Model evaluation through AeroCom

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AeroCom platform

Selected Observational datasets

AeroCom Model-based Aerosol climatology

AeroCom standard diagnostics and formats

New Model submissions

AeroCom dataserver (5 TB disk) for expert users

Benchmark "Dust"

Benchmark "CS-Forcing"

Benchmark "Hygroscopicity"

Benchmark "Size"

Benchmar "…other"

NASA/Giovanni

Machine to machine link to data servers

HTAP-Julich

NILU/Geomon

Web interface to
Image catalogues
Score report
Dynamic evaluation

http://nansen.ipsl.jussieu.fr/AEROCOM/data.html

AeroCom server

AeroCom server at LSCE:
~ 50 model simulations (AeroCom A,B,PRE, HTAP, EUCAARI, GEMS)
original files and renamed,harmonized files
~ 25 user accounts
~ linux, nco, idl, cdo, ncview, emacs
~ CALIOP model/data idl visualization tool 2006/2007
~ dods server
~ aerocom idl image & analysis software package (=> image catalogue)
(read model+obs+plot+analyse)

Observations:
MODIS, MISR, POLDER, TOMS, AVHRR, AIRS, EMEP, IMPROVE, EARLINET+ARMS 2000+2001, Aeronet+2003 SKYNET/GAW AEROCE

Emissions:
AeroCom B
Hindcast Diehl – collection (=>copy on dods server)

Introduction into AeroCom Zoo

SURFOBS Interface!!

Project Selection

Type of diagnostic

Score tables

Filter/Region/Station

Subset stations

Web interface visits, last weeks

AeroCom

Surfobs comparison web interface // 84 visits since 10 Sep

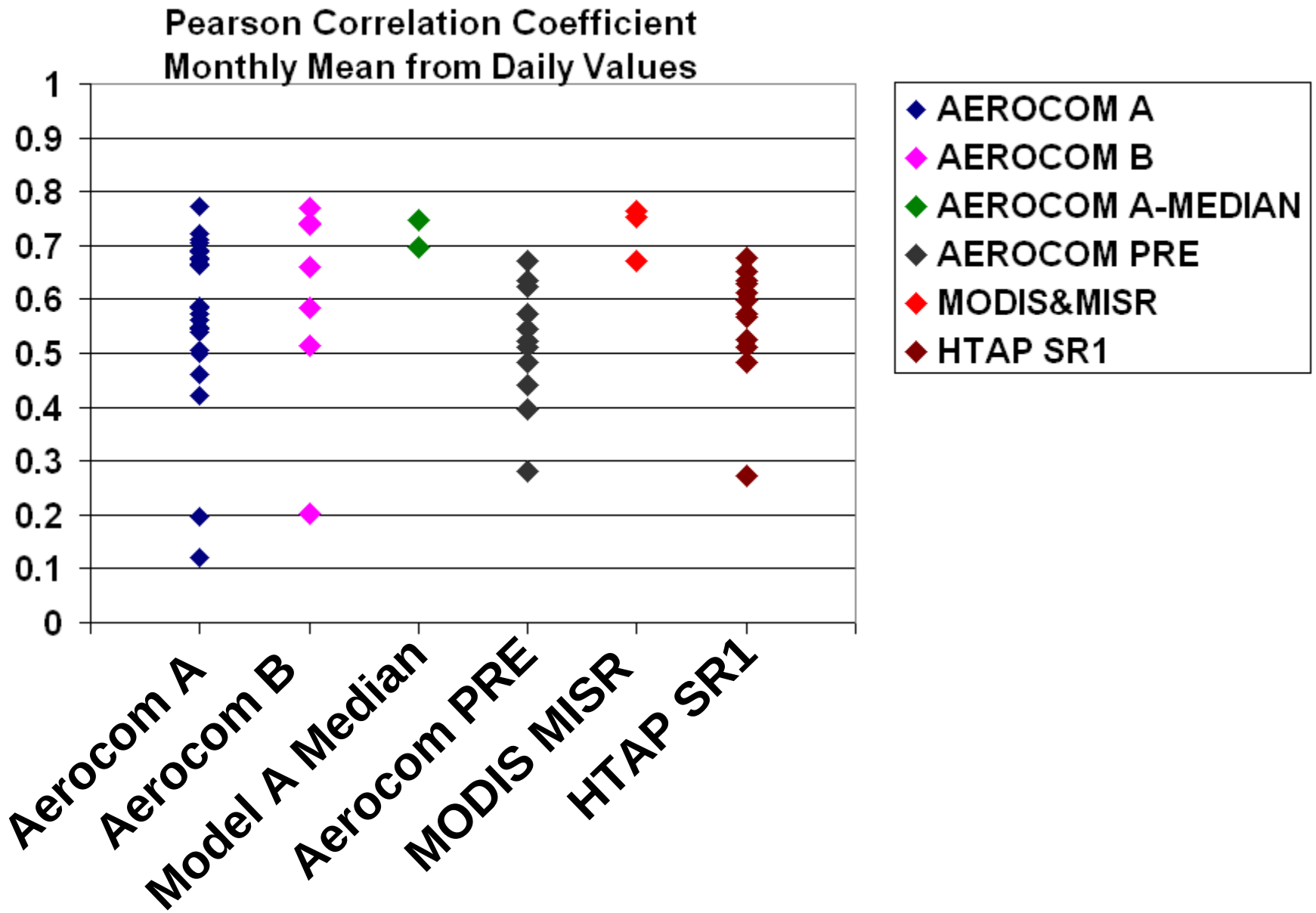
Aerocom work 2d fields web interface // 121 visits since 25 Sep

What we can do with scoring

- Show model progress
- Find systematic errors within/across models
- Complement traditional publishing
- Get credit
- Check impact of new parameterisation
- Identify models fit for purpose

Aerosol Optical Depth
Models compared to Aeronet (2001 # 721 / 2000 # 606)

AeroCom



ECMWF IFS Model --- Evaluation with Aeronet sun photometers

AeroCom

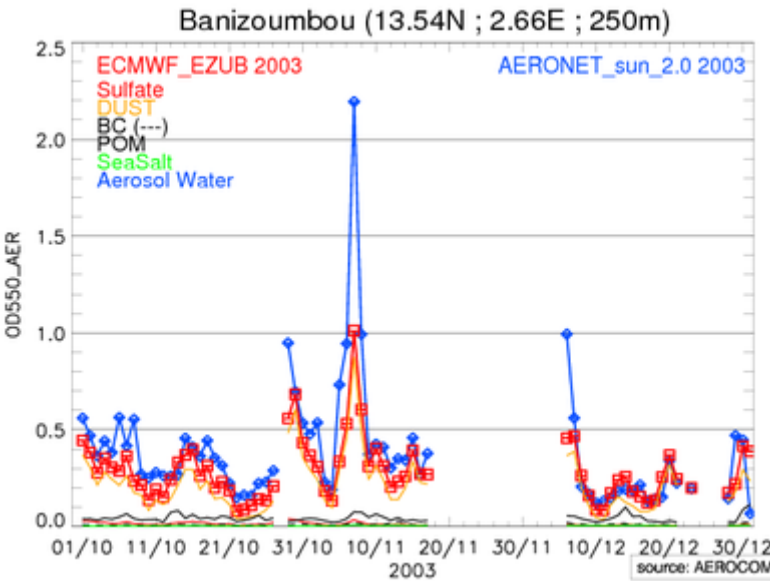
	Reanalysis	Forecast	Aeronet
Mean AOD	0.242	0.218	0.215
Correlation	0.86	0.71	
RMS	0.093	0.123	
Std Mod/Obs	0.79	0.75	
Month Bias	32%	39%	

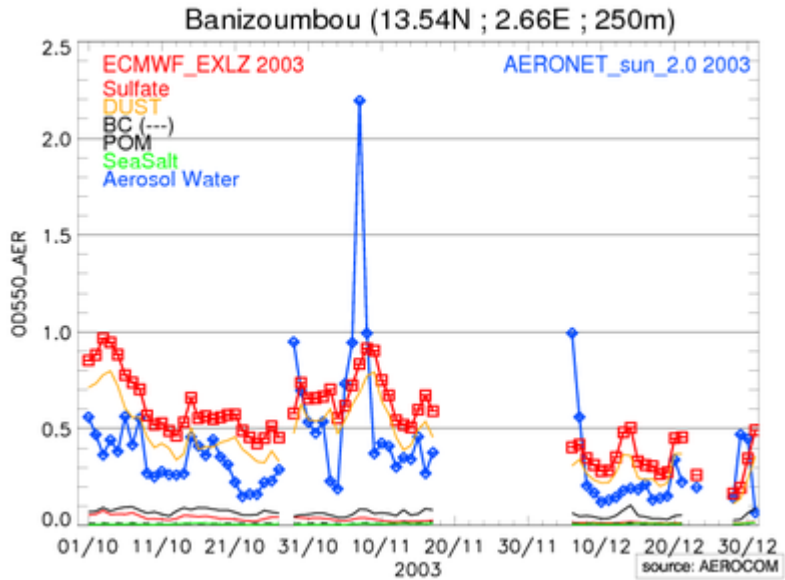
Based on # 1280 monthly means in 2003
from worldwide Aeronet network
no mountain sites

ECMWF IFS Model --- Evaluation with Aeronet sun photometers

AeroCom

Dust aerosols (autumn OND, Sahel)





ECMWF Reanalysis
Modis AOD assimilation

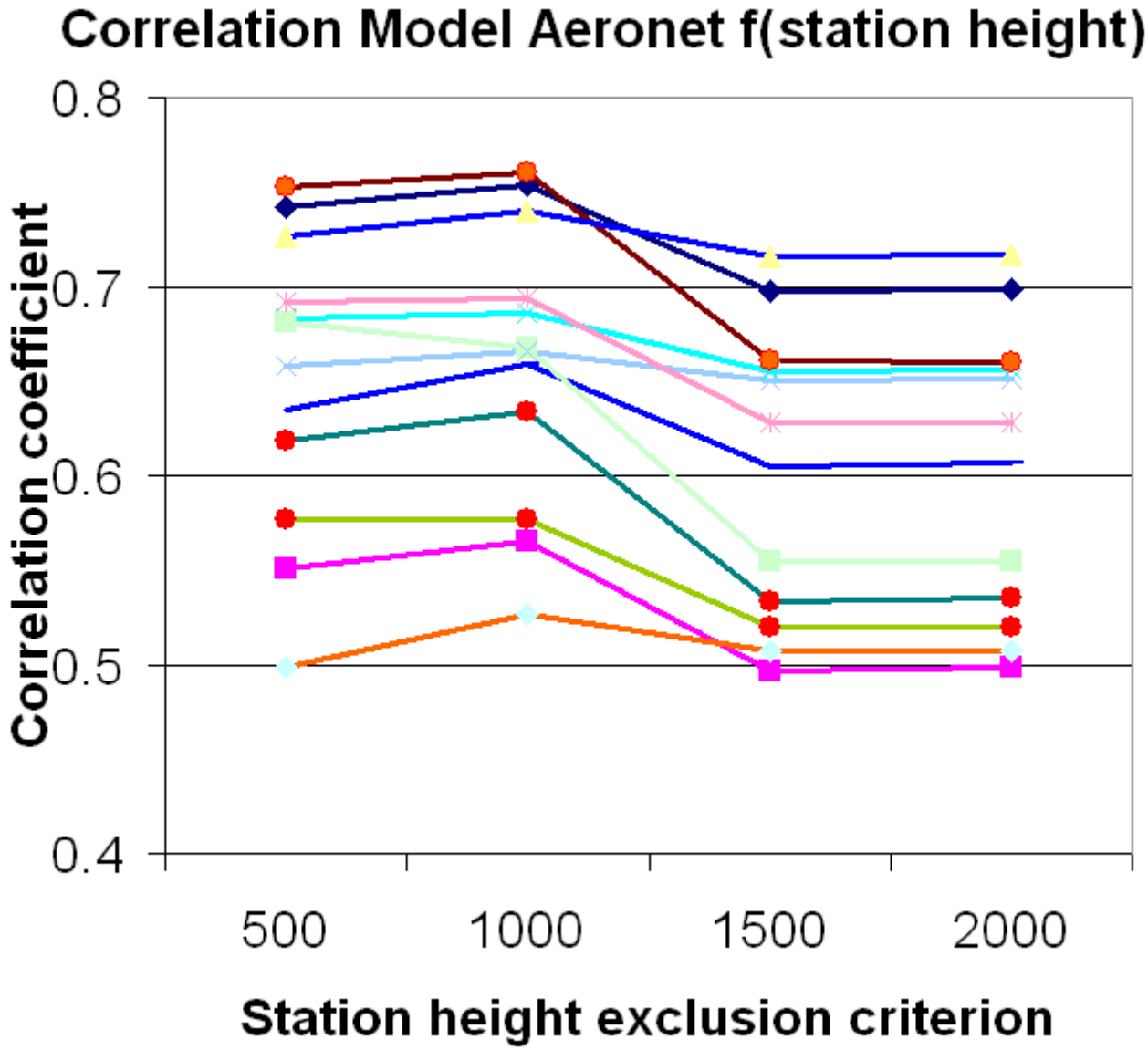
ECMWF forecast 00h

Against Aeronet sun photometer AOD obs

MEAN HTAP models score:
Does correlation improve when we add up wet deposition of SO2 and SO4 ??

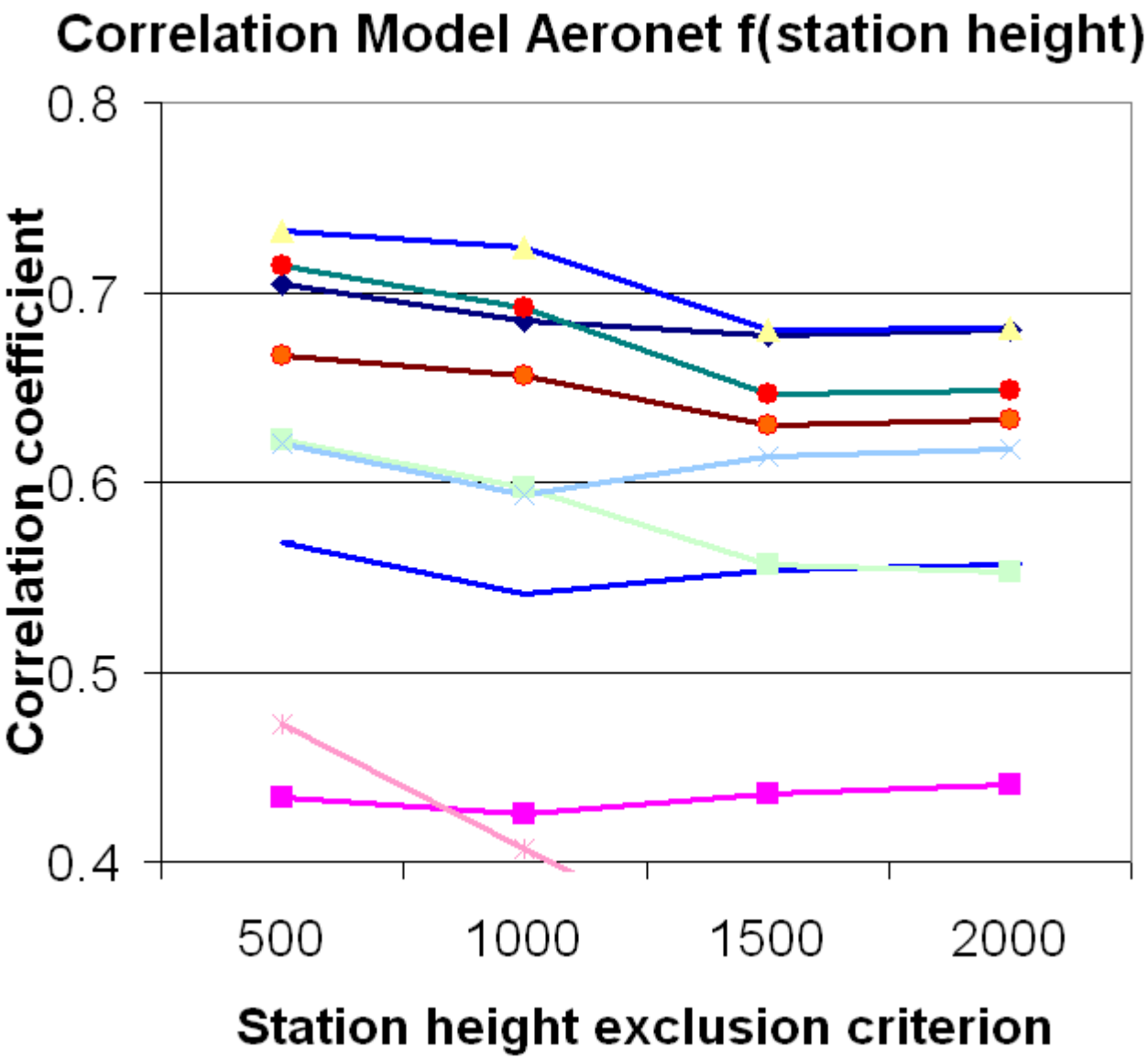
	EUROPE WET_SO4 2001 HTAP SR1	EUROPE WET_SO4+SO2 2001 HTAP SR1
# of valid observations:	780	780
MODEL mean	0.68	1.14
OBS mean	0.44	0.44
RMS error	1.15	1.43
Mean relative bias per month	164%	225%
STDDEV(Model)/STDDEV(Aeronet):	0.869	1.202
Correlation of Monthly station means	0.244	0.246
Spearman Rank Correlation monthly	0.334	0.348
Correlation of Yearly station means	0.491	0.492
Corrleation of monthly anomalies	0.844	0.754
Taylor Score	0.444	0.493

Give subsets of the stations the same answer ? OD550_AER

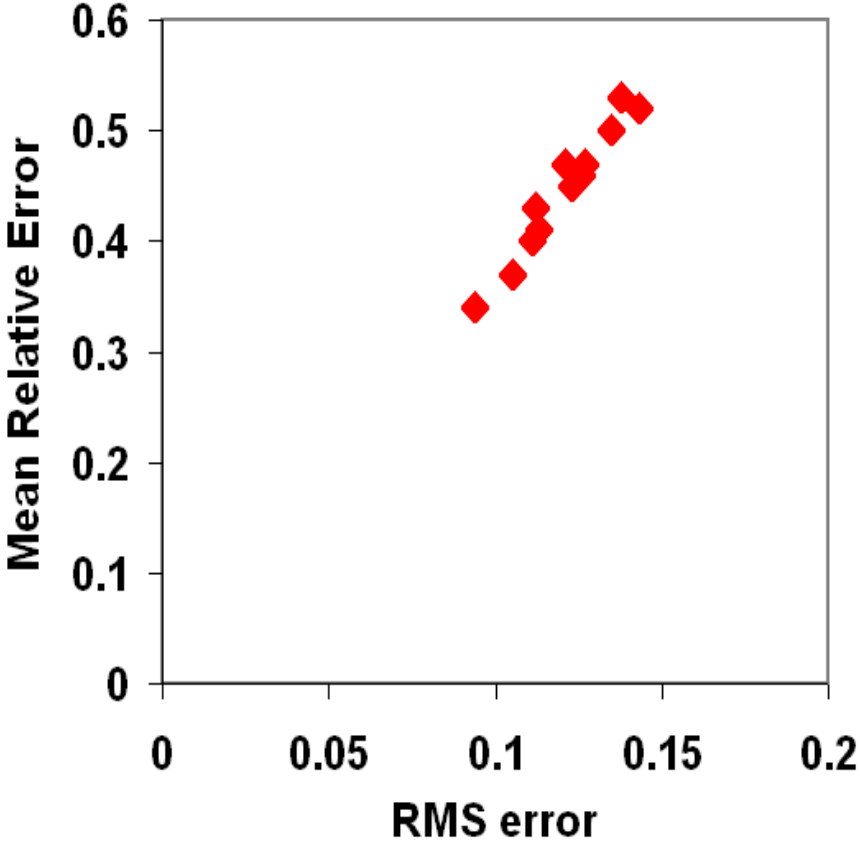


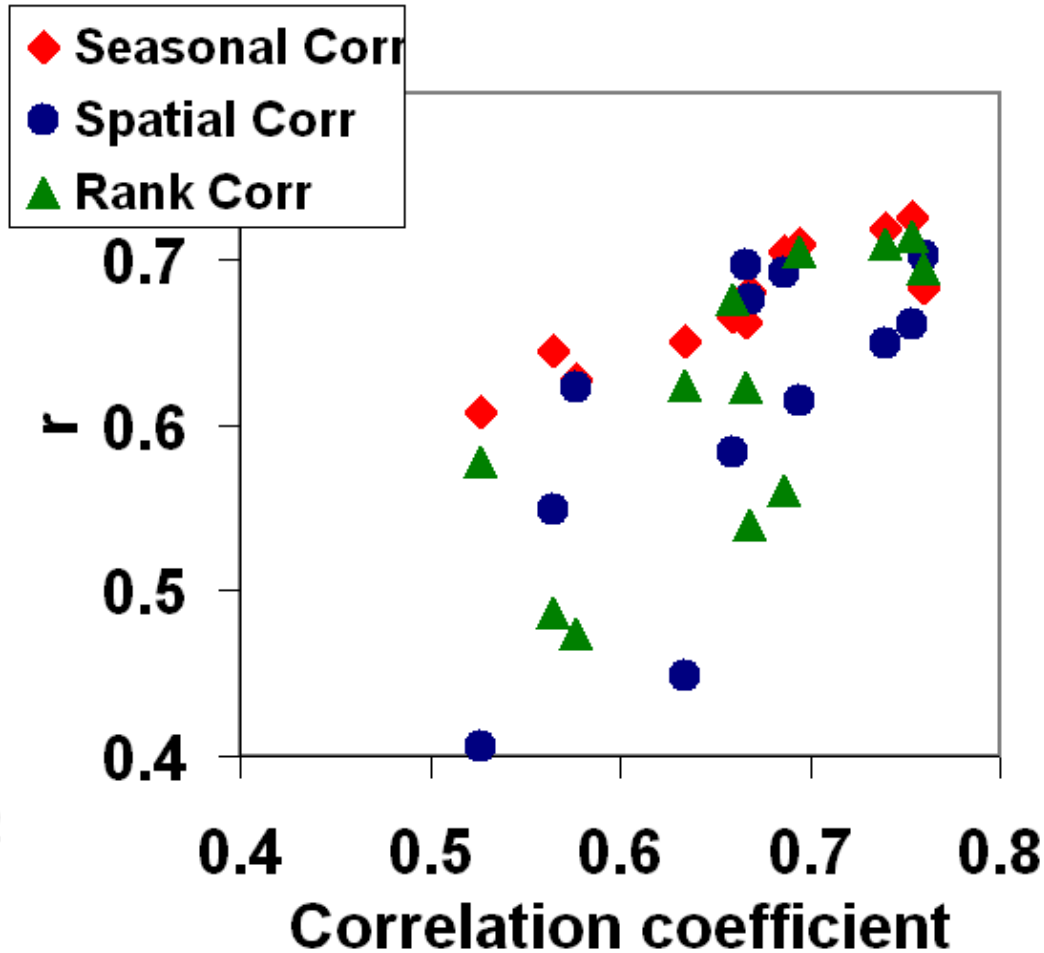
Give subsets of the stations the same answer ?
Angstroem Component

AeroCom



Which statistics provide new information on quality of a model ??
AeroCom A models versus Aeronet OD550_AER





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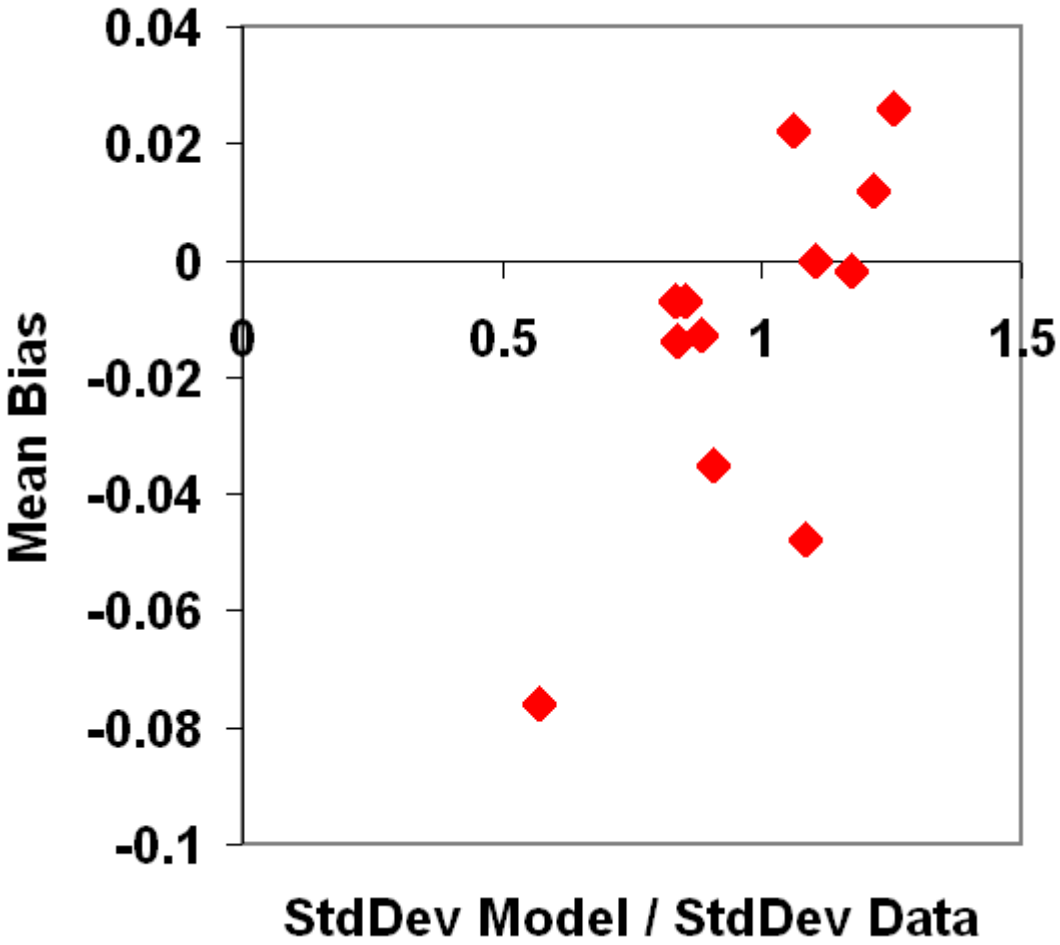
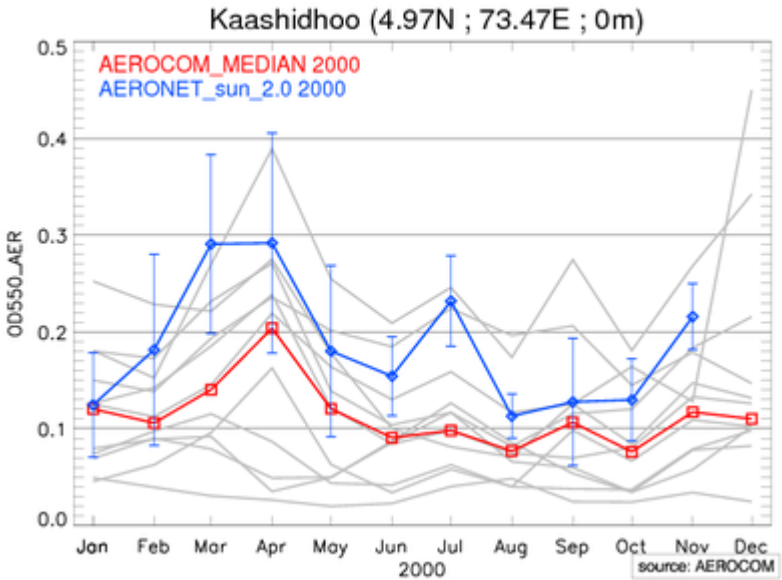
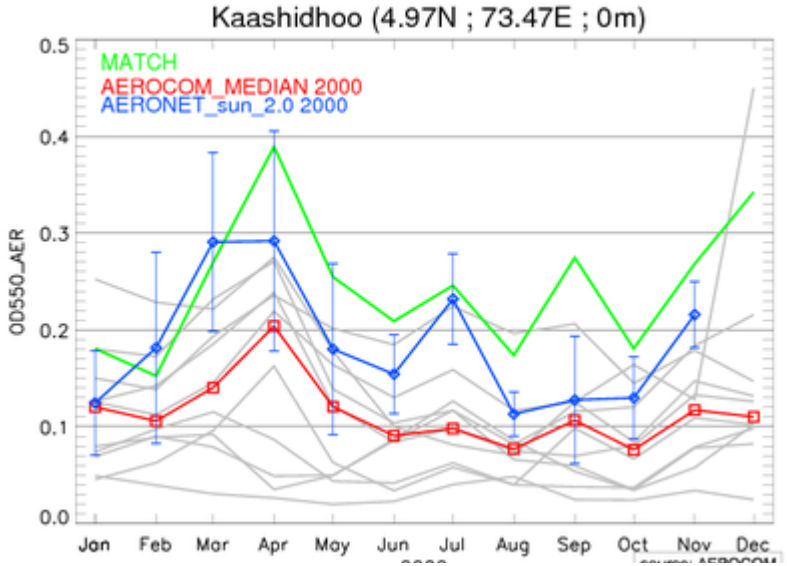
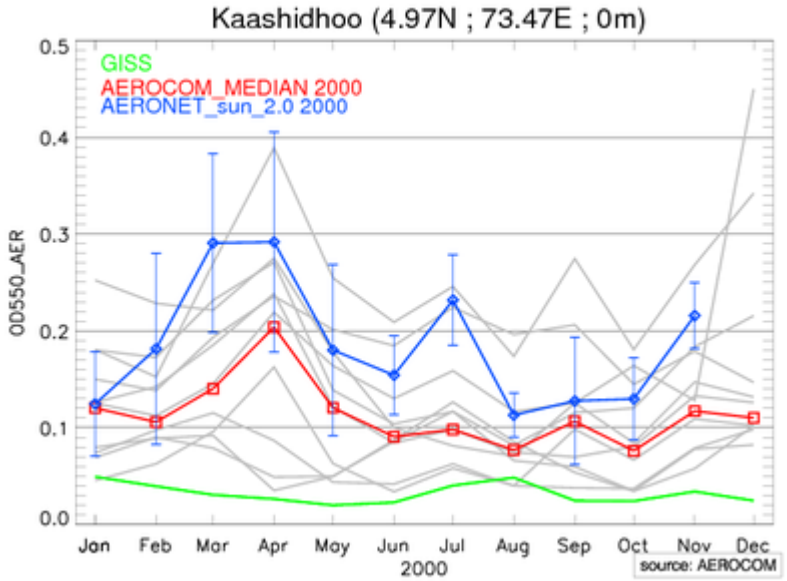


Individual Model
Versus Median Model
Versus other models

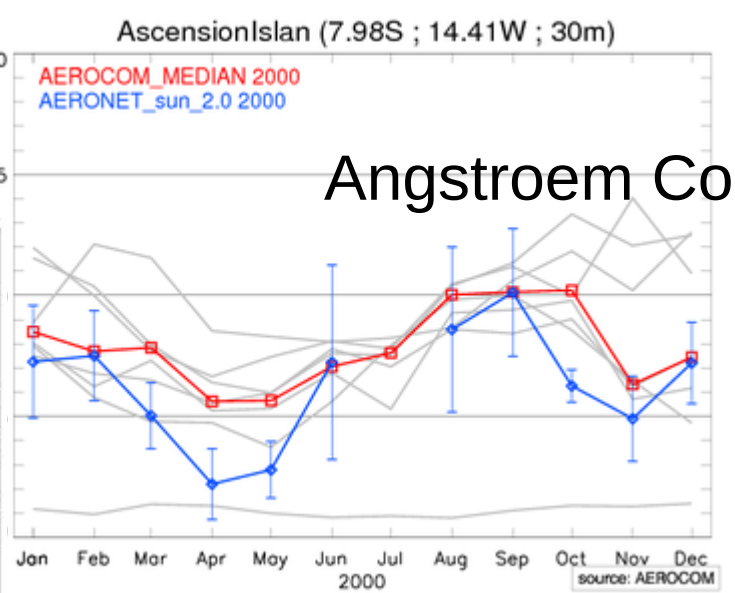


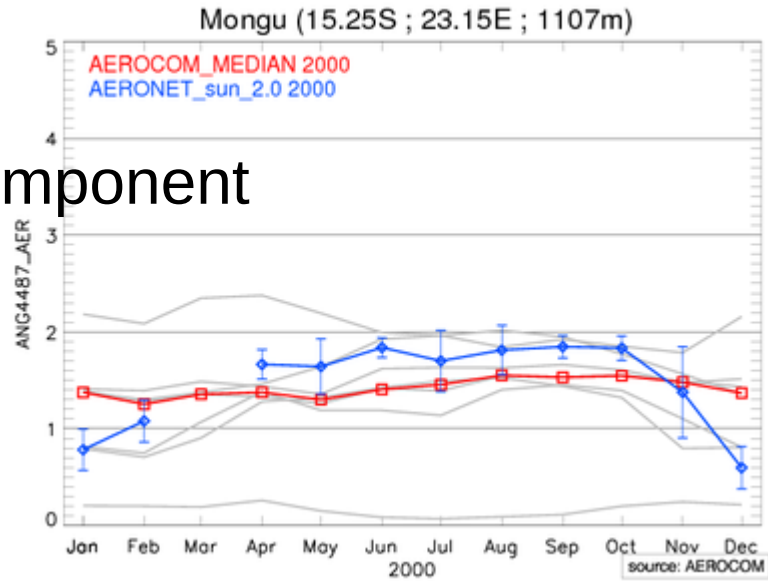




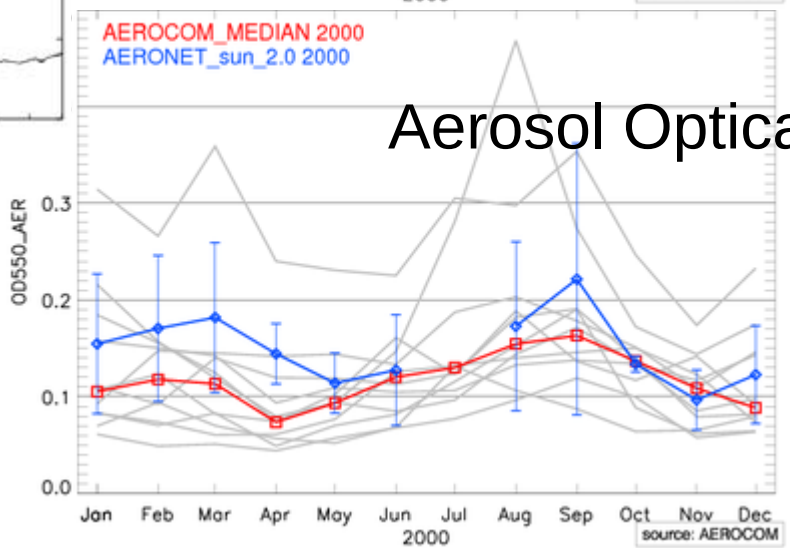
Biomass burning aerosol

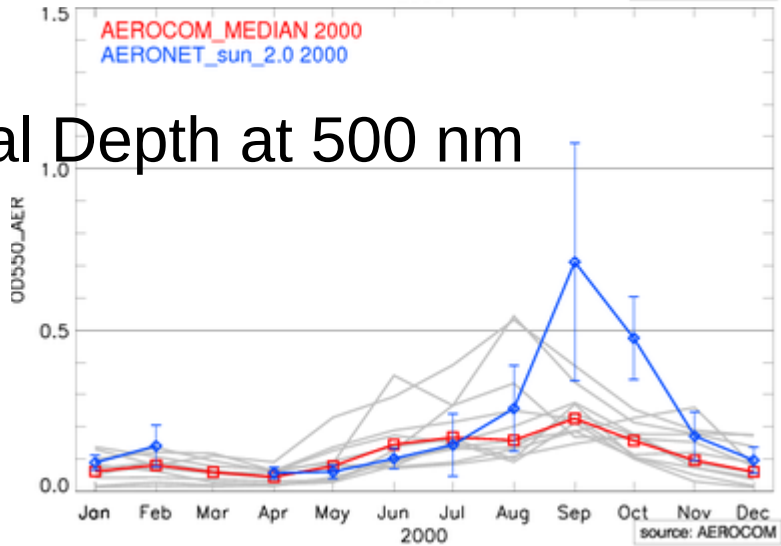
AeroCom





Angstroem Component

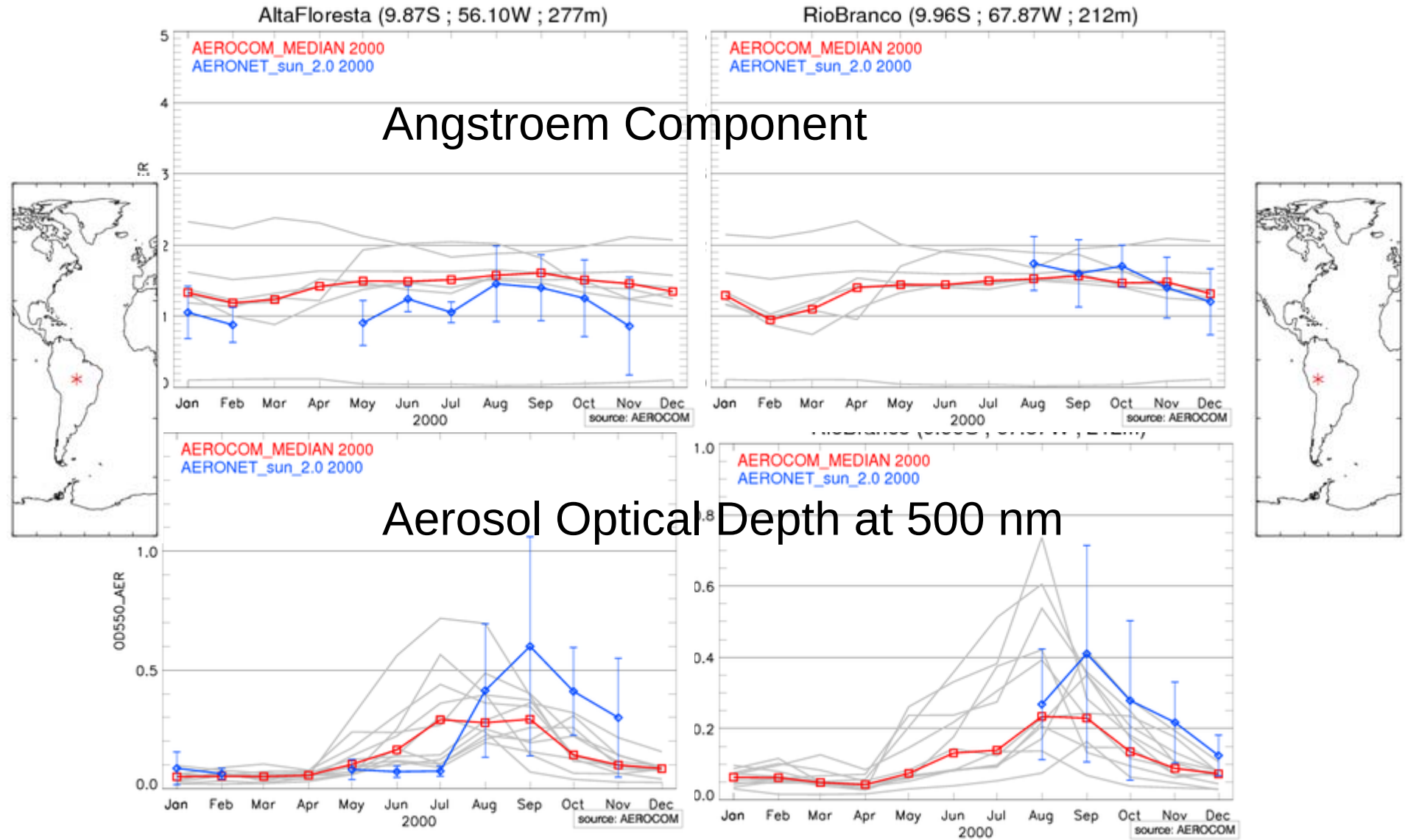




Aerosol Optical Depth at 500 nm

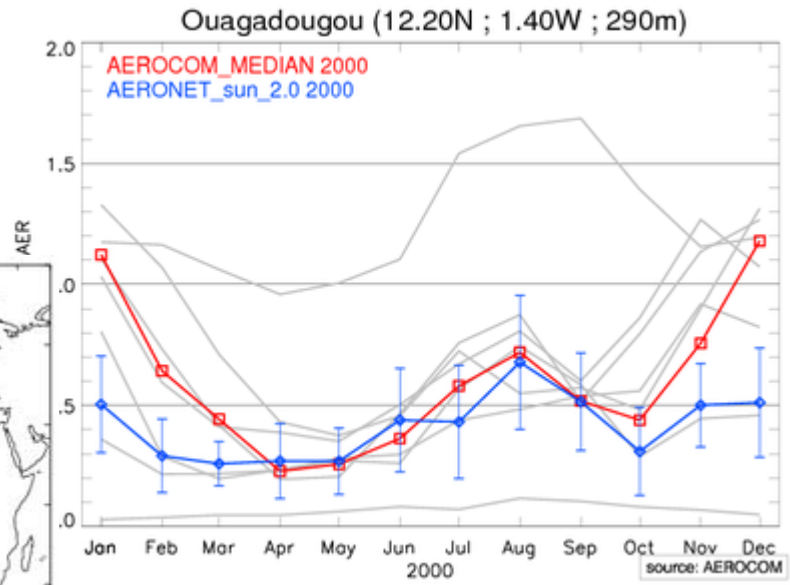
Biomass burning aerosol

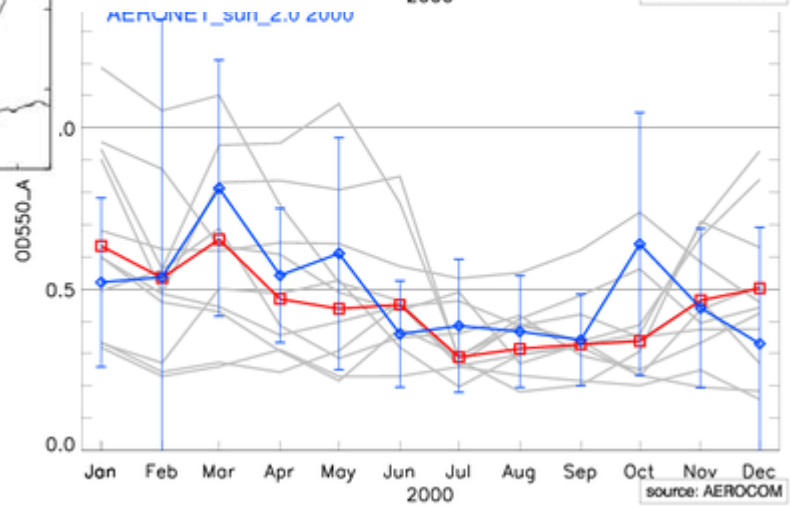
AeroCom

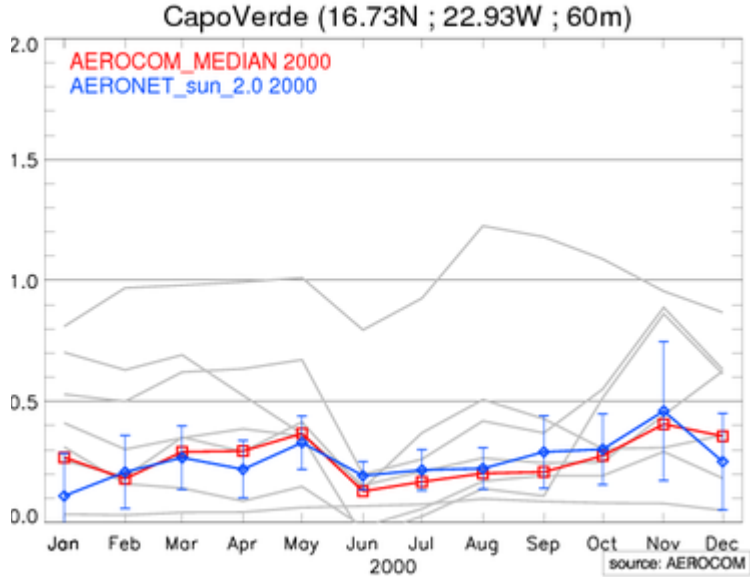


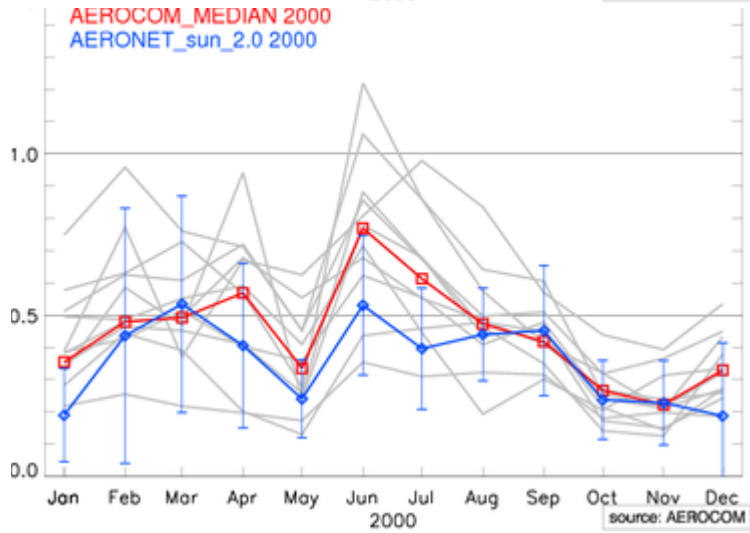
DUST aerosol

AeroCom



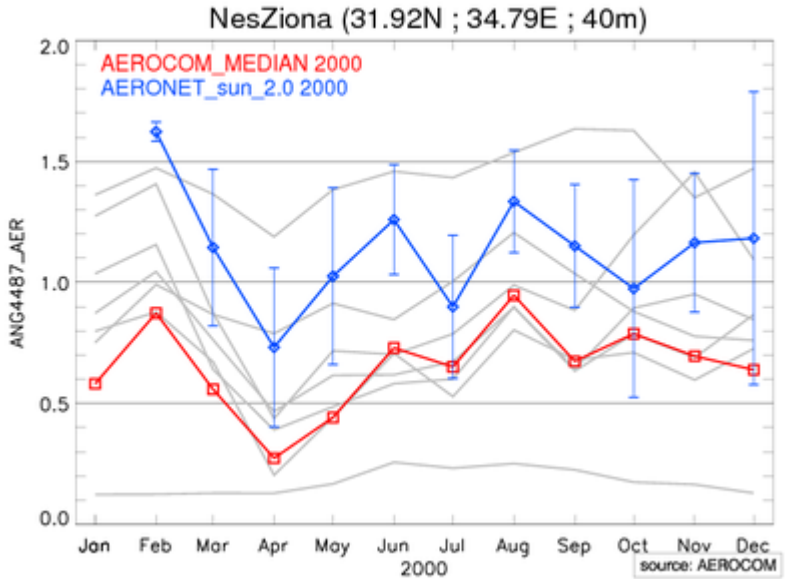


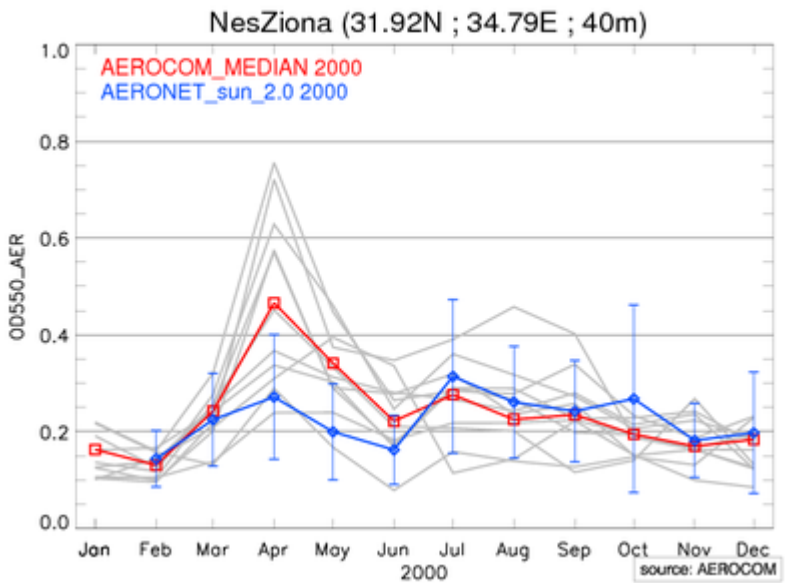




DUST and pollution aerosol

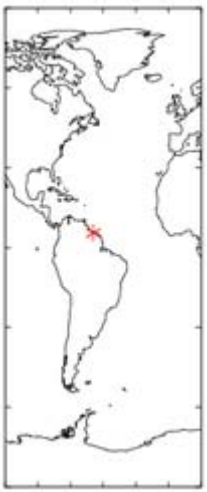
AeroCom

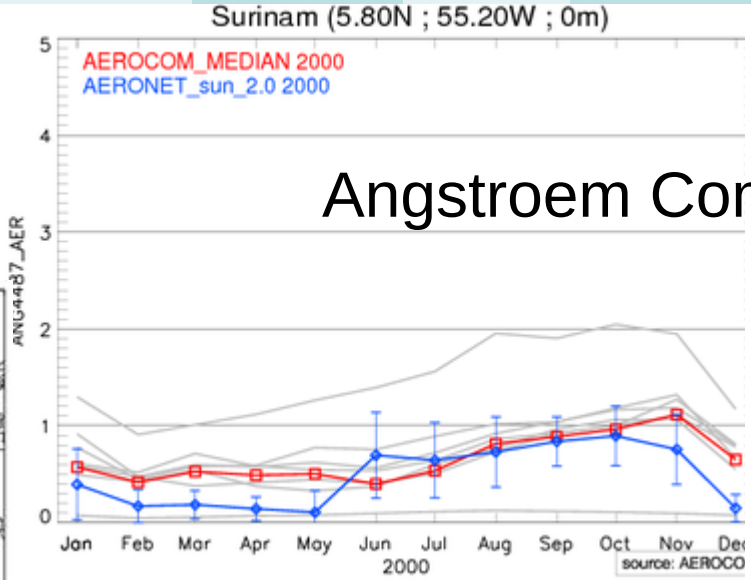




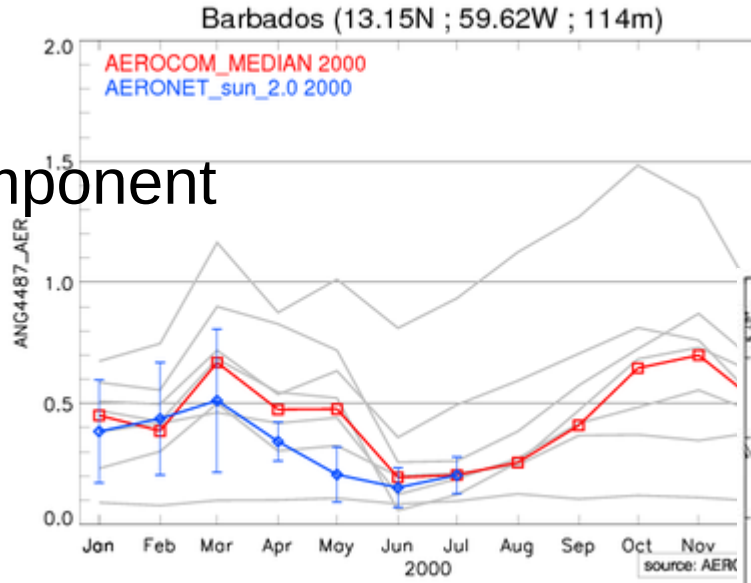
Long range transported dust

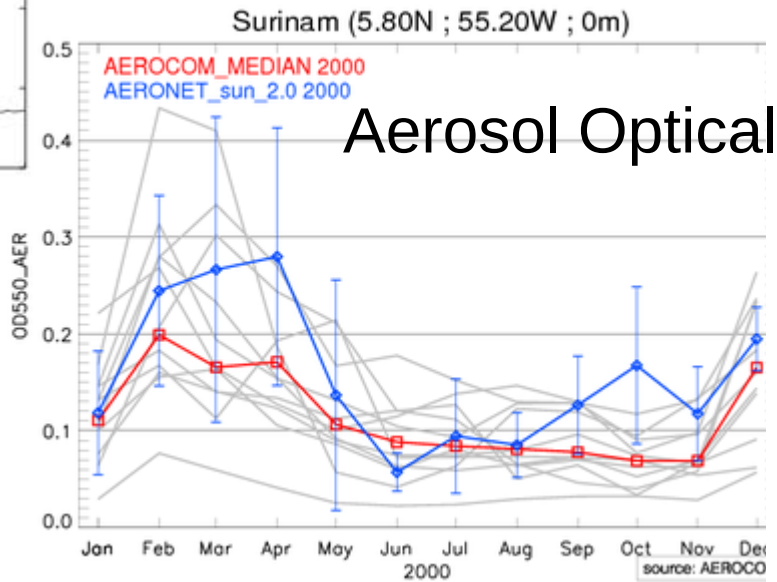
AeroCom



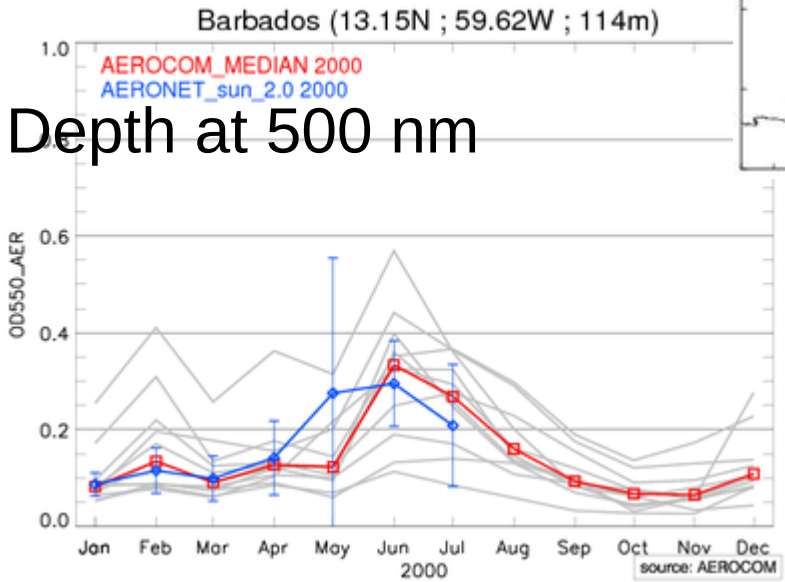


Angstroem Component



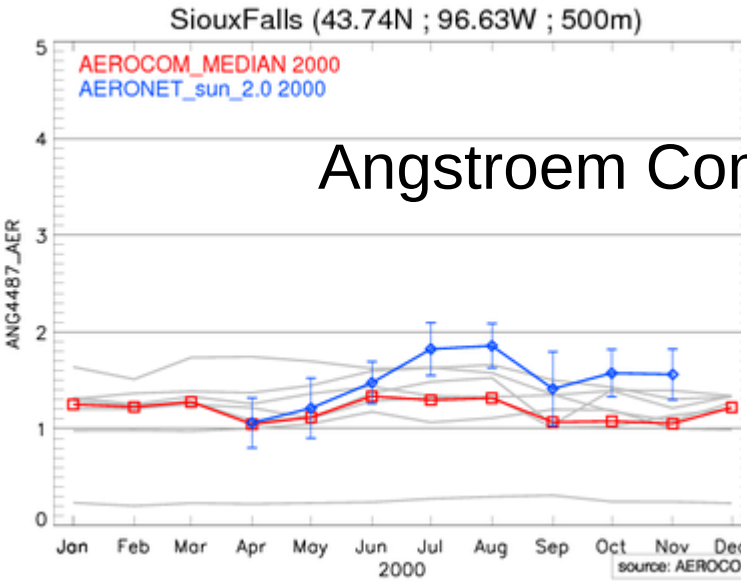


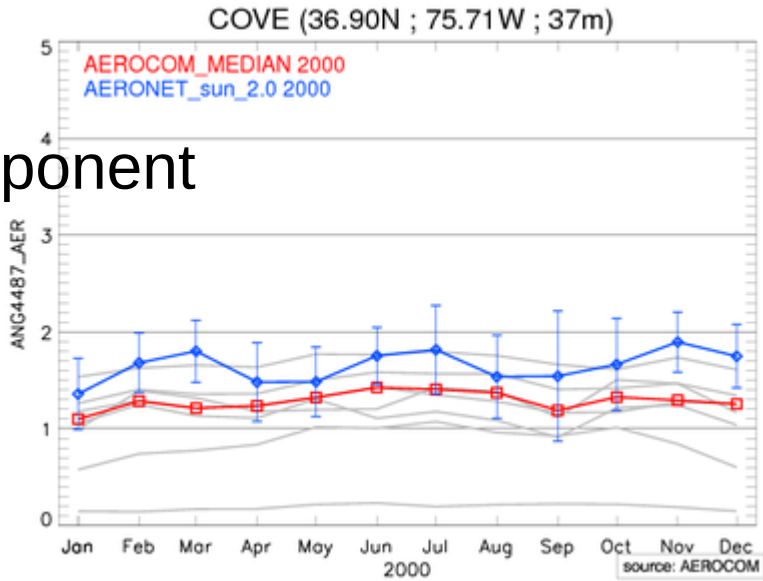
Aerosol Optical Depth at 500 nm



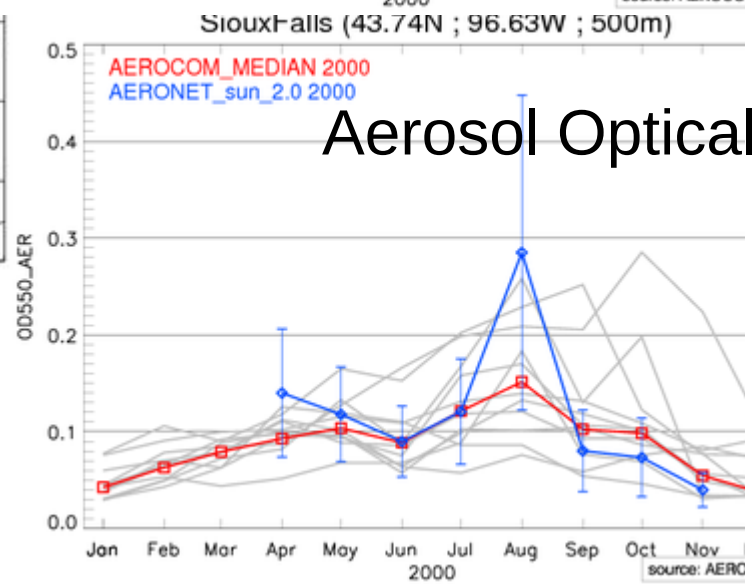
North American aerosol

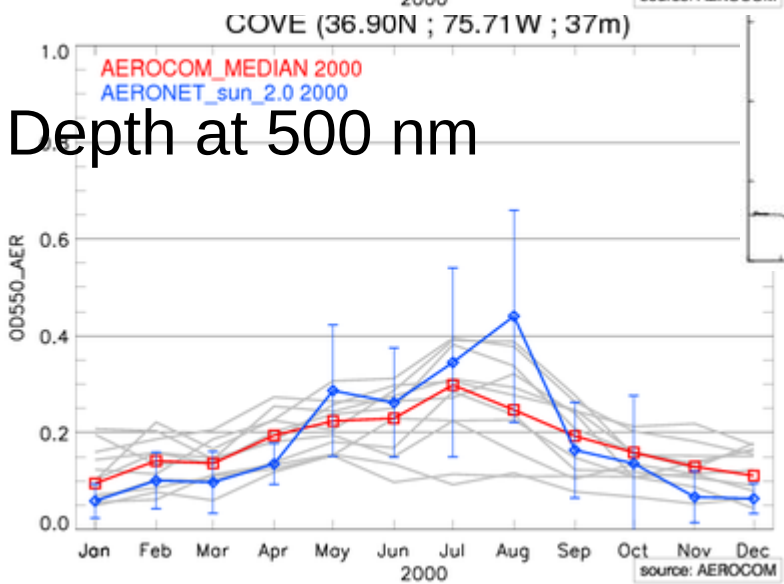
AeroCom





Angstroem Component

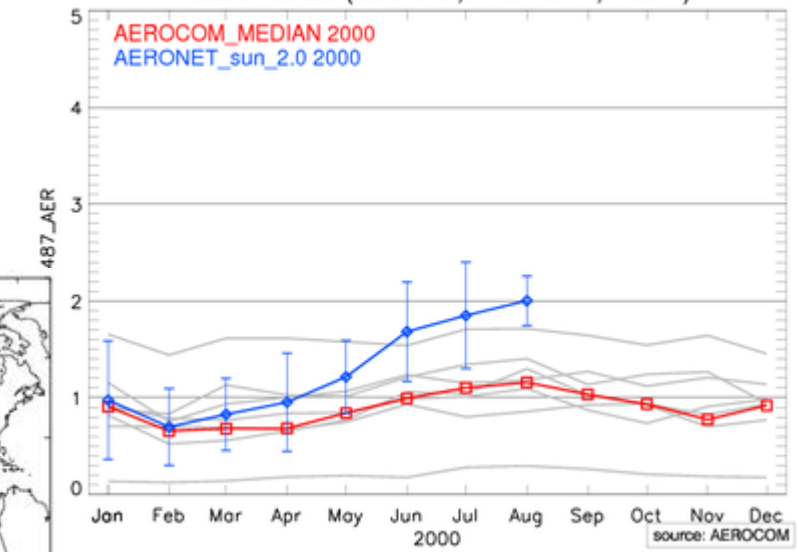


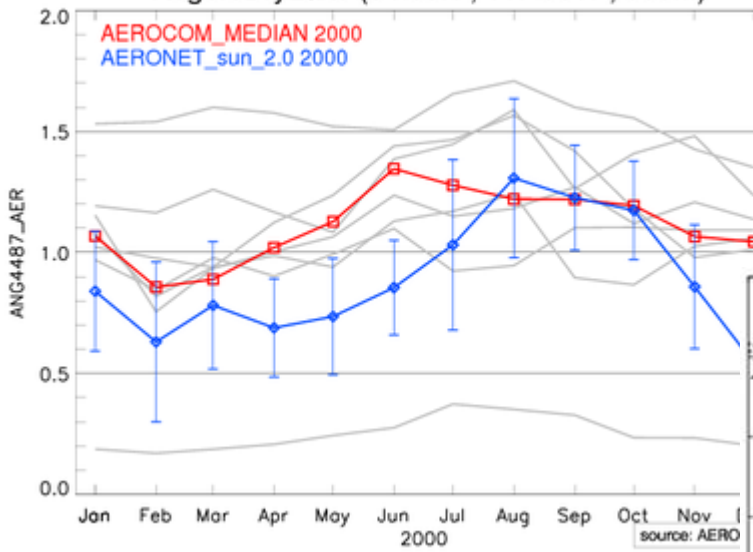


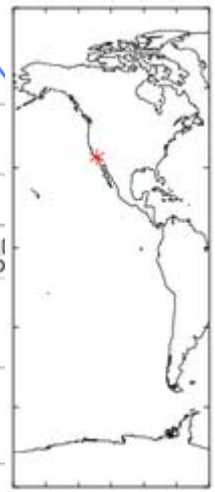
Aerosol Optical Depth at 500 nm

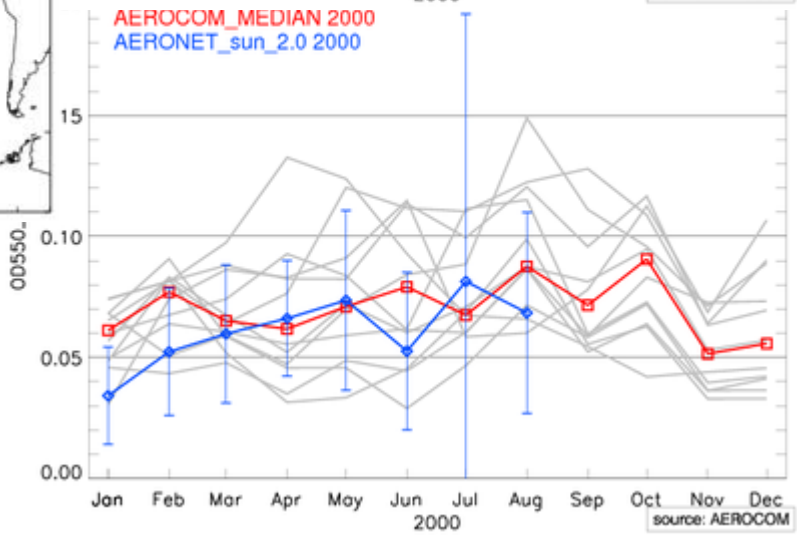
California Coast / Inland

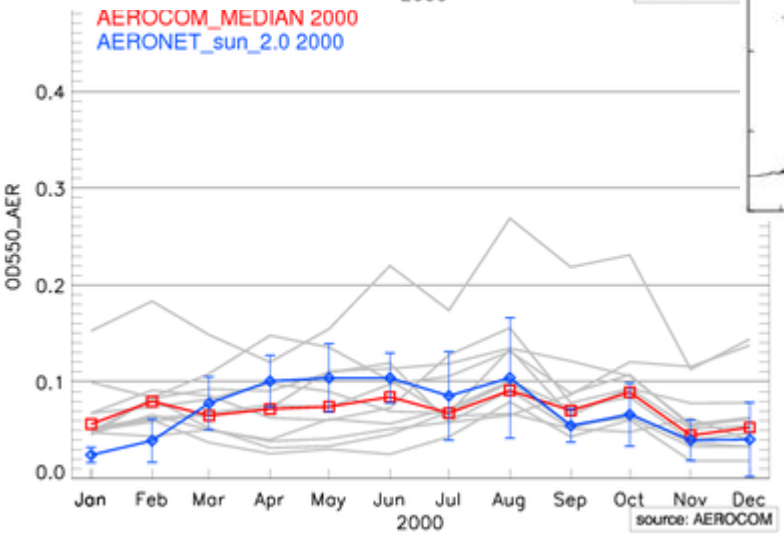
AeroCom





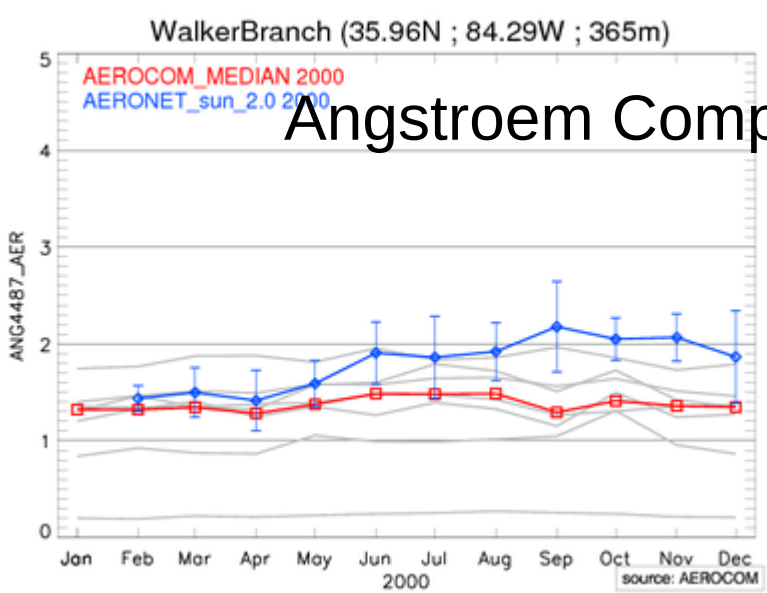




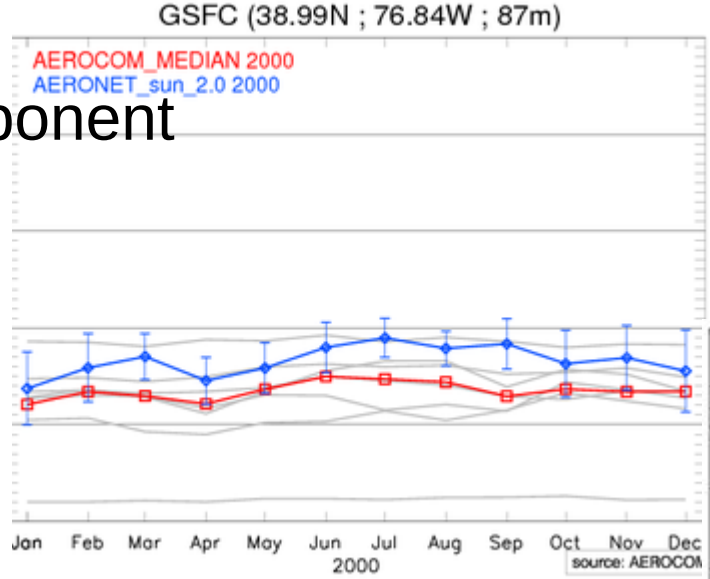


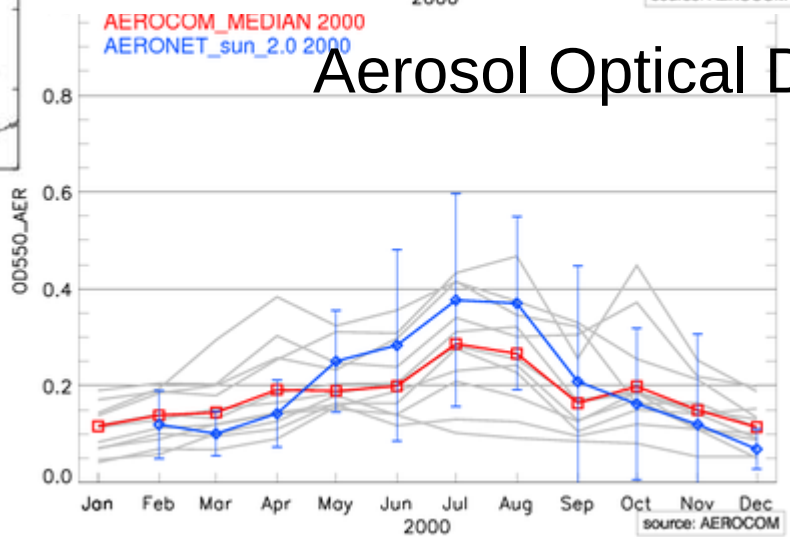
Missing Secondary Organic Matter?

AeroCom

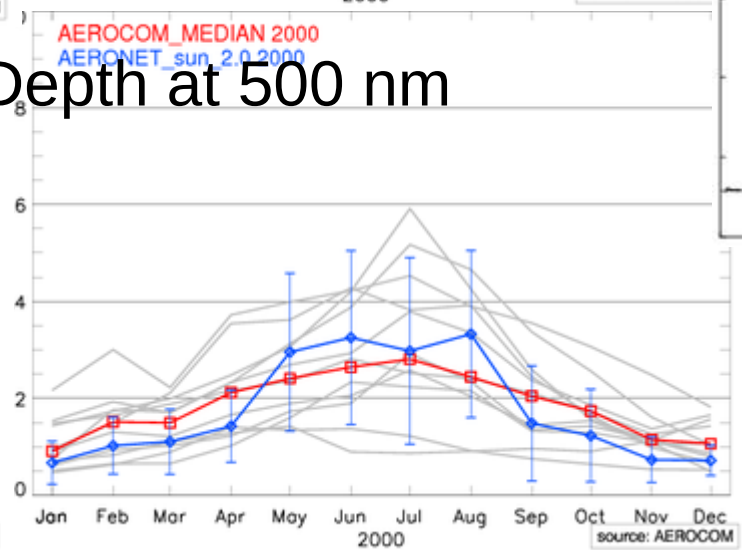


Angstroem Component



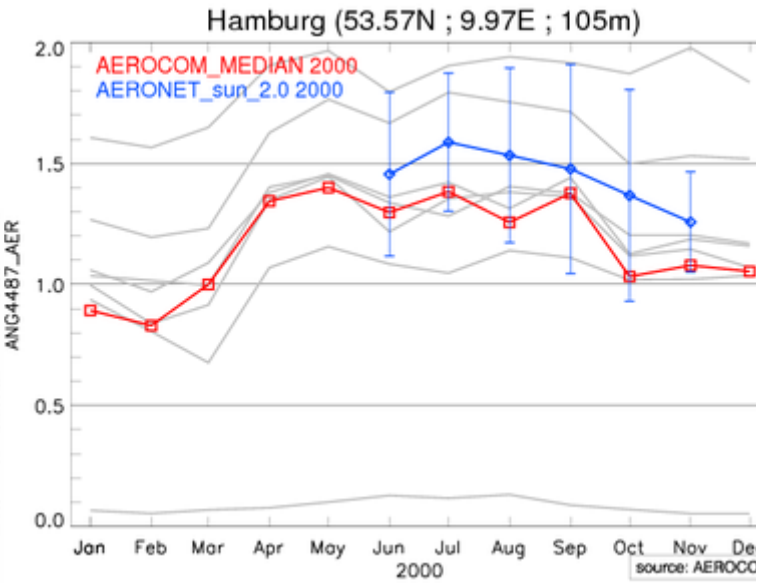


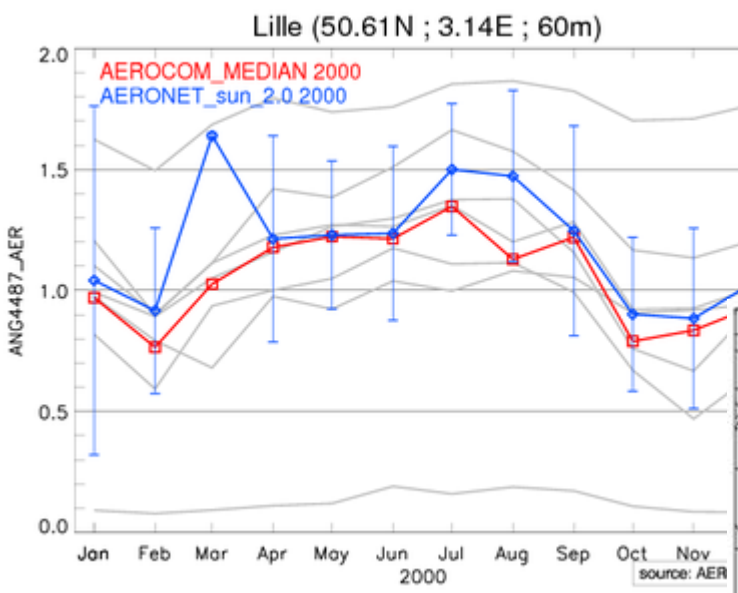
Aerosol Optical Depth at 500 nm

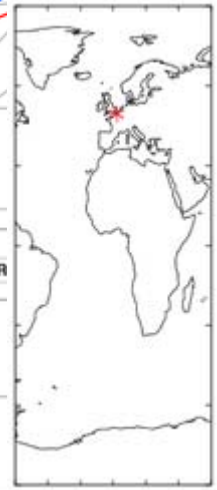


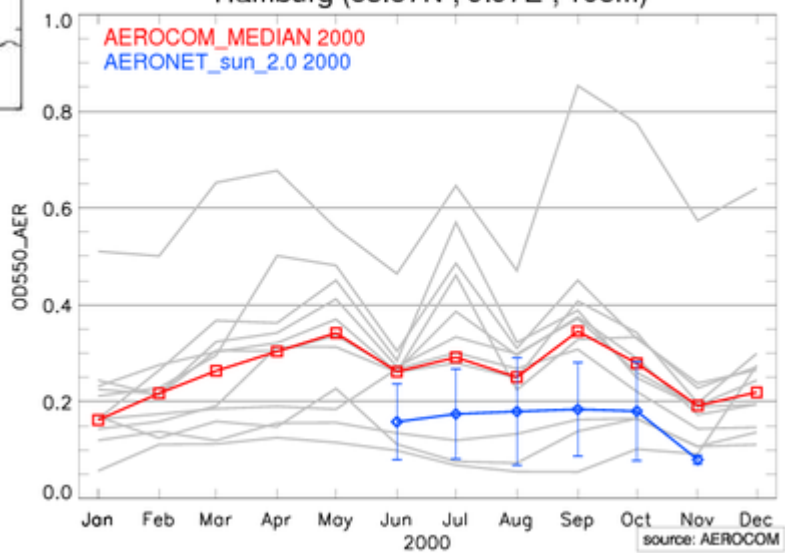
European aerosol

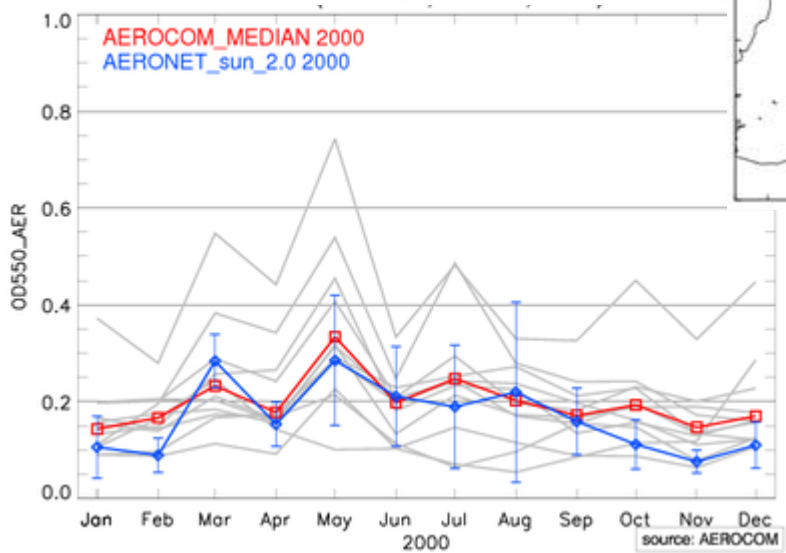
AeroCom







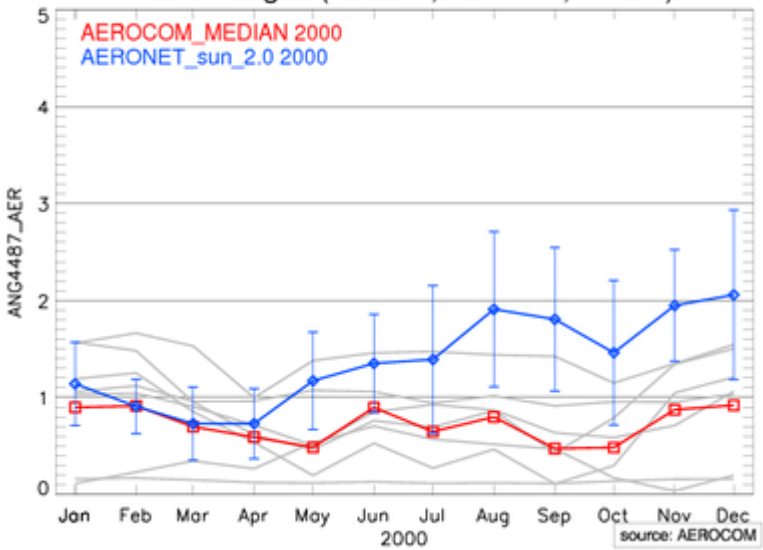


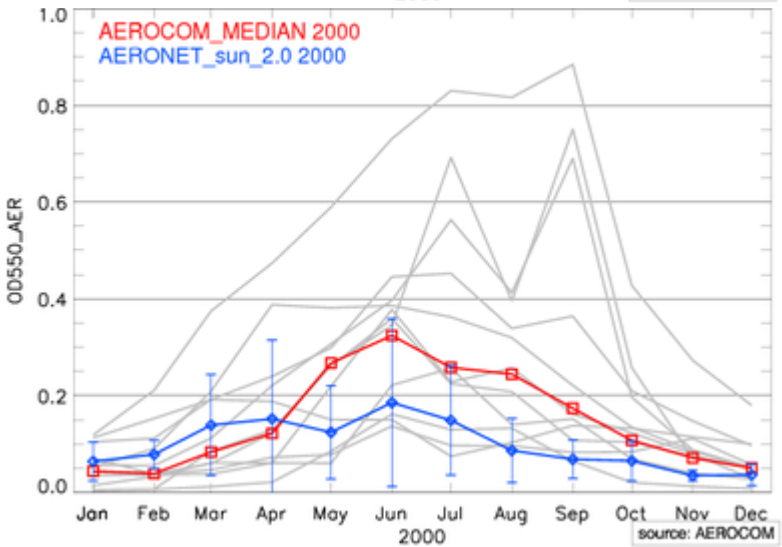


Asian Dust&pollution aerosol

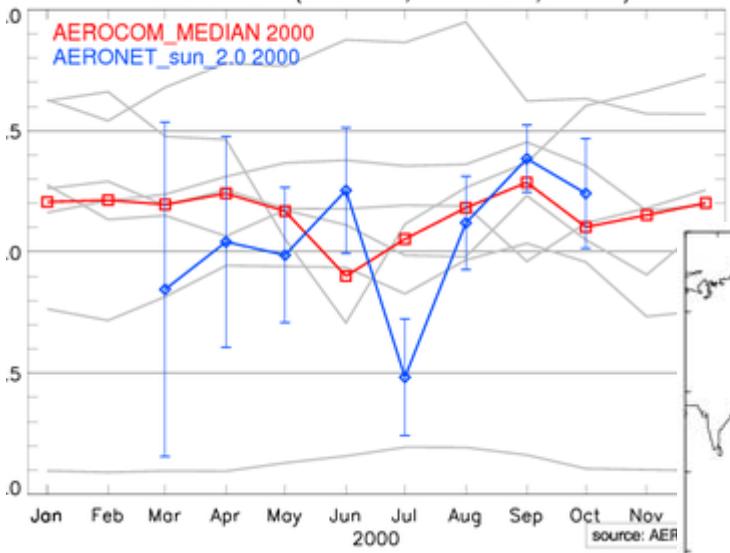
AeroCom

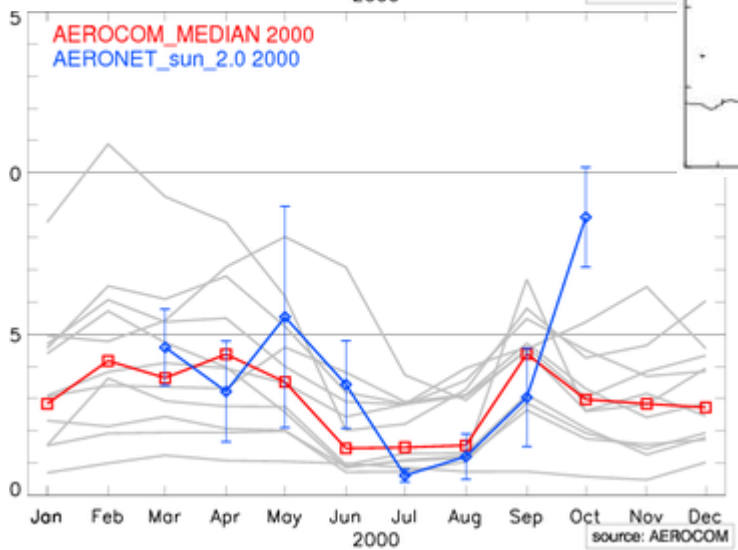
Dalanzadgad (43.58N ; 104.42E ; 1470m)

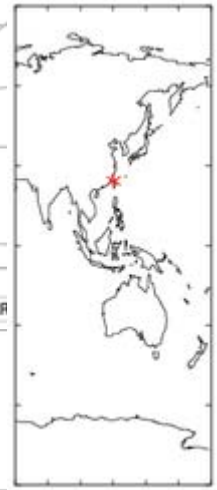




NCUTaiwan (24.97N ; 121.19E ; 171m)

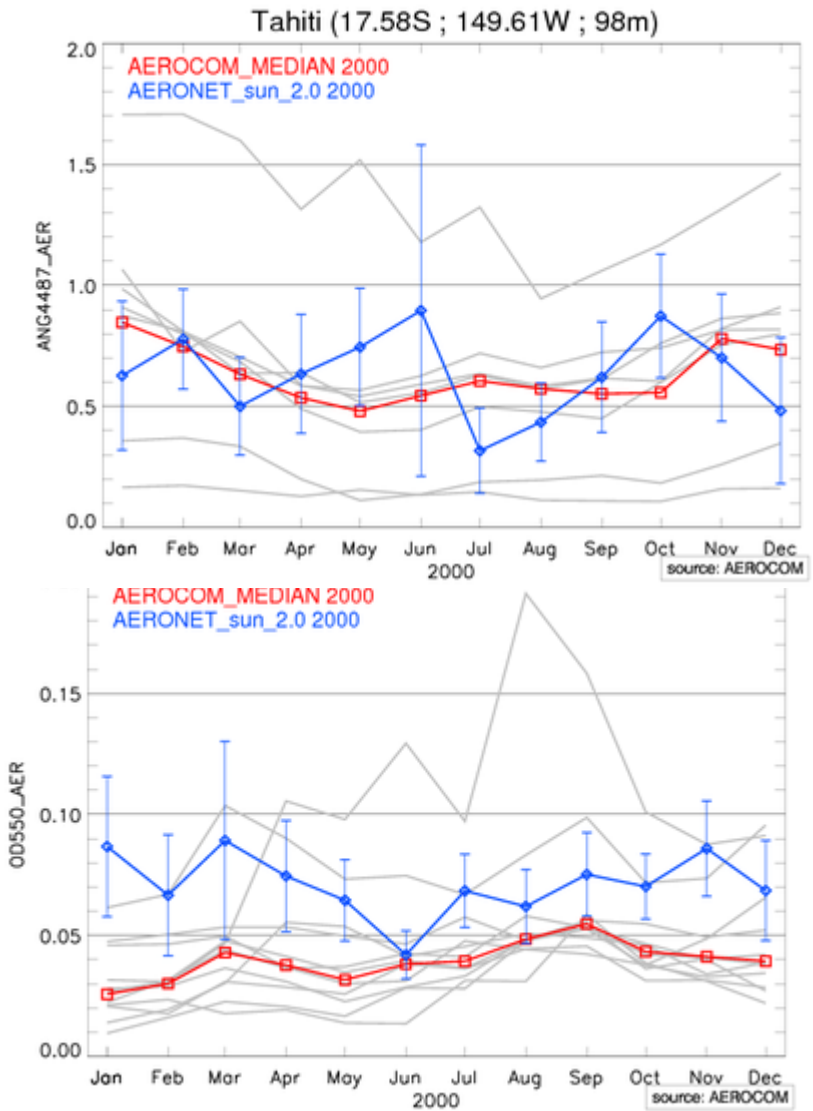


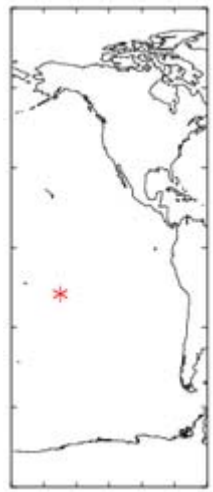




Sea salt

AeroCom





Outlook

- Complete catalogues with new data sets
- Evaluate use of statistics
- Maintain aerocom server
- Bundle idl tools for other users and stand-alone benchmark tests

What we can do with scoring

- Show model progress
- Find systematic errors within/across models
- Get credit
- Check impact of new parameterisation
- Identify models fit for purpose