

Project-> AEROCOM | Subset/Paper-> AEROCOM Phase II CTRL | Explicit-1-panel | URL LINK to current

AeroCom

Graph Type: Map of data (w area mean value)

Data Set / Model: CAM4-Oslo-Vcmip5.A2.CTRL

Parameter: LOAD_BC

Place-Year-Freq: WORLD | an9999 | Annual Average

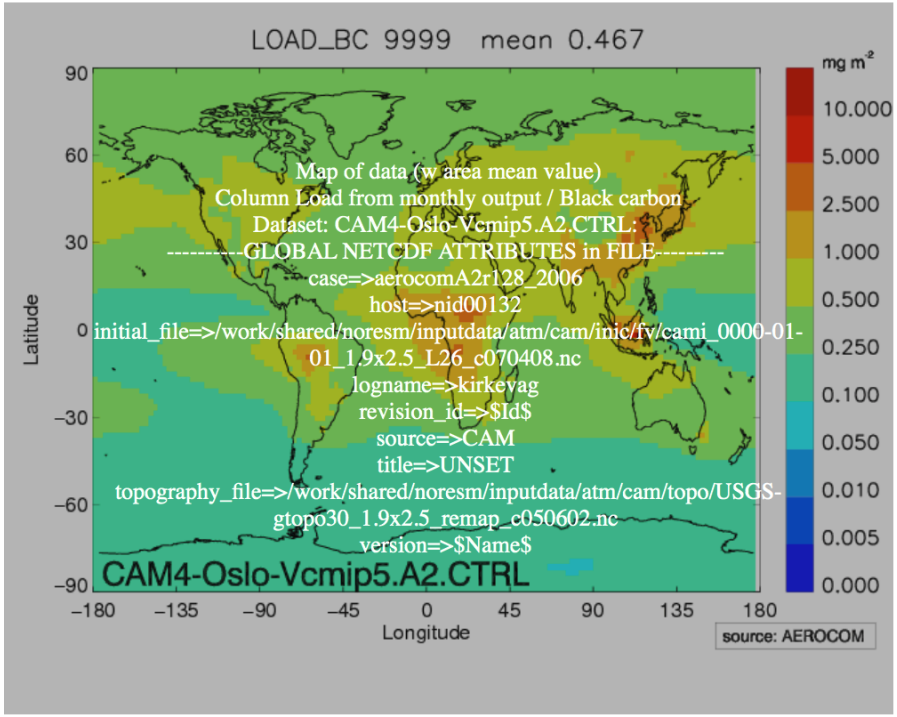

image created 27.03.2014 9:37

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Which models/datasets should be looked at together? Subsets for different project phases & publications

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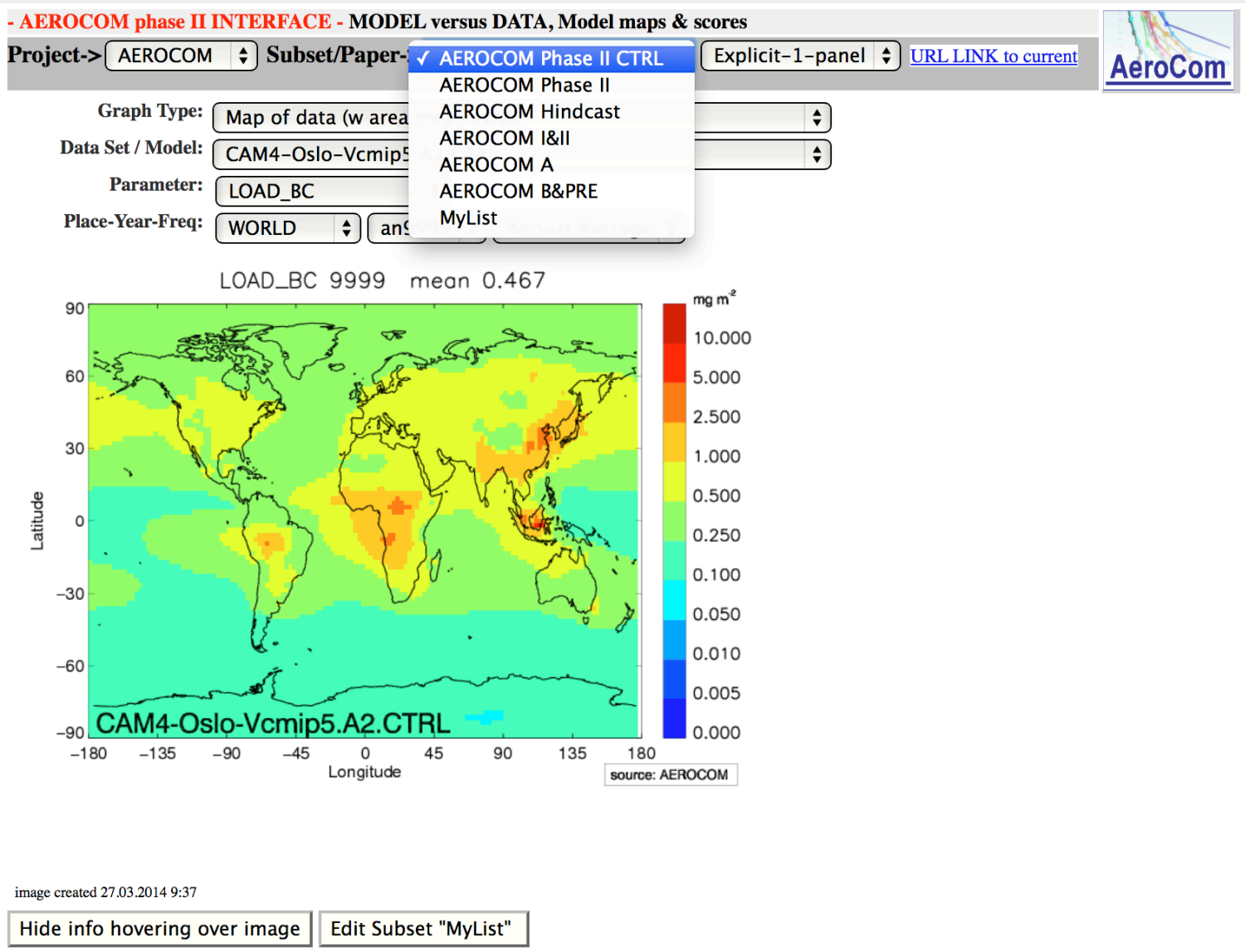

Which datasets were used in which publication? example: retrievals in cci-aerosol publication in AMT

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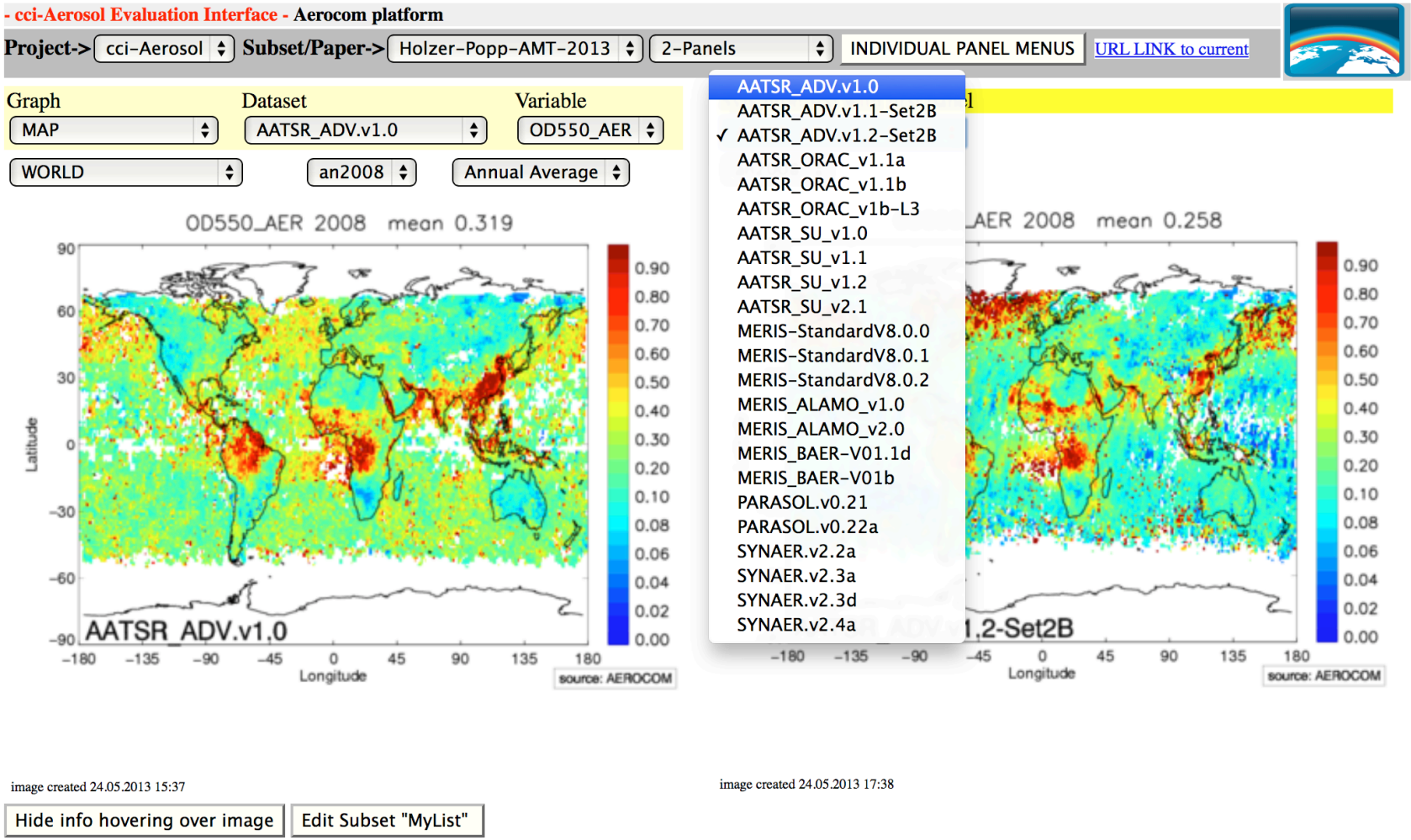

Which other models can I compare to? Synchronize shows comparable datasets available

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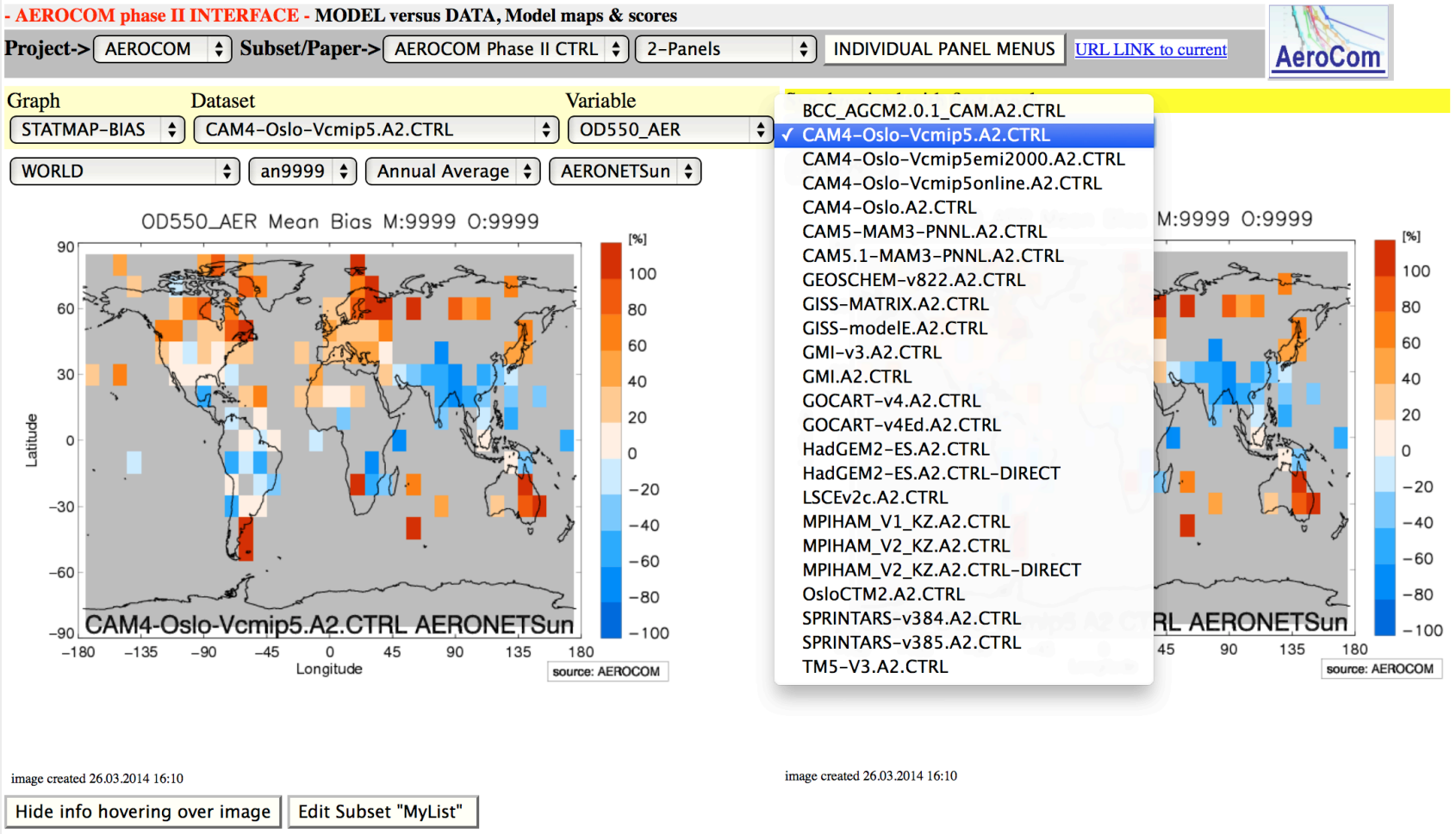

Can we compare against a reference? example MACC MAM 2014 to MACC MAM climatology

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Monitoring atmospheric composition & climate

macc Monitoring atmospheric composition & climate

Copernicus

AeroCom

HOME | NEWS | CATALOGUE | PRESS ROOM | ABOUT THE PROJECT | CONTACT US

Home > Air Quality & Atmospheric Composition > Verification of Global Services > MACC AeroCom Evaluation Interface

Home

Verification of Global Services

- Aerosol ALERT
- AOD
  - 2014
  - 2013
  - 2012
  - 2011
  - 2010
- Angstroem Exp
  - 2014
  - 2013
  - 2012
  - 2011
  - 2010
- Global vs Regional

Related Links

- MACC Evaluation pages
- VAL reports
- AeroCom

Project-> MACC **Subset/Paper->** MACC-VALreports Explicit-1-panel URL LINK to current

Graph Type: Map of Local bias from monthly field data to reference field

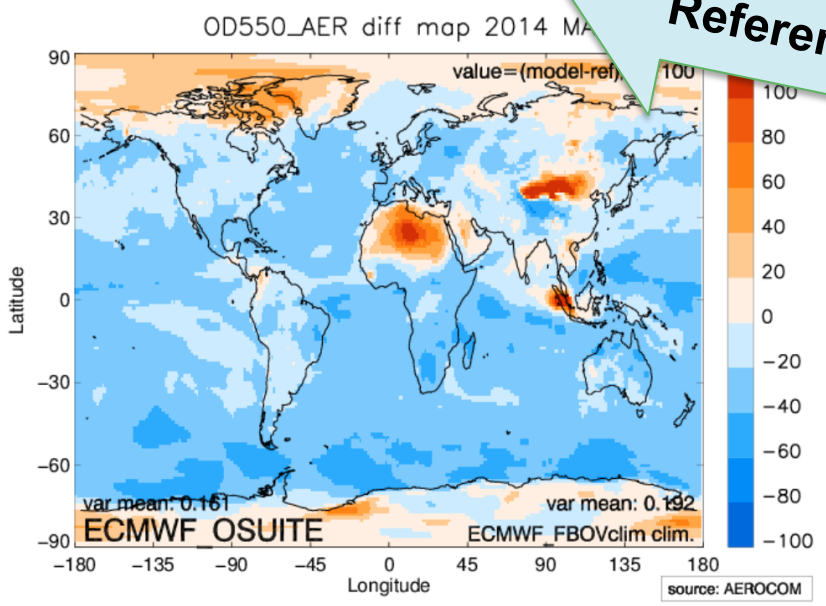
Data Set / Model: ECMWF_OSUITE

Parameter: OD550_AER

Place-Year-Freq: WORLD an2014 nMAM

Reference: ECMWF_FBOVclim_9999

Reference Dimension



Difference/Correlation map vs different references? Example ATSR vs AeroCom Median & Modis

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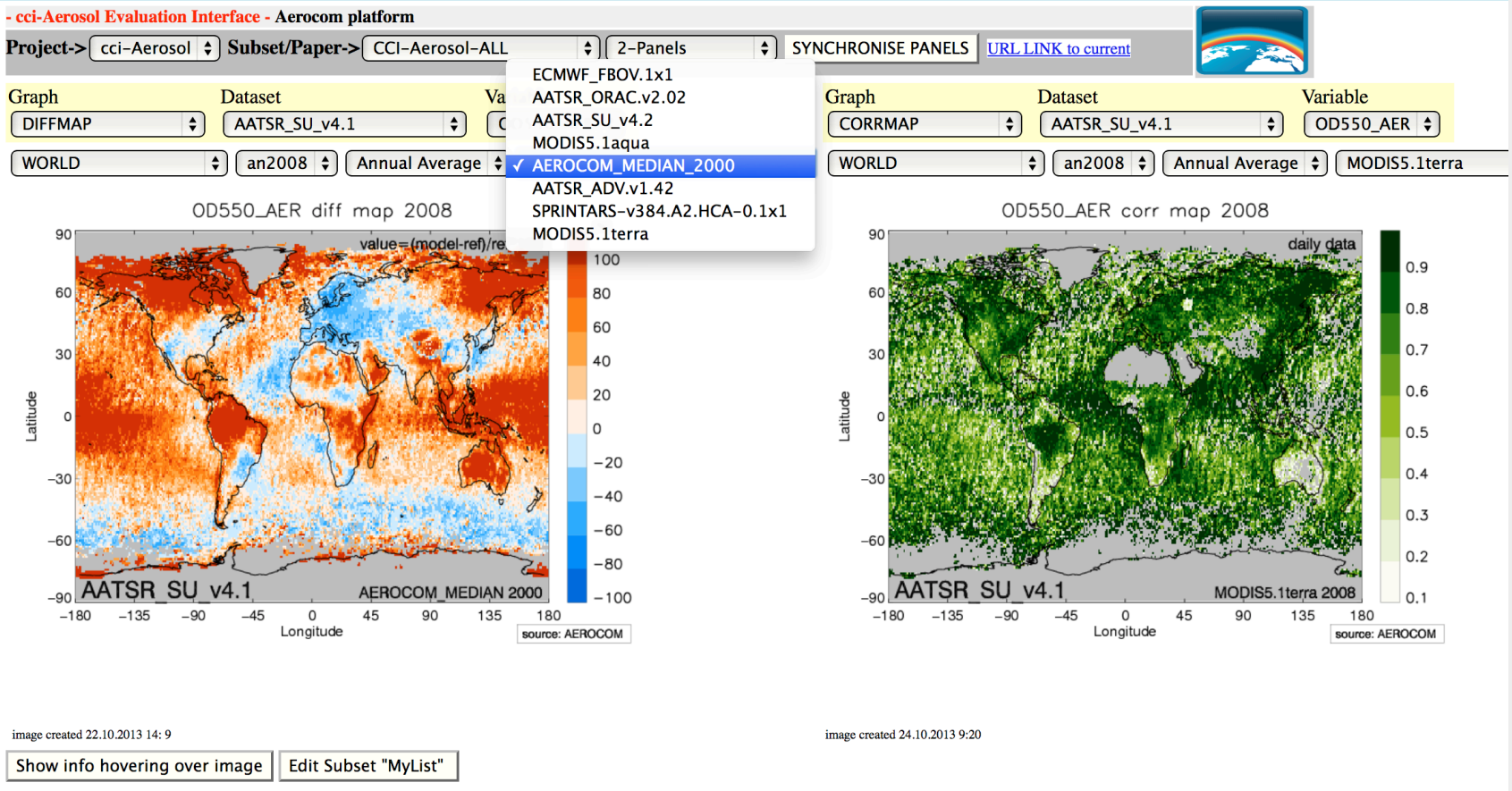

Data evaluated against different observations? example MACC against Aeronet 2.0 and 1.5 NRT

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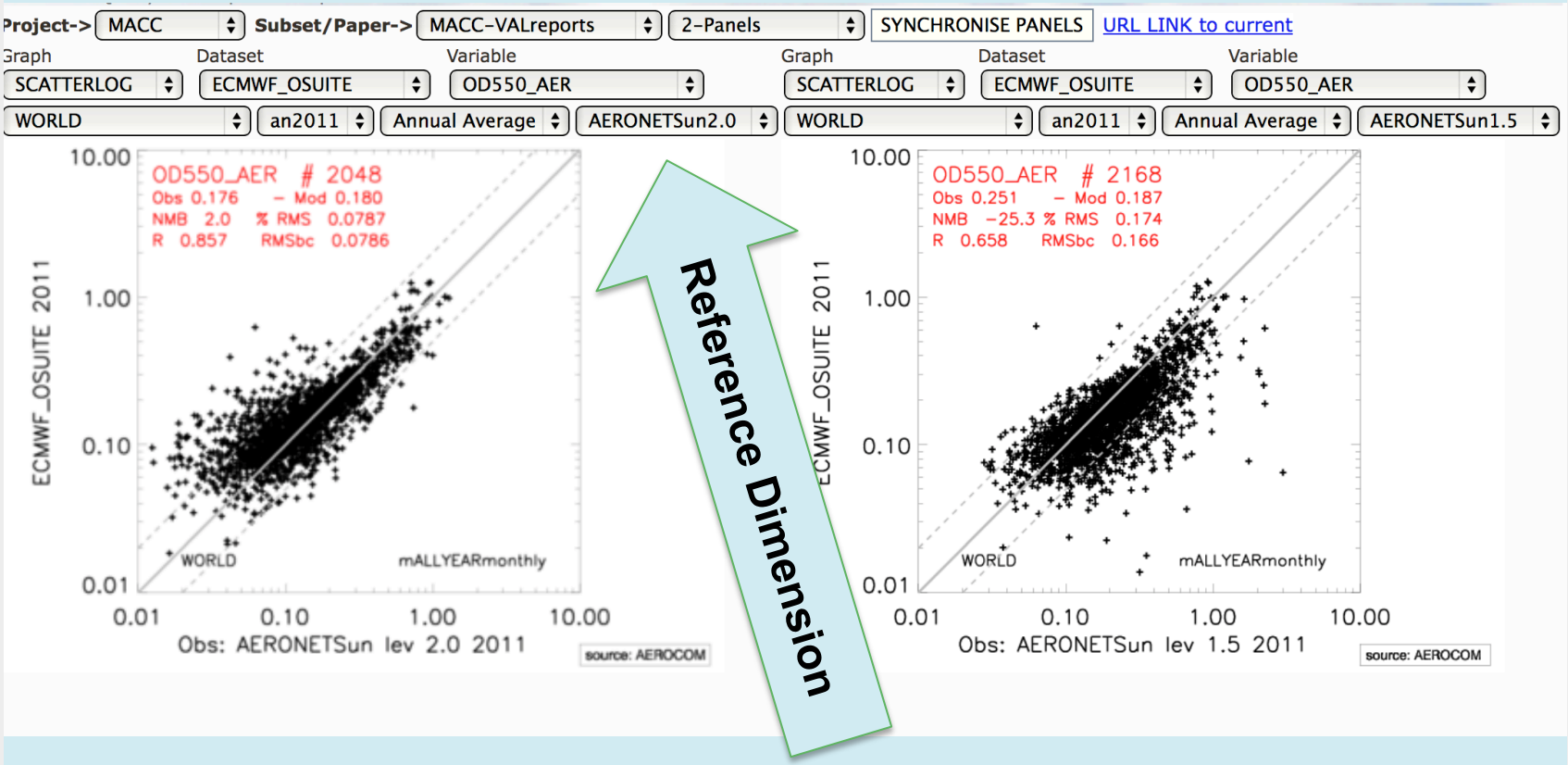

AeroCom Web Interface

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- Feedback very welcome !!

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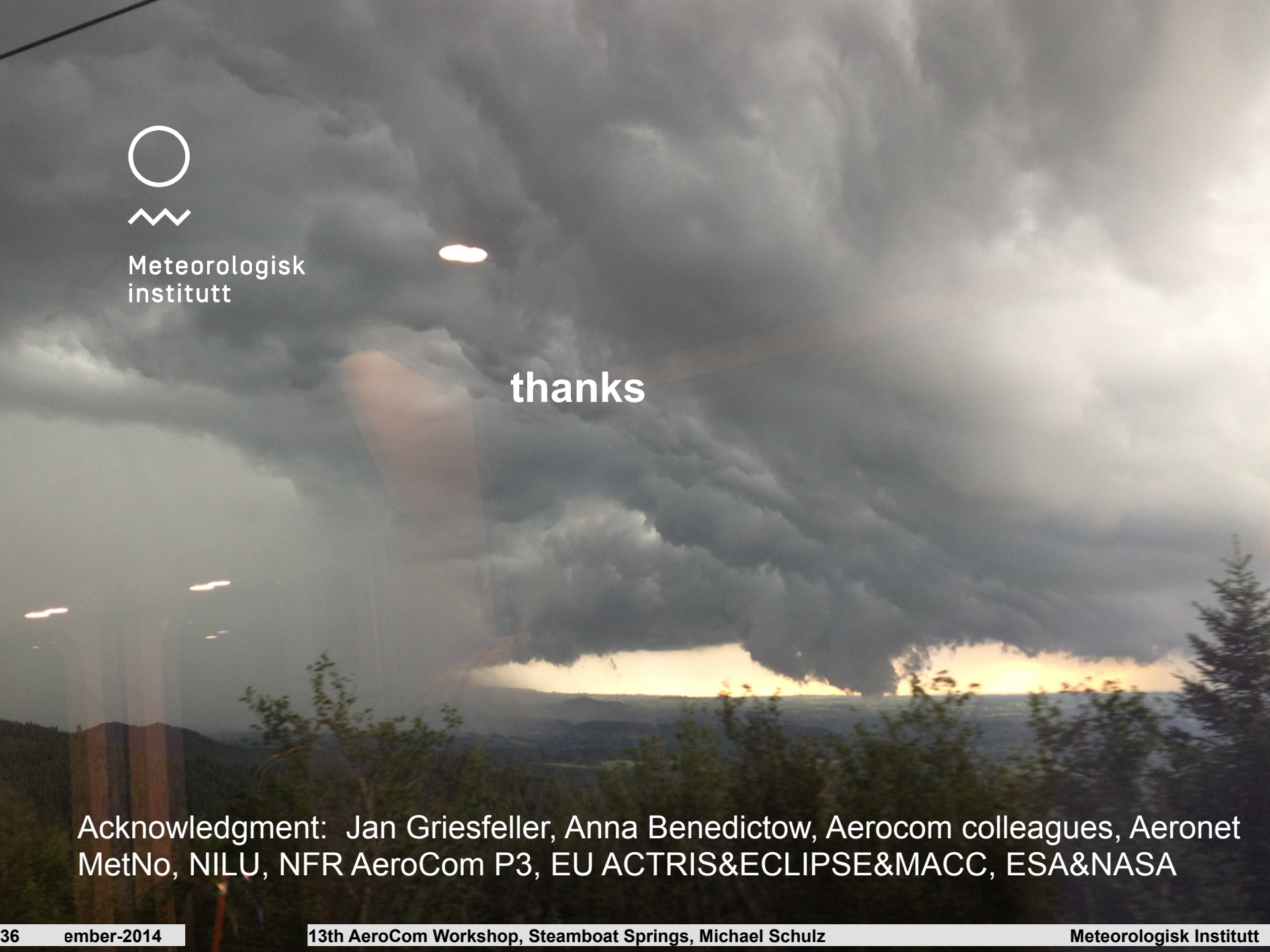
Goals of the workshop

Goals and Questions for the workshop

- Progress in current AeroCom Experiments?
  Nitrate, BB, Indirect, (HTAP), Lifetime
- AerChemMIP diagnostics and experiments?
- Next steps for meaningful model evaluation?
  - Satellite and surface observation synergy
  - Trend significance
  - Model error finding
  - Model improvement documentation
  - Forcing documentation in GCMs
- Database and Tools overview / review
  What could be done better?
- AeroCom Scientific Committee ?



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thanks

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