

# Interpreting AEROCOM model errors from remote sensing observations

Nick Schutgens  
Vrije Universiteit Amsterdam

O. Dubovik, O. Hasekamp, A. Heckel, G. de Leeuw, P. Leonard, R. Levy, A. Lipponen, A. Lyapustin, P. North, T. Popp, J. Redemann, A. Sayer, V. Sayer, Y. Shinozuka, L. Sogacheva, G. Thomas, O. Torres, Y. Wang,

S. Bauer, H. Bian, Y. Balkanski, N. Bellouin, G. Gurci, Z. Kipling, A. Kirkevåg, H. Kokkola, T. Mielonen, G. Myhre, T. van Noije, J. Penner, S. Remy, T. Takemura, K. Tsigaridis, D. Watson-Parris, K. Zhang, J. Zhu

S. Kinne, M. Schulz, P. Stier

# Datasets

Platform	Sensor	Algorithm
AERONET	AERONET	DirectSun
	AERONET	Inversion
MAN	AERONET	DirectSun
Aqua/Terra	MODIS	DarkTarget
		BayesianDarkTarget
		DeepBlue
		MAIAC
		FL-MOC
AURA	OMI	OMAERUV
ENVISAT	AATSR	ADV-FMI
		ORAC-RAL
		Swansea U
PARASOL	POLDER	SRON
		GRASP
noaa18	AVHRR	SOAR/DeepBlue
SeaStar	SeaWiFS	SOAR/DeepBlue

Remote sensing datasets:

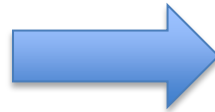
- aggregated
  - $1^\circ$  by  $1^\circ$ ,  $30^{min}$
  - $4^{hr}$

Model
CAM5
CAM5.3-Oslo
ECHAM6-HAM
ECHAM6-SALSA
ECMWF-IFS
GEOS5
GEOS-Chem
HadGEM
IMPACT
INCA
OsloCTM3
SPRINTARS
TM5

Models:

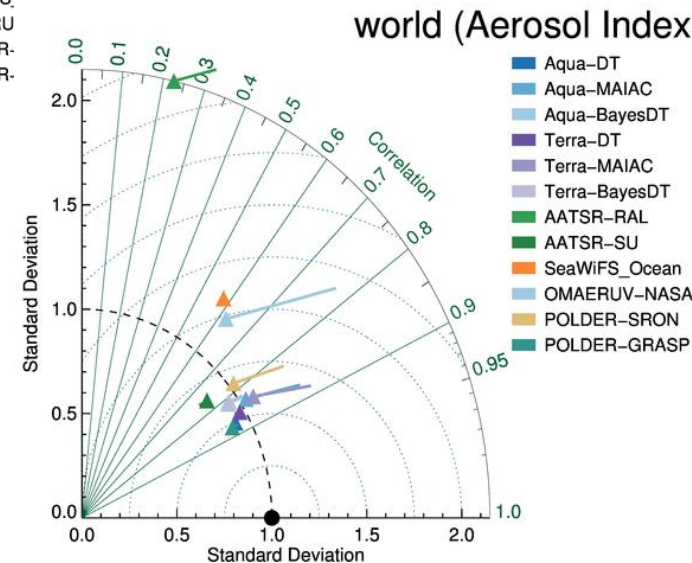
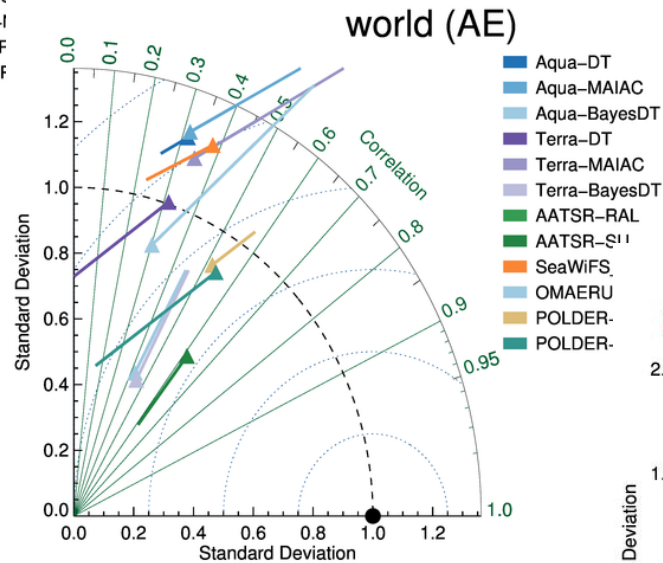
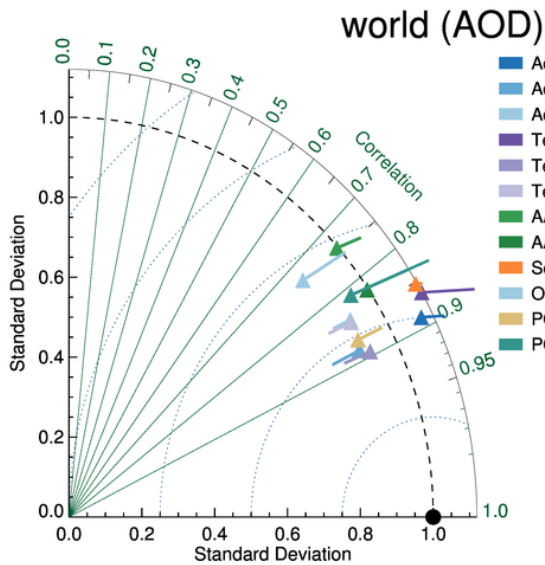
- 3-hourly output

# The Challenge

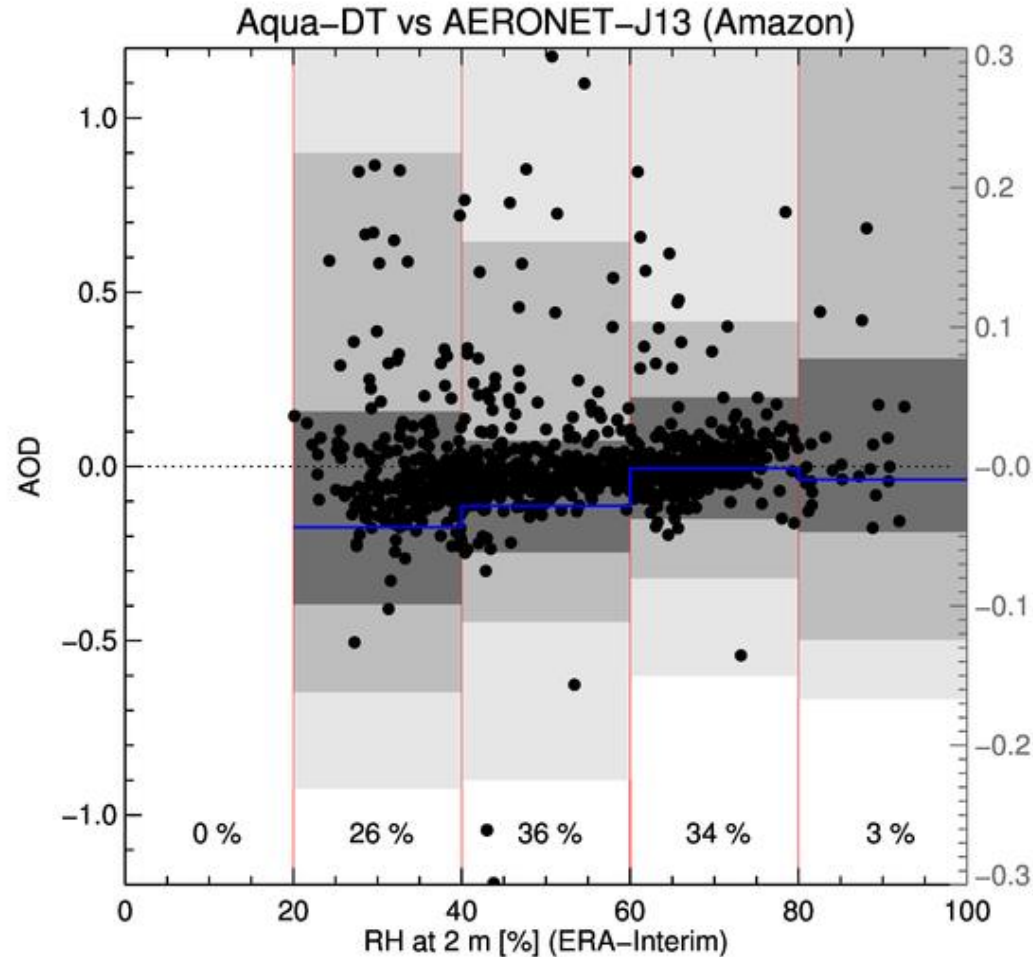




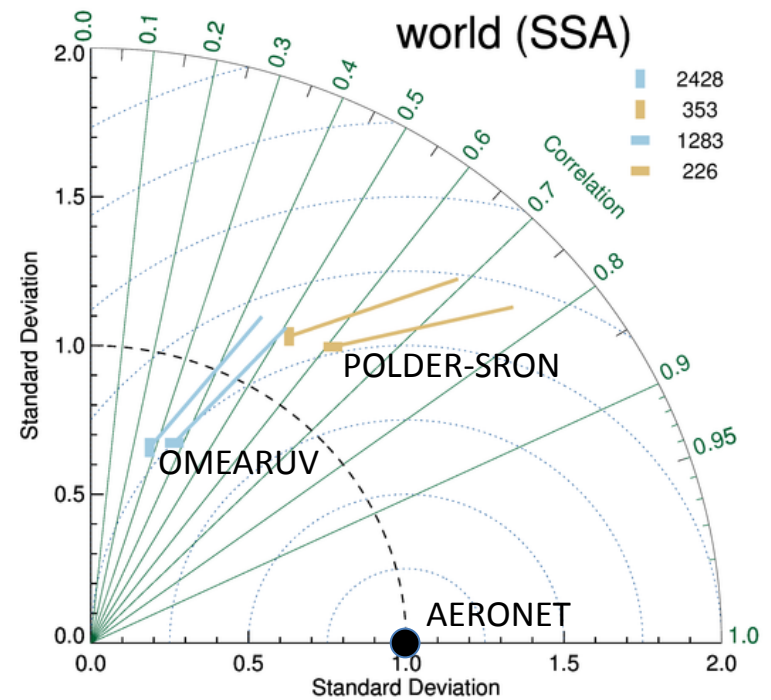
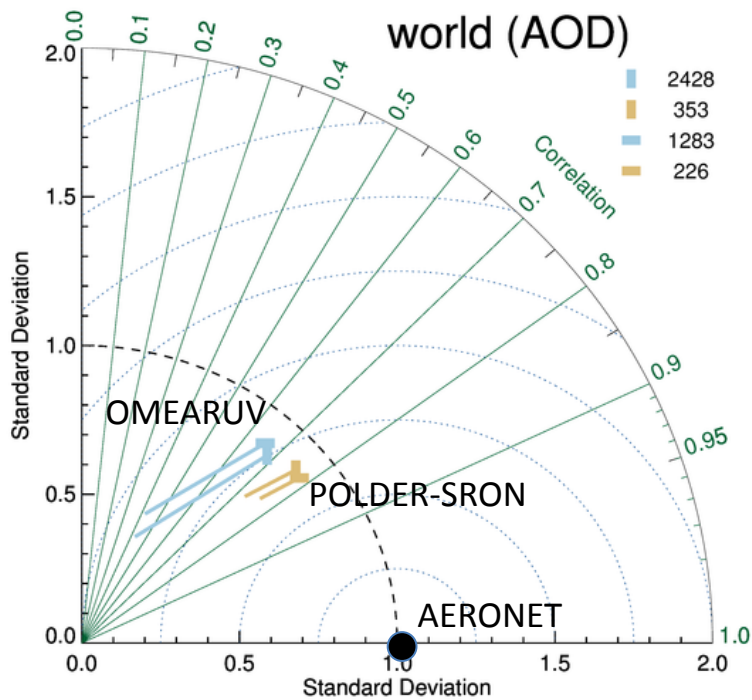
# Ongoing remote sensing evaluation



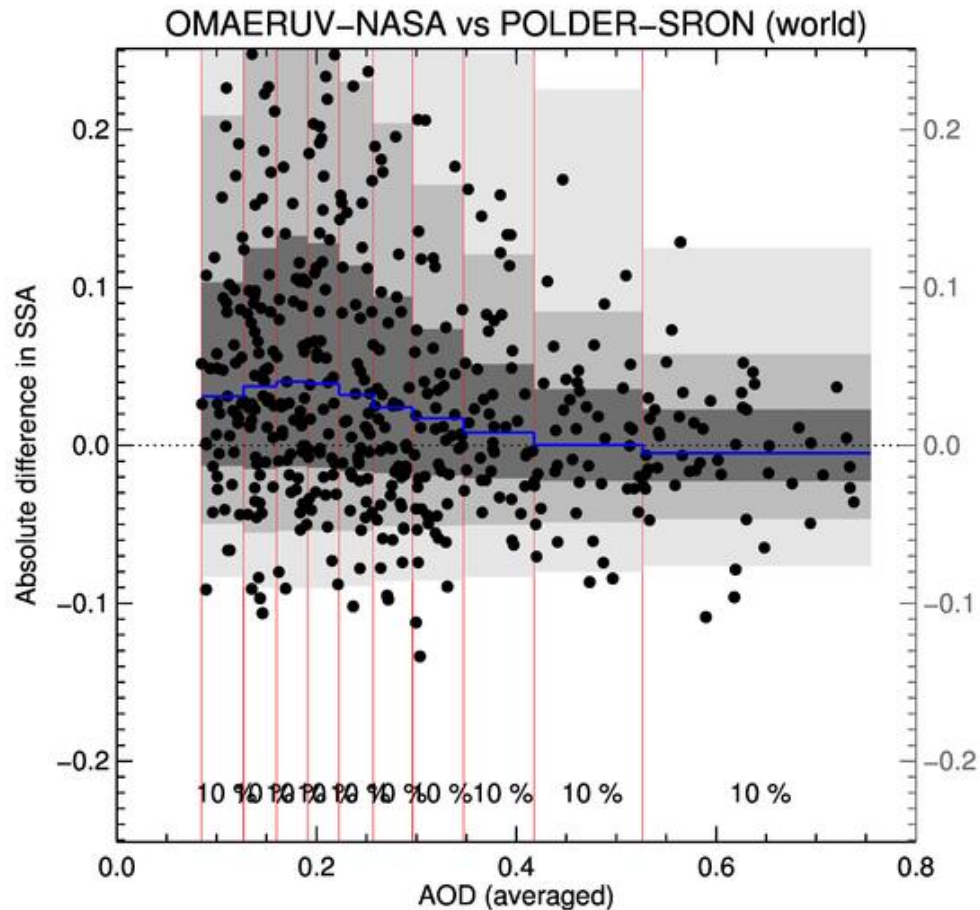
# Impact of RH on satellite AOT



# Satellite AAOOT & SSA



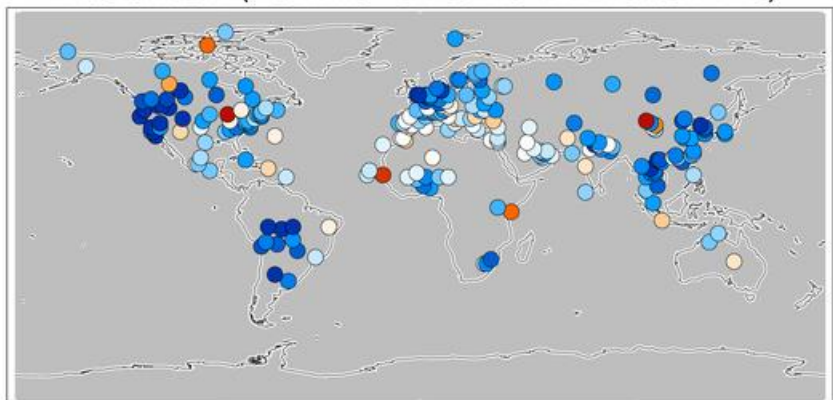
# OMEARUV vs POLDER-SRON



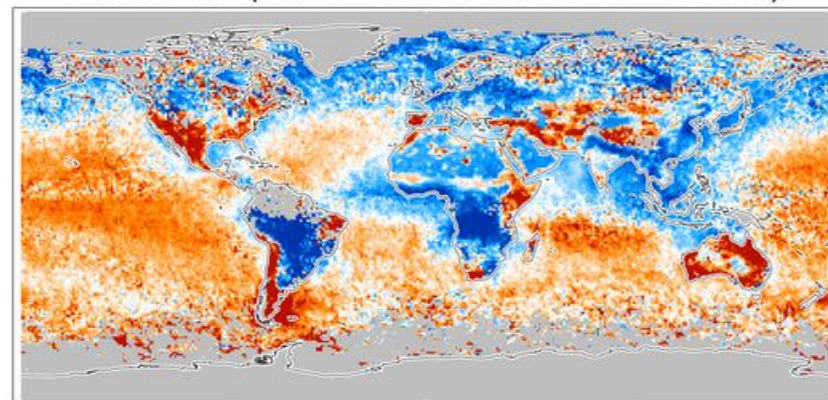


# Model evaluation (ECHAM-SALSA)

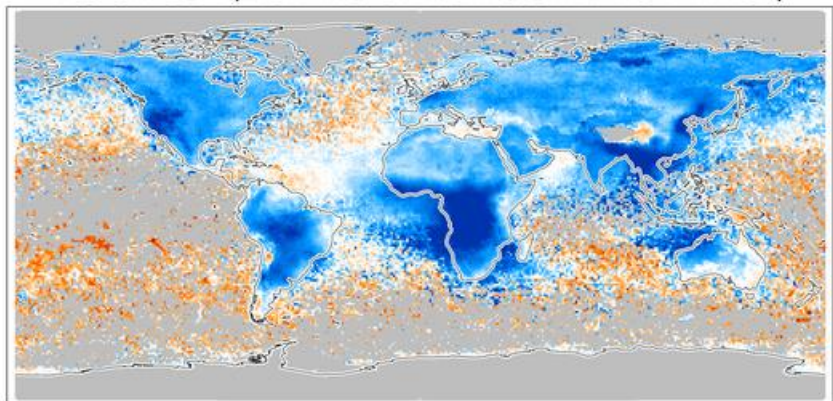
Abs diff SSA (ECHAM6-SALSA vs INVERSION-L20)



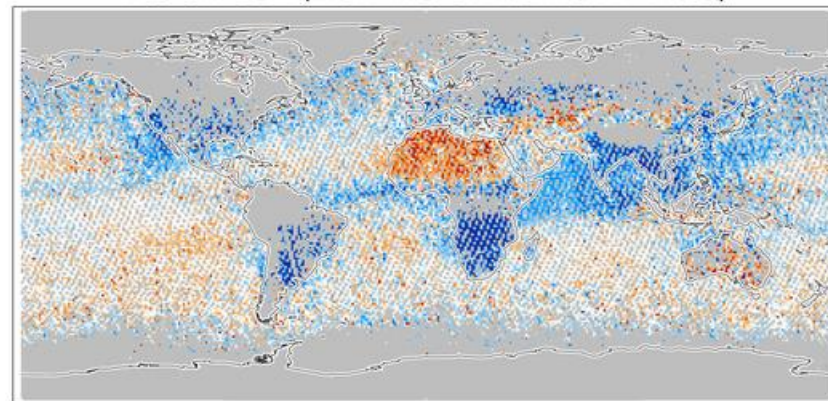
Abs diff SSA (ECHAM6-SALSA vs POLDER-SRON)



Abs diff SSA (ECHAM6-SALSA vs OMAERUV-NASA)

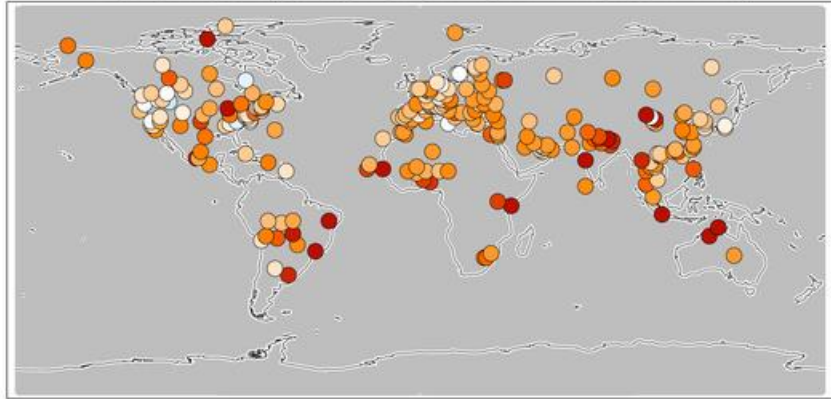


Abs diff SSA (ECHAM6-SALSA vs FL-MOC)



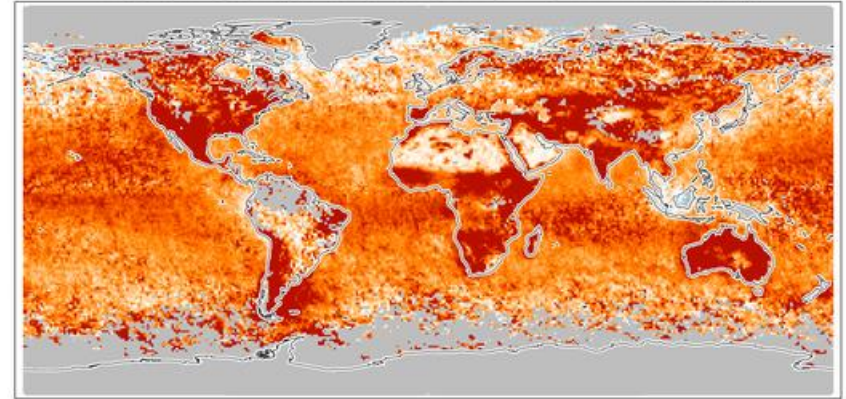
# Model evaluation (GEOS-Chem)

Abs diff SSA (GEOS-Chem vs INVERSION-L20)



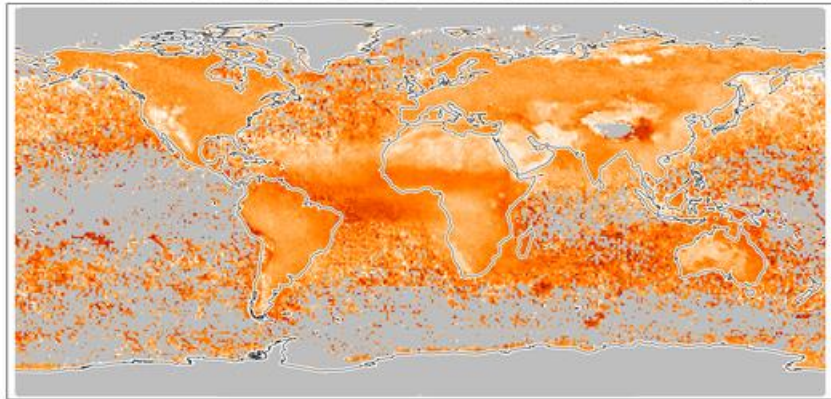
-0.10 -0.05 0.00 0.05 0.10

Abs diff SSA (GEOS-Chem vs POLDER-SRON)



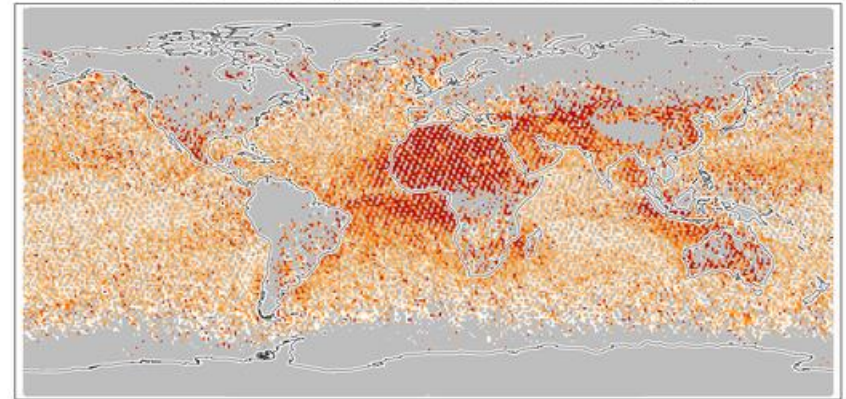
-0.10 -0.05 0.00 0.05 0.10

Abs diff SSA (GEOS-Chem vs OMAERUV-NASA)



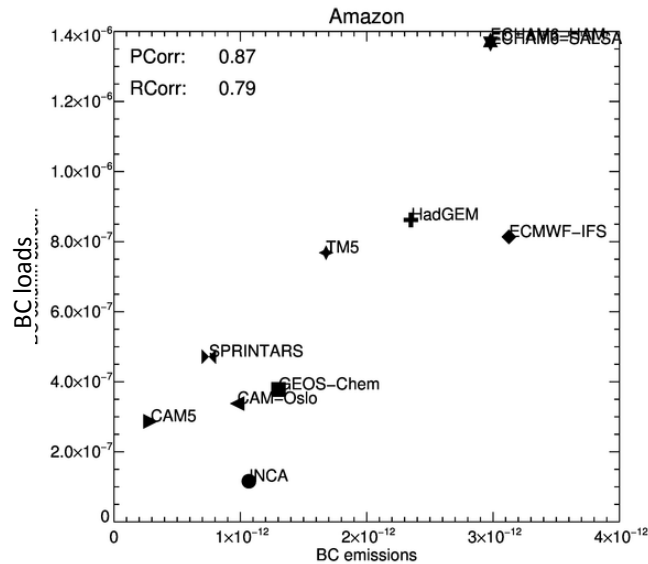
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Abs diff SSA (GEOS-Chem vs FL-MOC)



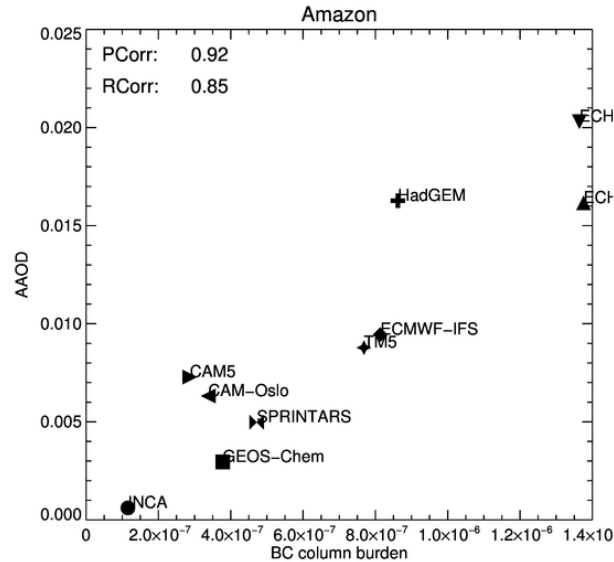
-0.10 -0.05 0.00 0.05 0.10

# Relating emissions to AAOT (1)



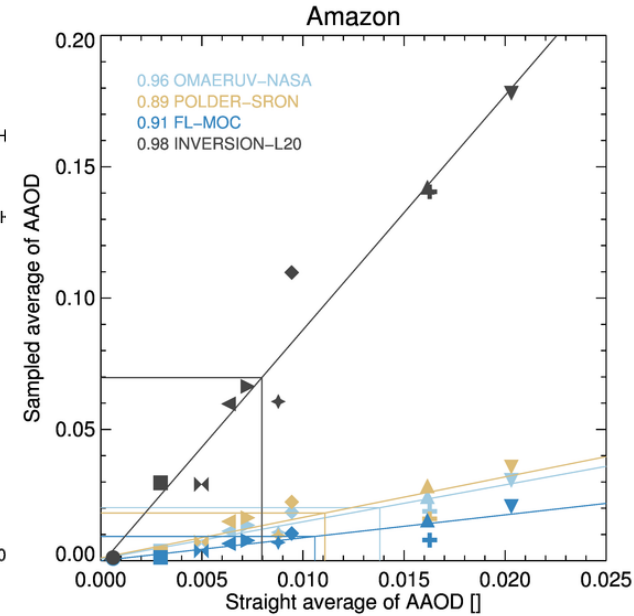
Emissions can be related to atmospheric burdens

model vs model



Atmospheric burdens can be related to AAOT

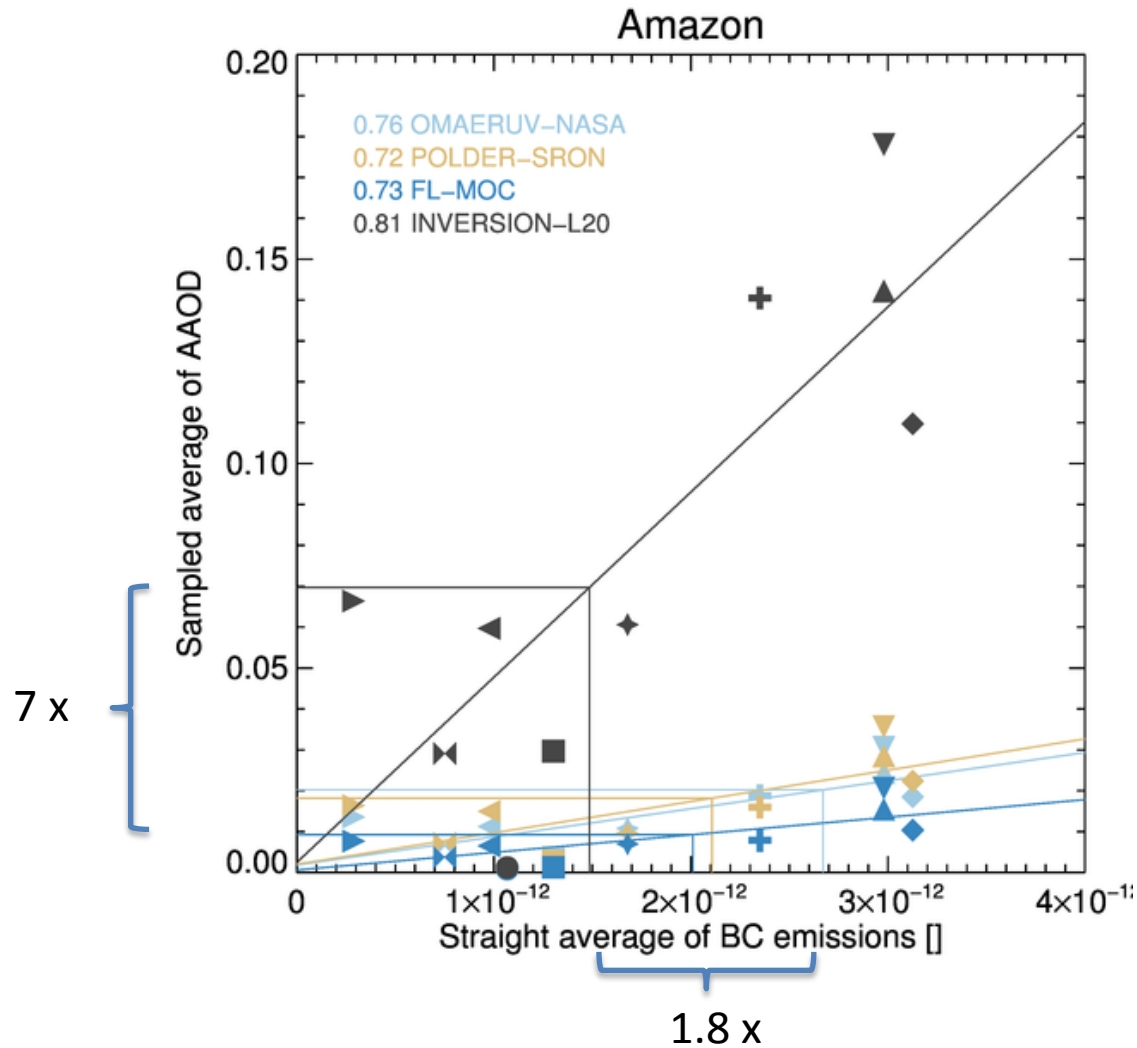
model vs model



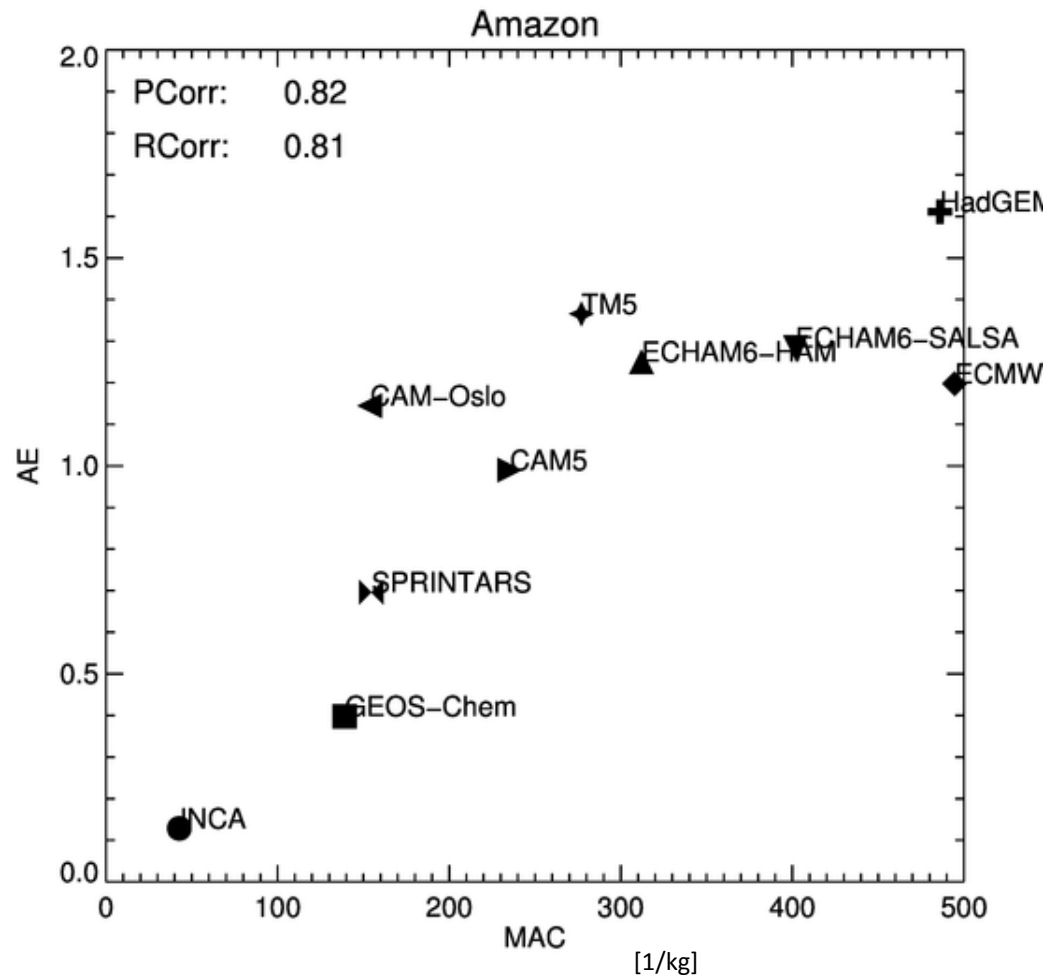
Sampling impact of observational datasets

sampled model vs model

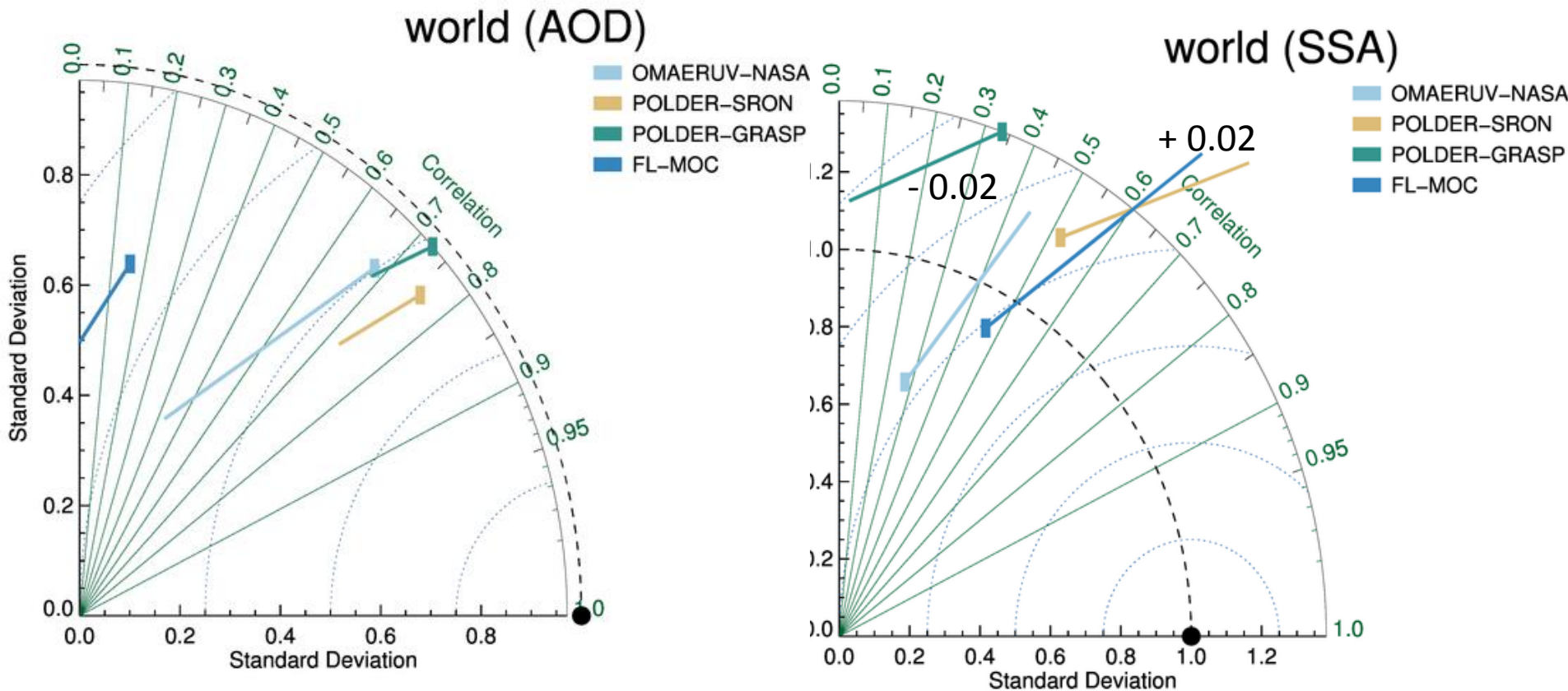
# Relating emissions to AAOT (2)



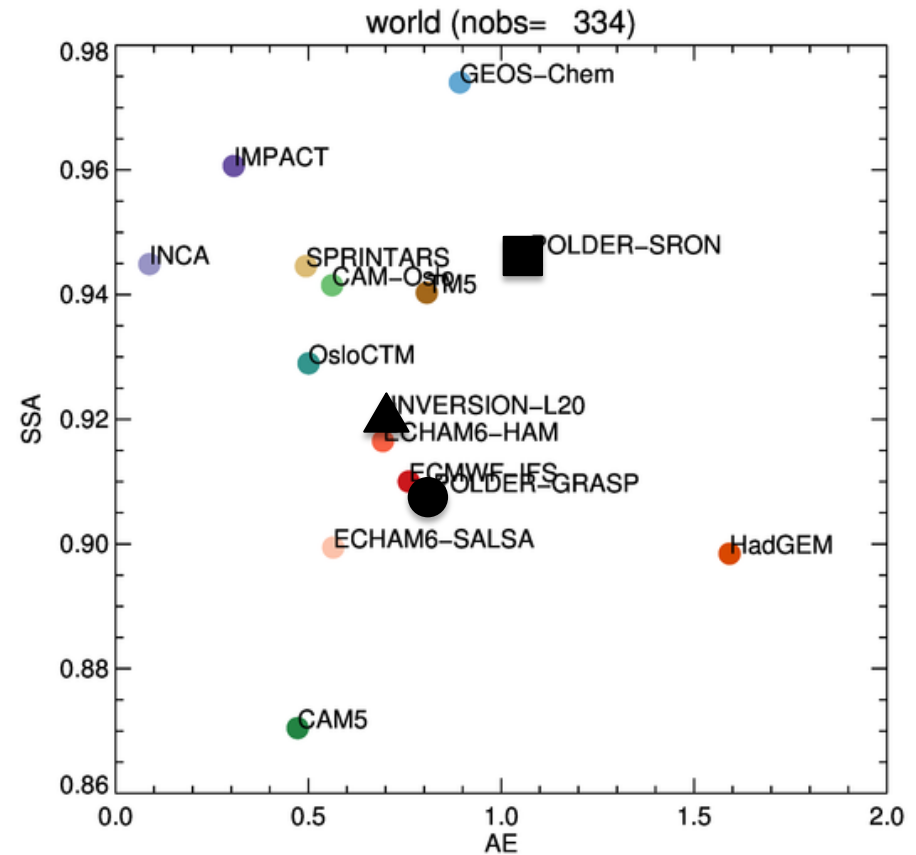
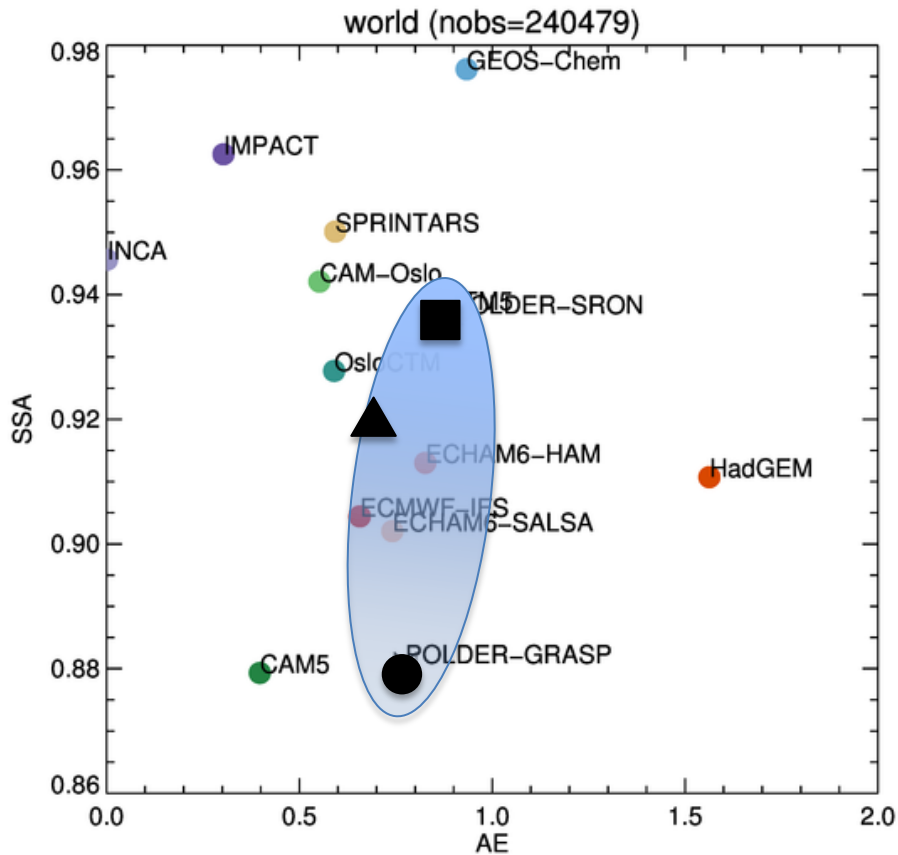
# Other relations within AEROCOM



# Preliminary evaluation of GRASP



# Particle properties: SSA vs AE



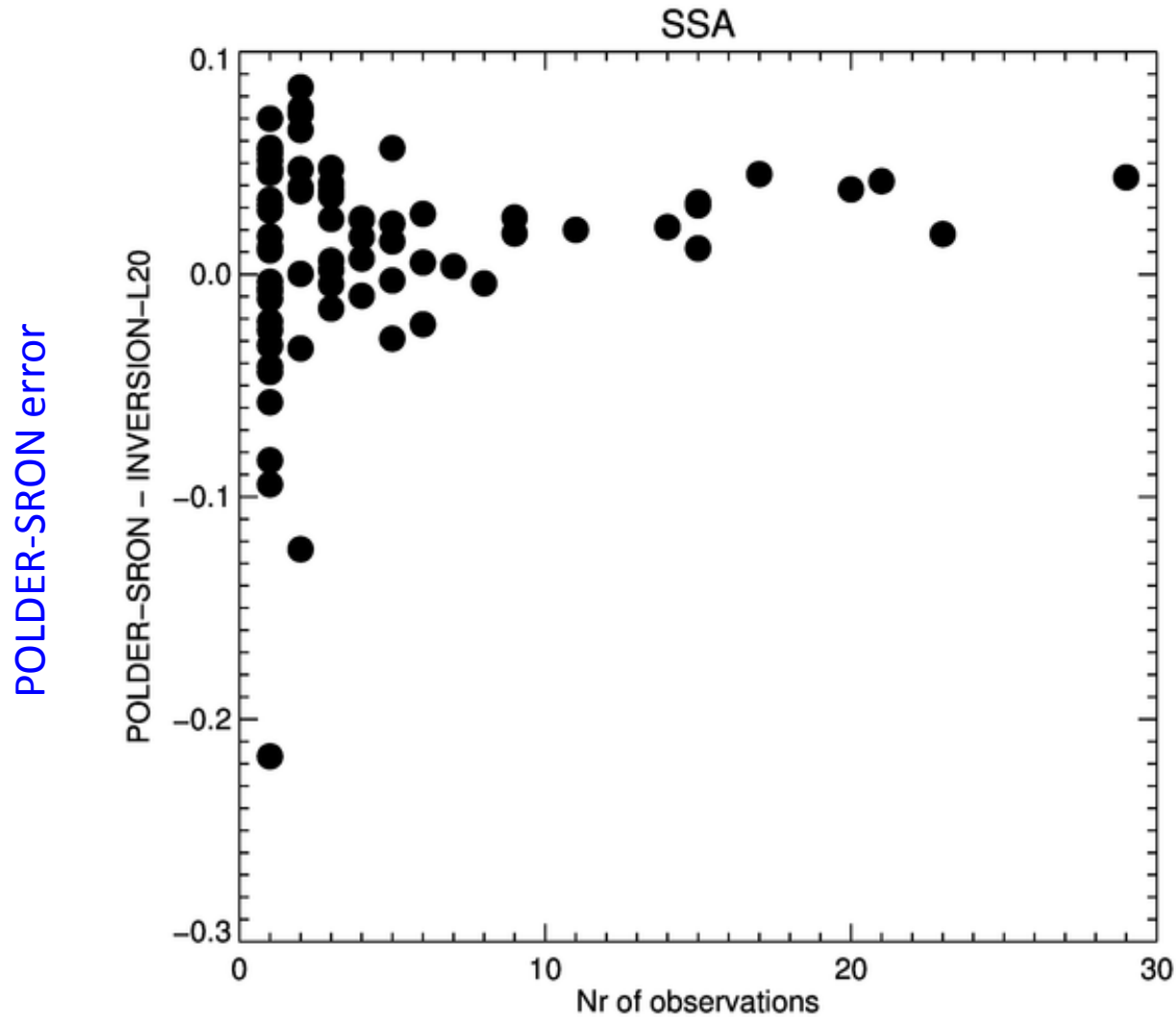
# Summary

AEROCOM remote sensing experiment:  
understand model errors in the context of  
observational sampling and observational errors

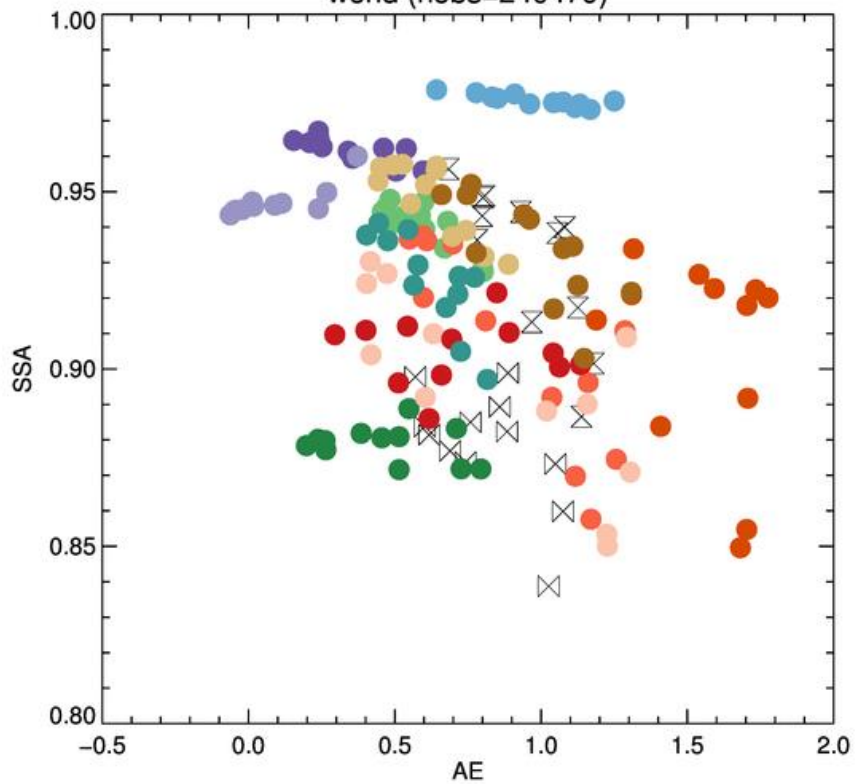
- 18 satellite remote sensing datasets
  - Evaluation with AERONET & MAN
  - Intercomparison with other satellite data
  - AE, AI and SSA
- 13 models
  - Evaluation with remote sensing data
  - AE and SSA
  - Possible interpretation



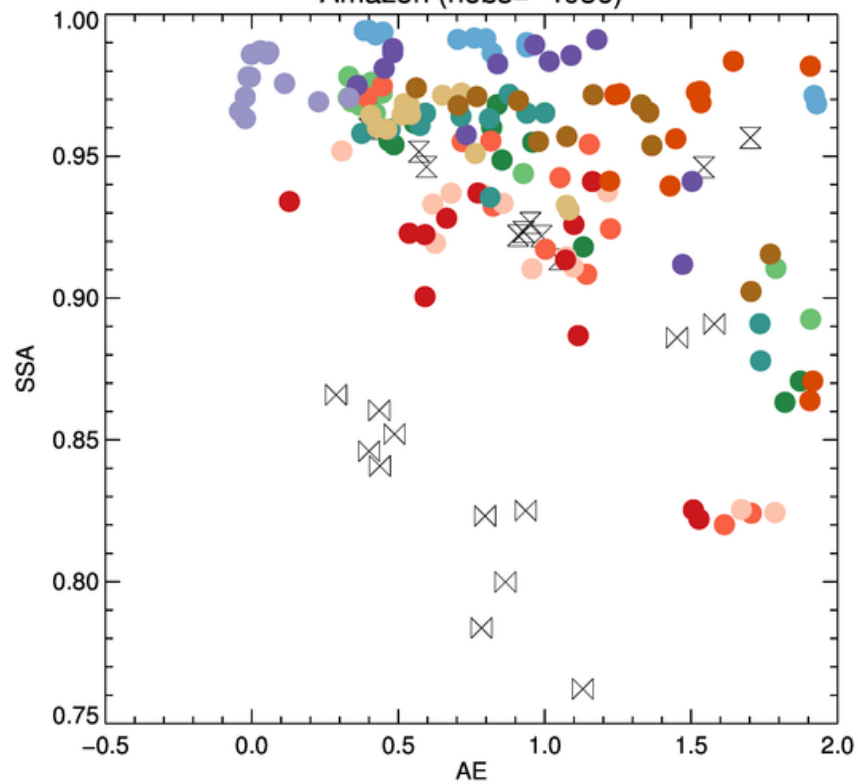
# Impact of temporal averaging

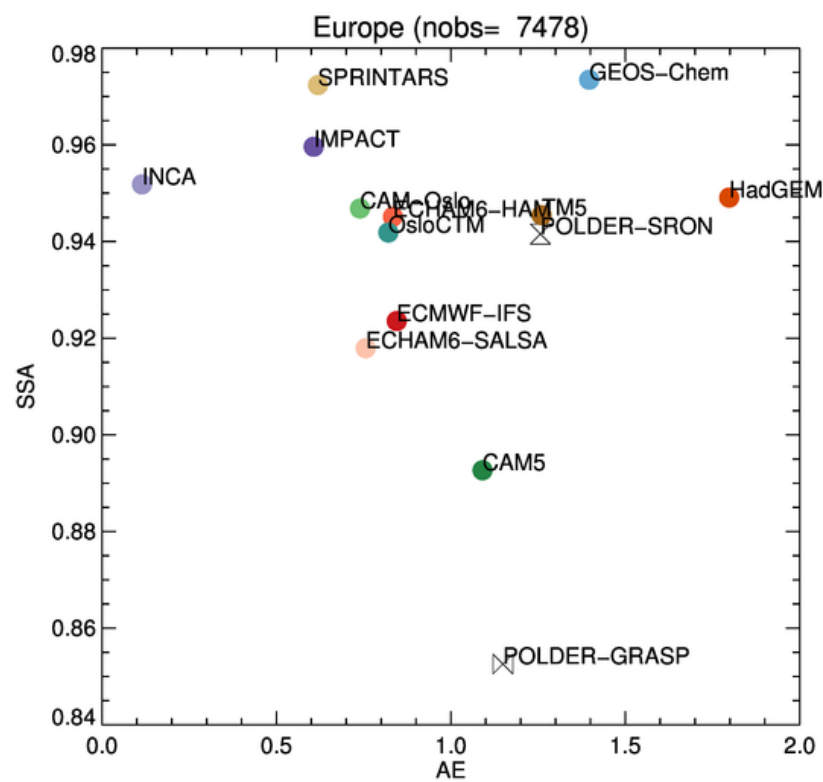
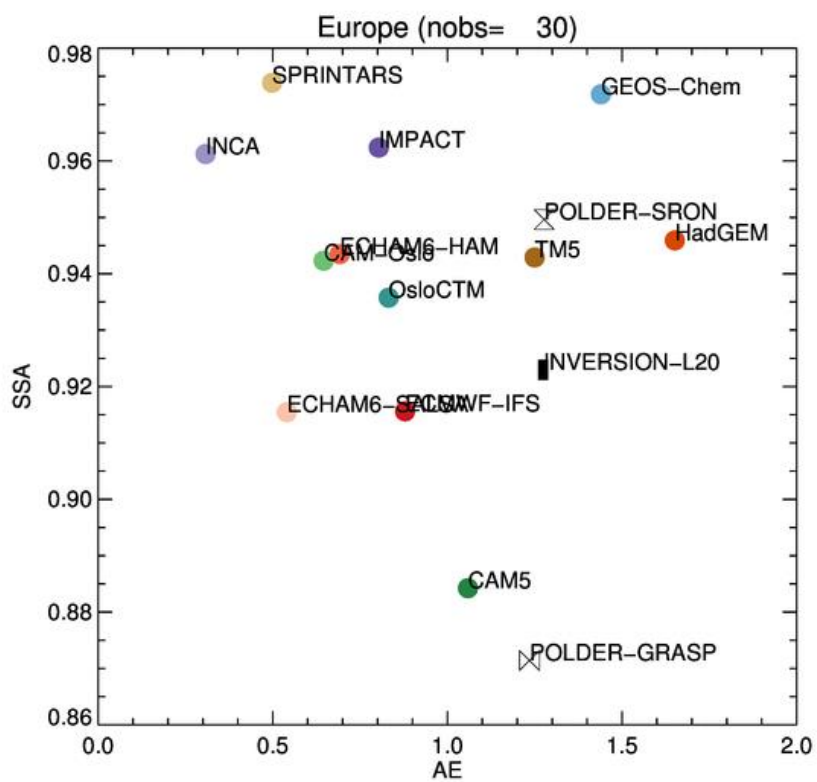


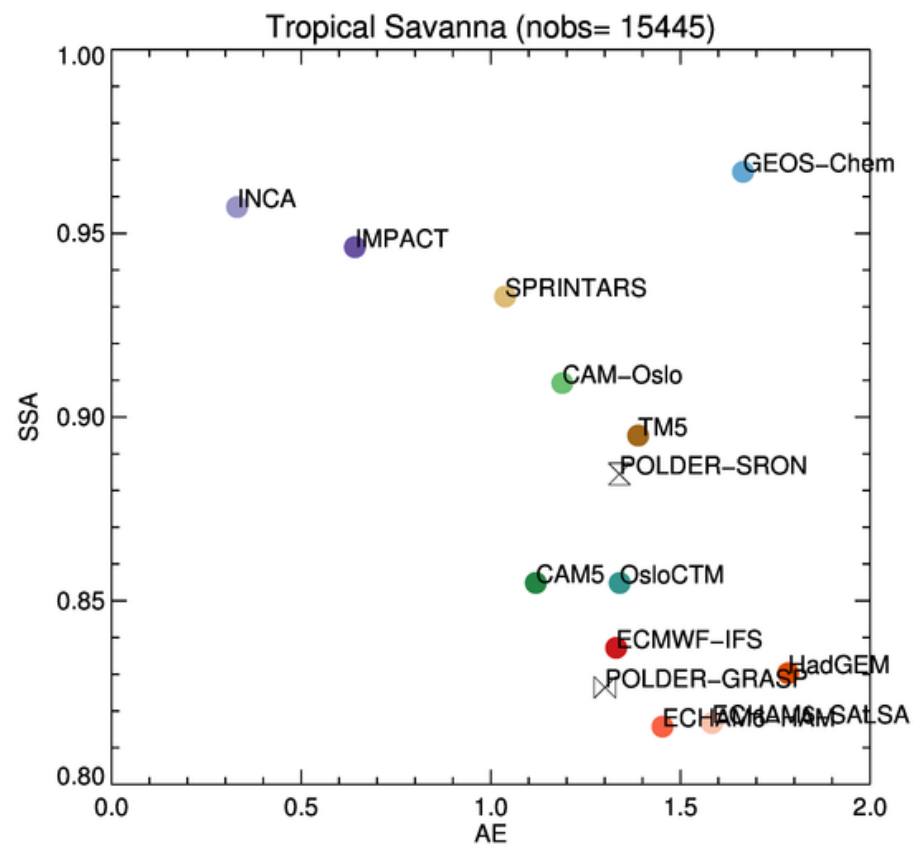
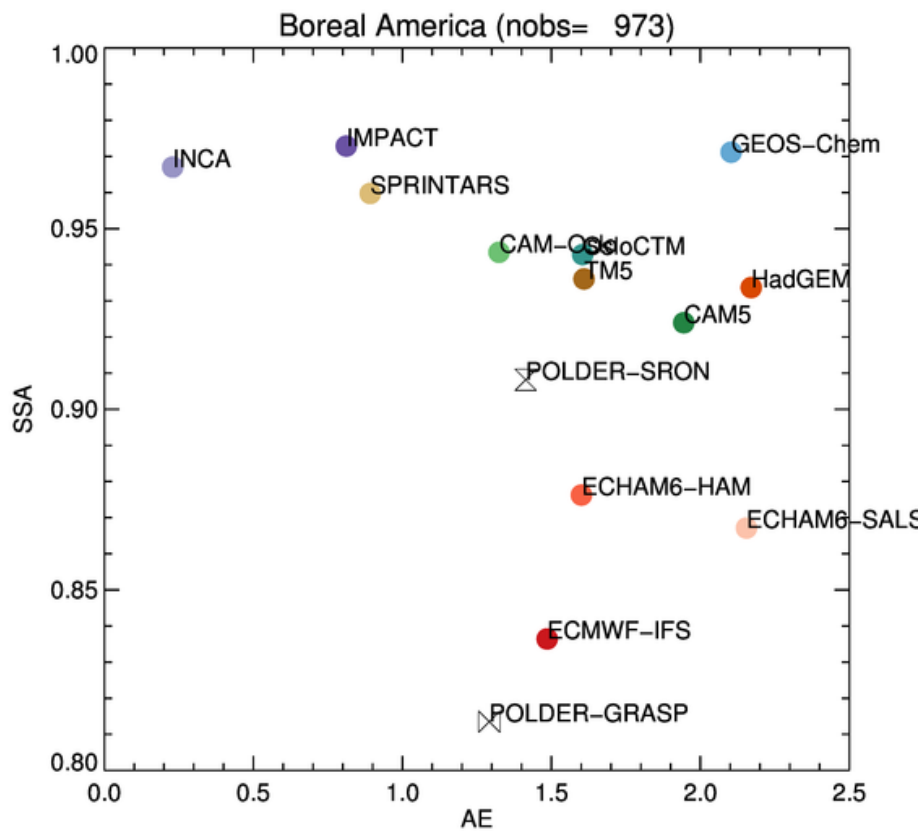
world (nobs=240479)



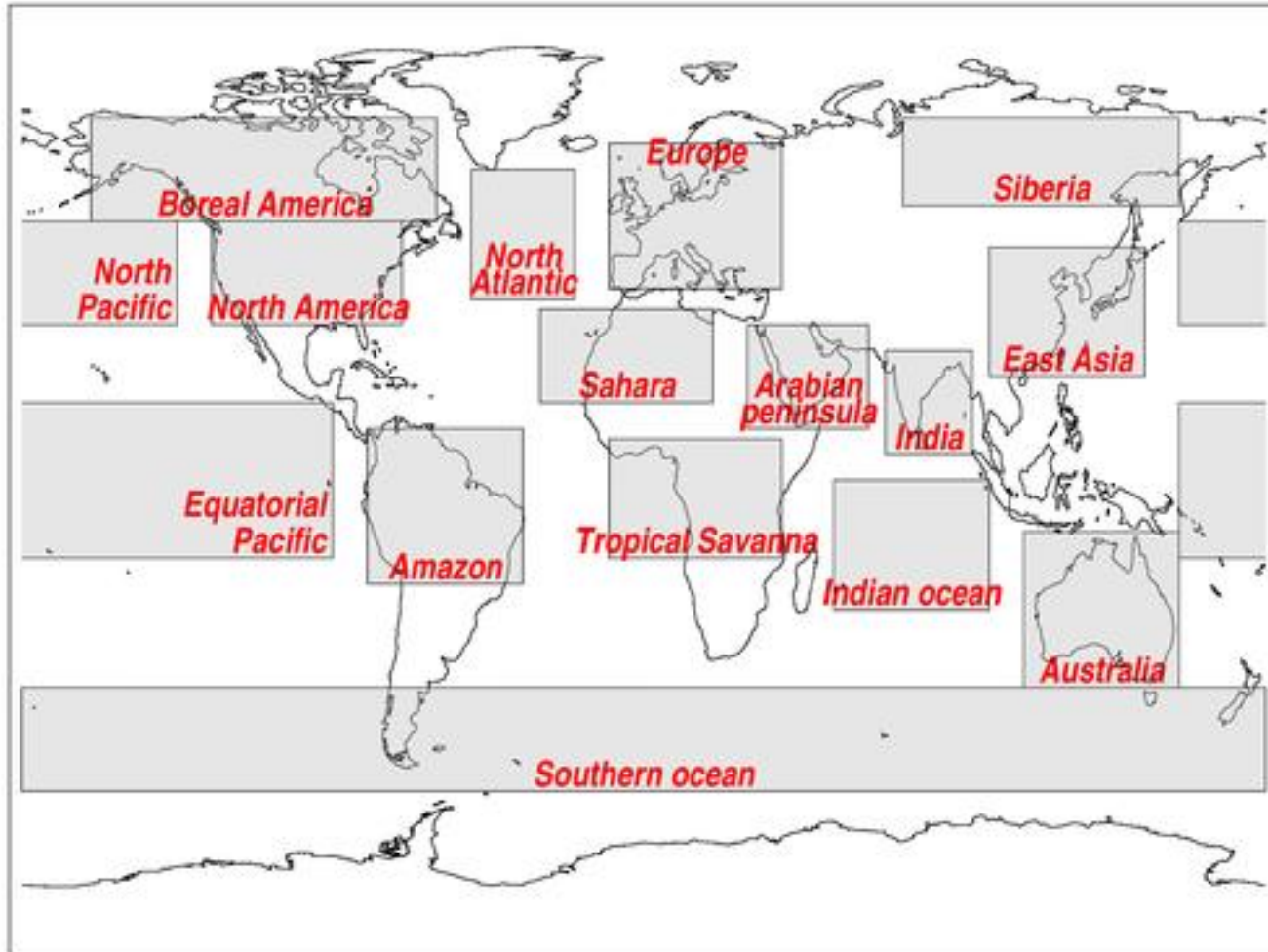
Amazon (nobs= 4036)





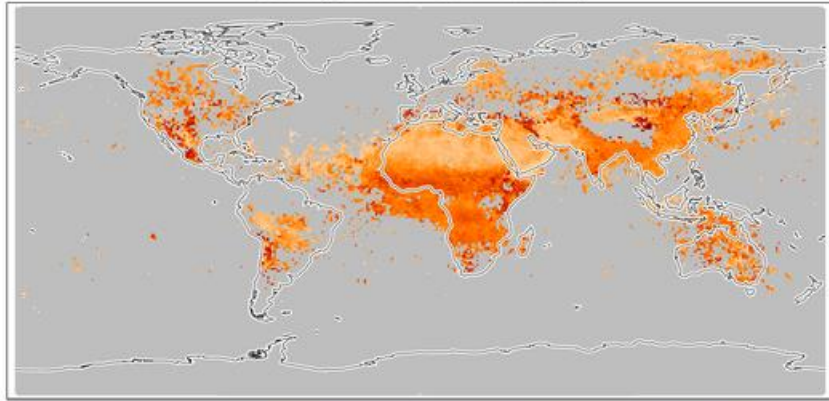


# Regions

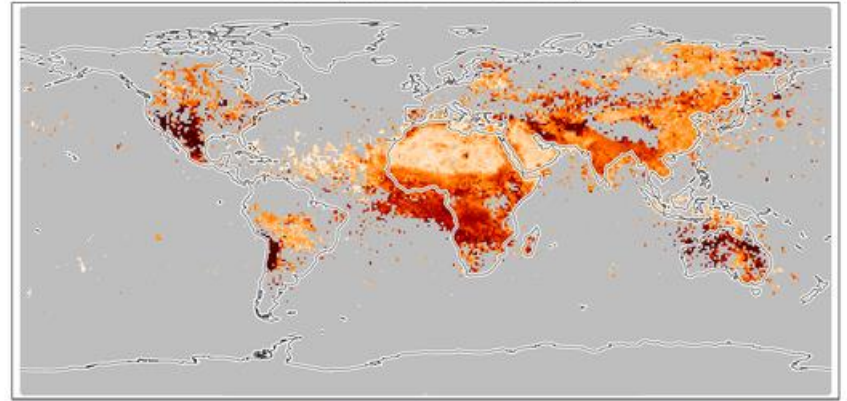


# OMEARUV vs POLDER-SRON

SSA (OMAERUV-NASA)



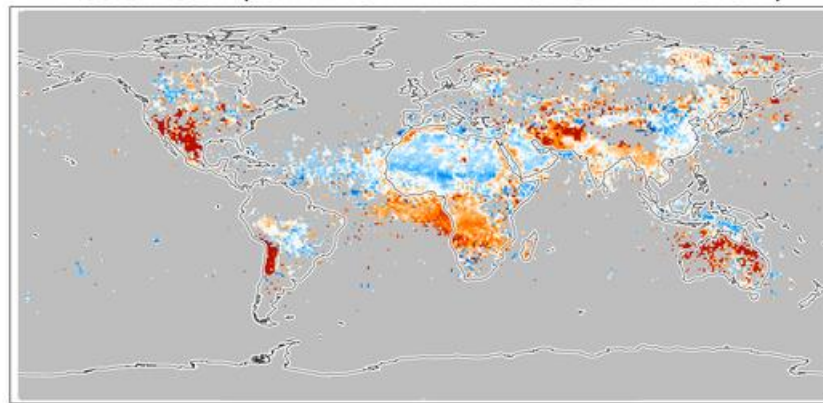
SSA (POLDER-SRON)



0.80 0.85 0.90 0.95 1.00

0.80 0.85 0.90 0.95 1.00

Abs diff SSA (OMAERUV-NASA vs POLDER-SRON)



-0.10 -0.05 0.00 0.05 0.10

AOT > 0.4

# Arabian peninsula

