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The 2015 Control Experiment

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Modelling: Where do we stand?

AeroCom yearly control run



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Motivation

Comparable output data set of the latest model version simulations
Would allow additional interpretation for special experiments.
Document model progress, provide feedback on model development

Procedure

AeroCom models should produce each year one Control simulation year 2010, with standard diagnostics, Strict format requirements

Output requested (2D fields, Monthly averages, year 2010 meteorology):

EMI Emissions: BC, OA, SO₂, DMS, NO_x, 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

Model Submission before AeroCom workshop to AeroCom server at MetNo

Standard plots available on MetNo AeroCom webinterface

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

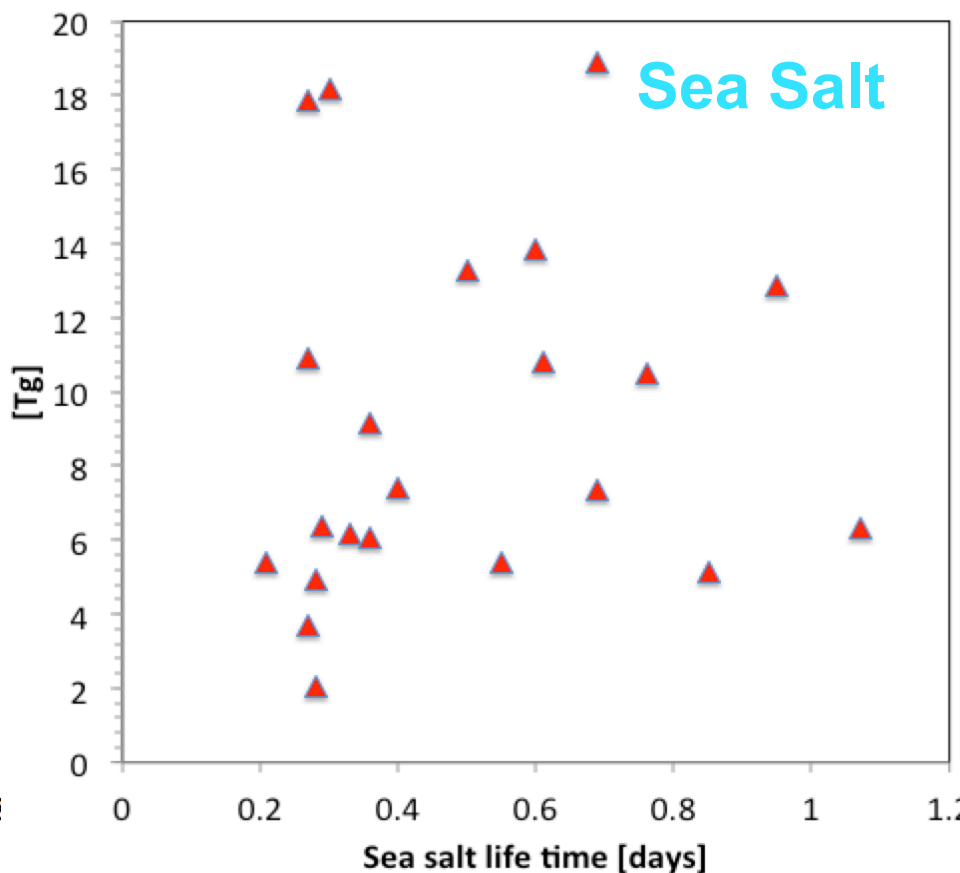
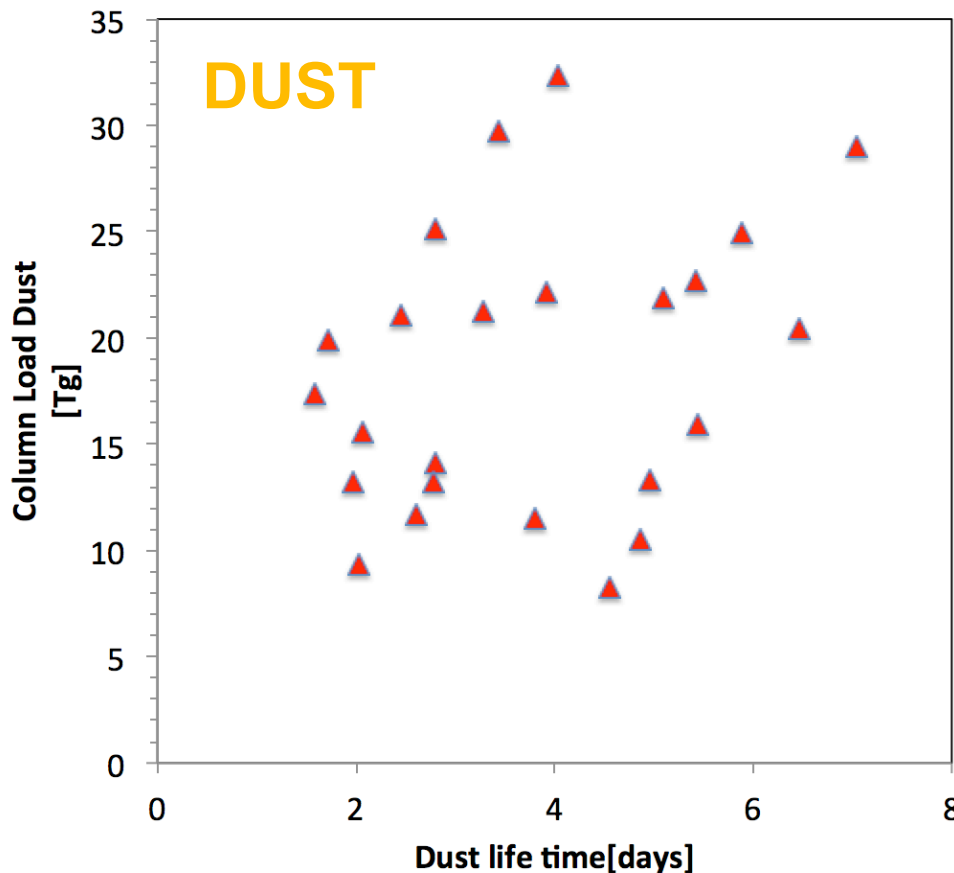


Emission variability “hidden”



Determines Life time global loads?
ALL CTRL EXPERIMENTS AEROCOM A, PH II+III

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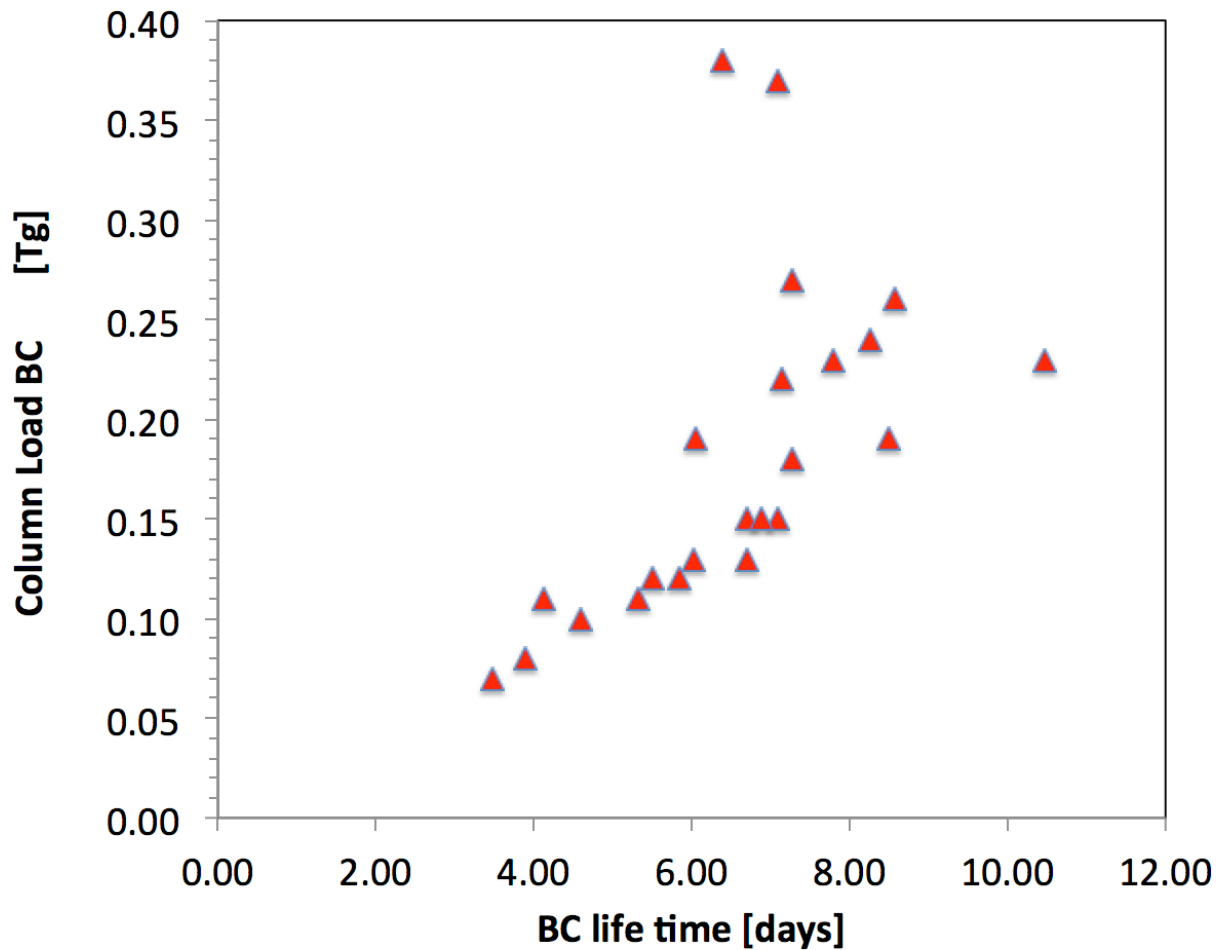




For BC simulations in AeroCom Emissions are rather similar



ALL CTRL EXPERIMENTS AEROCOM A, PH II+III

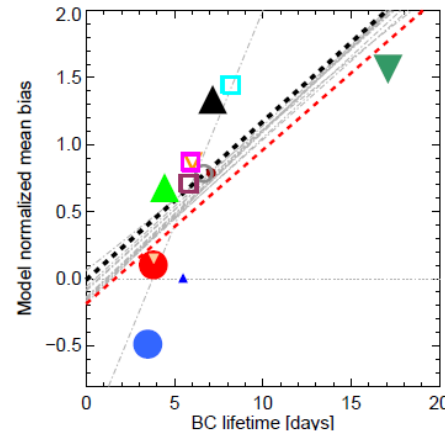
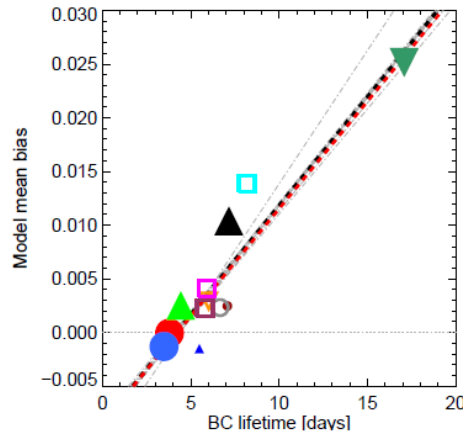
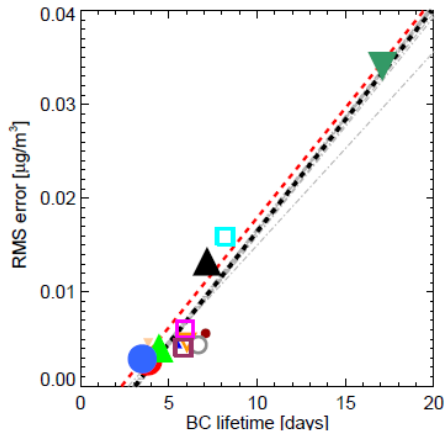




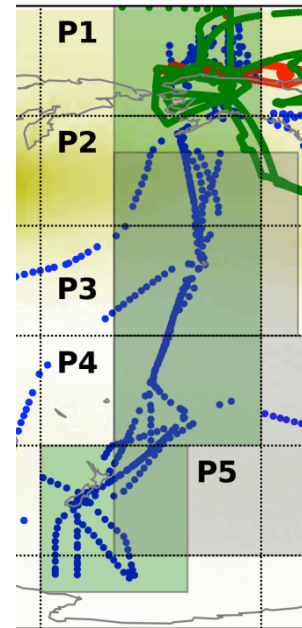
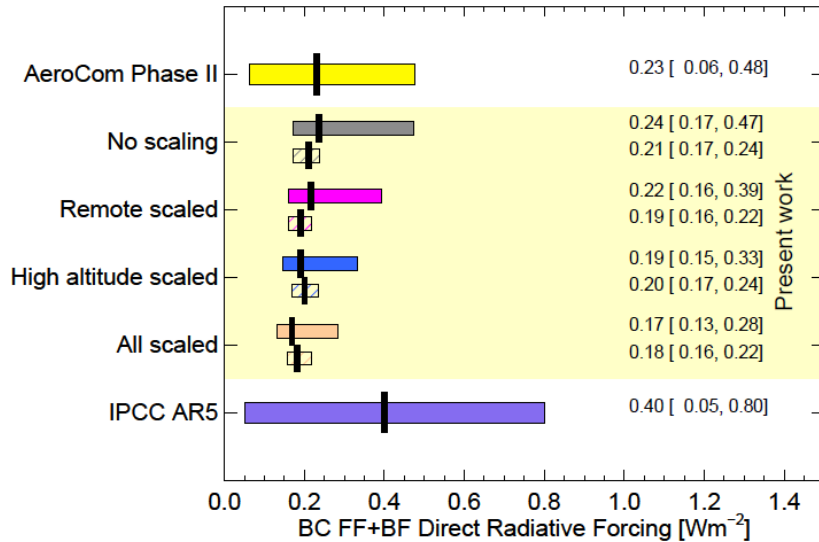
Upper troposphere lifetime of BC



Samset et al. 2014: AeroCom BC profiles vs flight campaigns



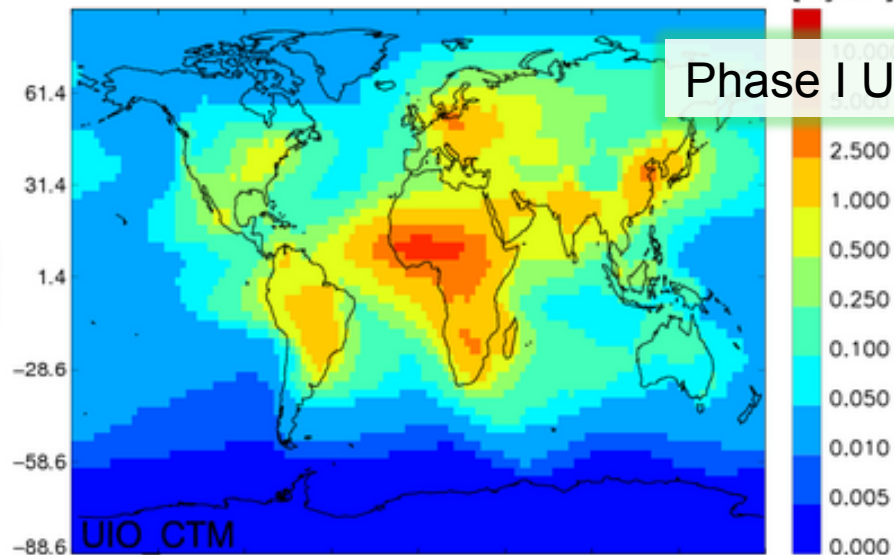
- NCAR-CAM3.5
 - CAM4-Oslo
 - CAM5.1
 - ▲ ECHAM-HAM
 - ▲ GISS-MATRIX
 - GISS-modelE
 - ▲ GMI
 - ▲ GOCART
 - ▲ HadGEM2
 - IMPACT
 - INCA
 - ▲ OsloCTM2
 - SPRINTARS
-
- $0.0 < \rho < 0.4$
 - $0.4 < \rho < 0.8$
 - $\rho > 0.8$



LOAD_BC 2000 mean 0.387

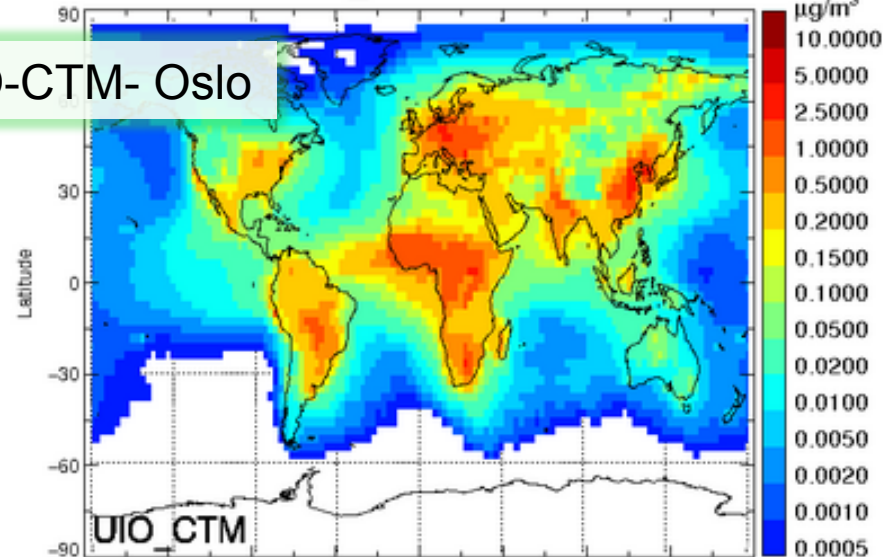
[mg m⁻²]

Phase I UIO-CTM- Oslo



SCONC_BC 2000 mean 0.133

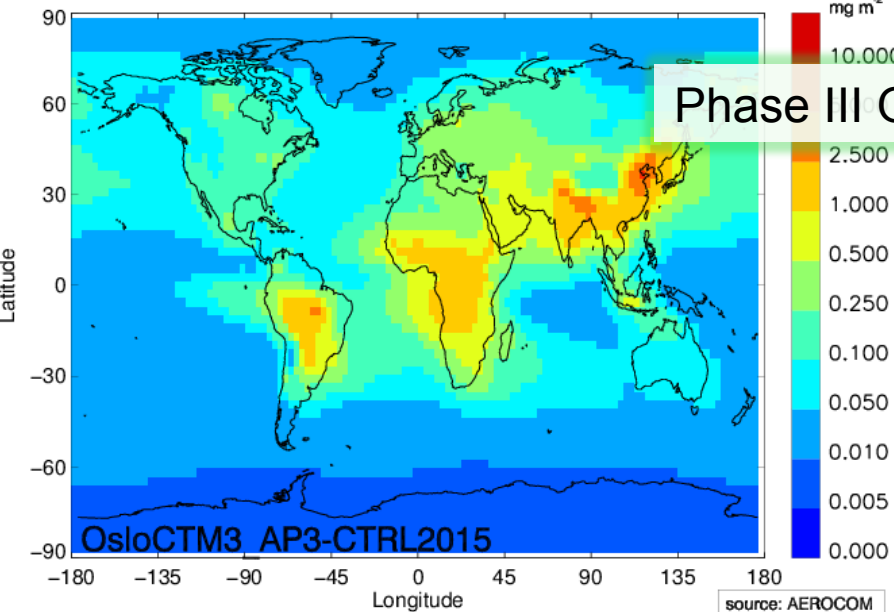
µg/m³



LOAD_BC 2010 mean 0.214

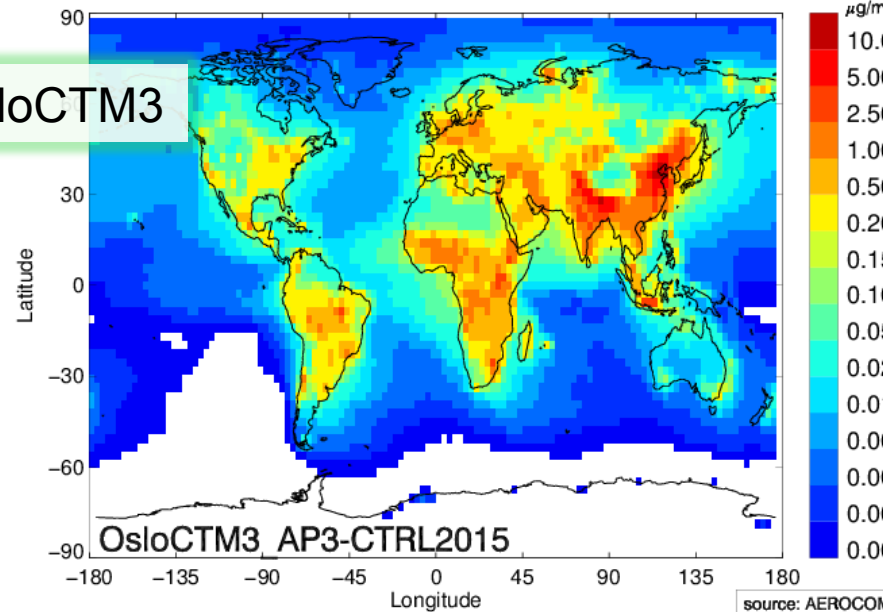
mg m⁻²

Phase III OsloCTM3



SCONC_BC 2010 mean 0.180

µg/m³



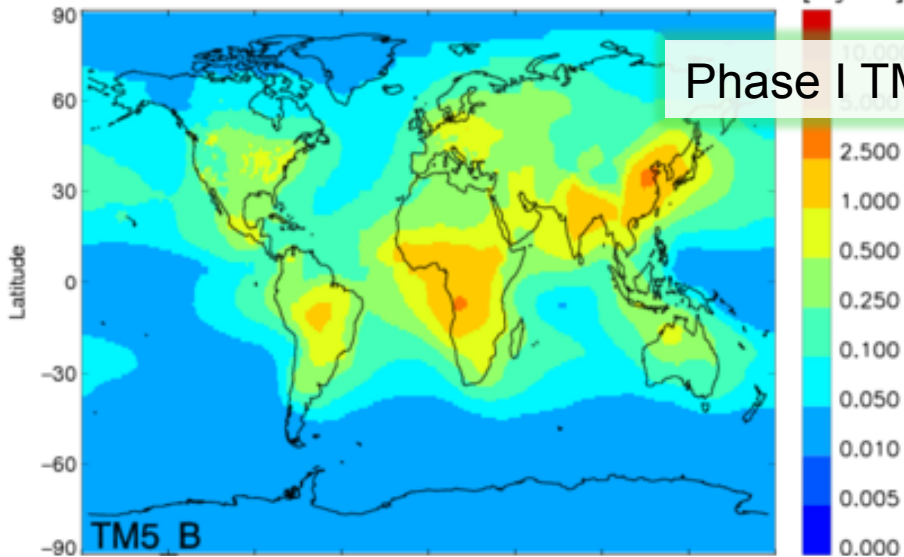
source: AEROCOM

source: AEROCOM

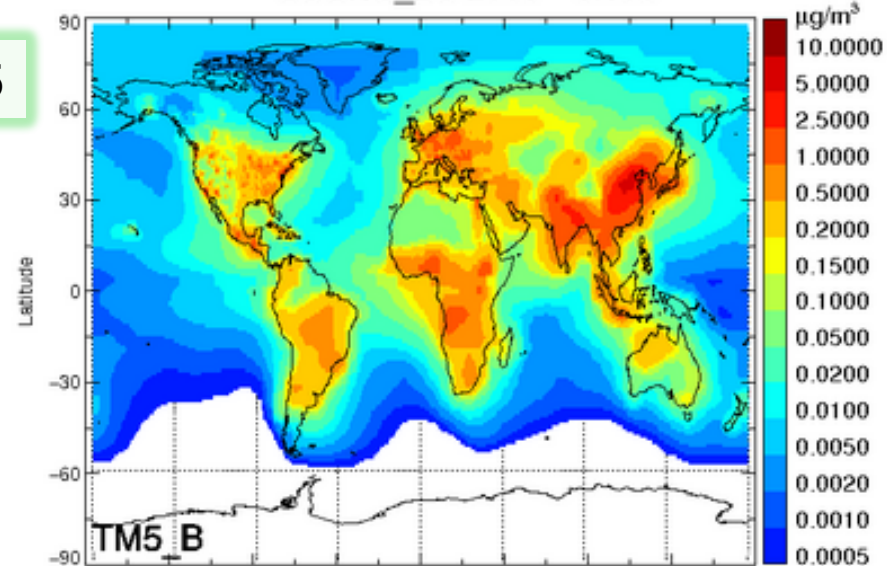
LOAD_BC 2000 mean 0.241

[mg m⁻²]

Phase I TM5



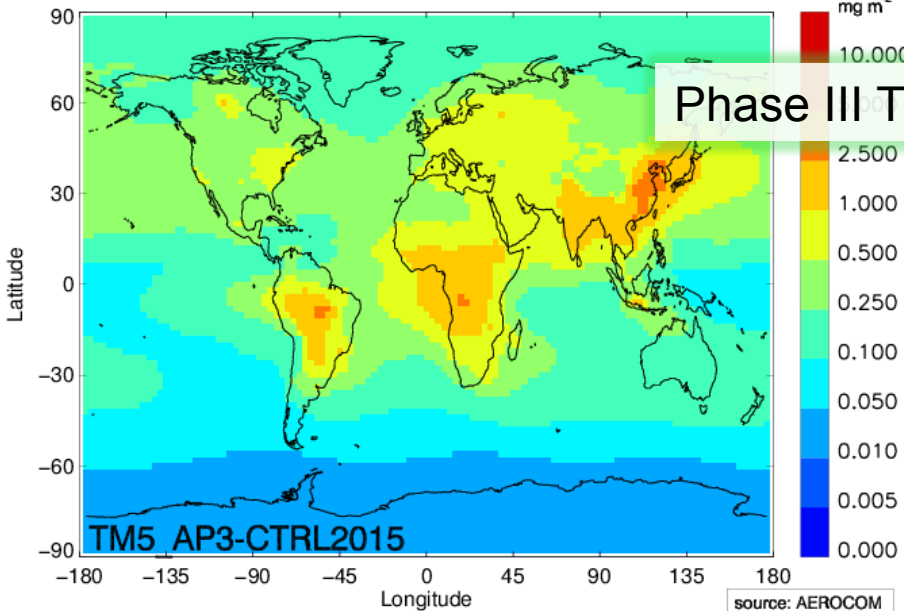
SCONC_BC 2000 0.153



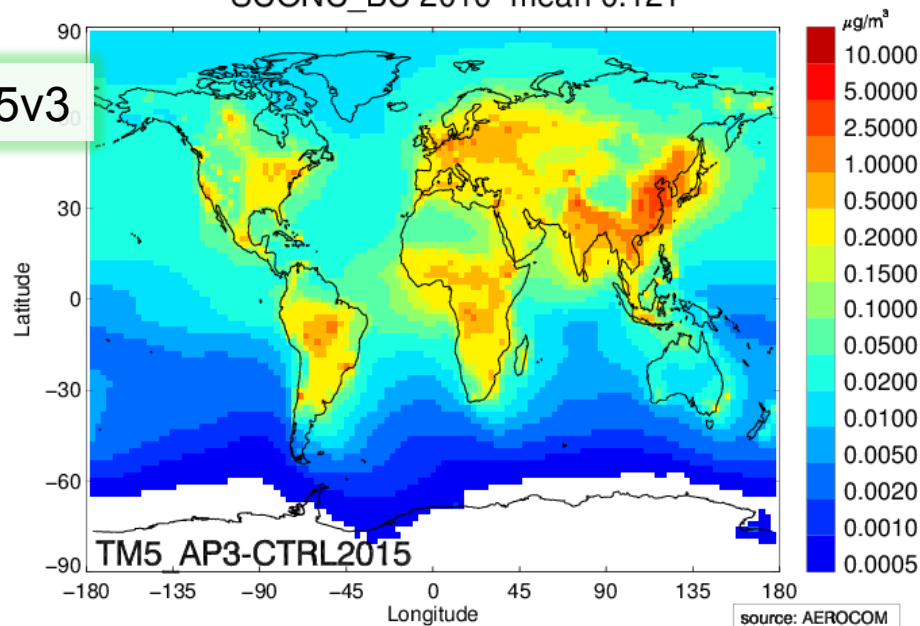
LOAD_BC 2010 mean 0.370

mg m⁻²

Phase III TM5v3



SCONC_BC 2010 mean 0.121

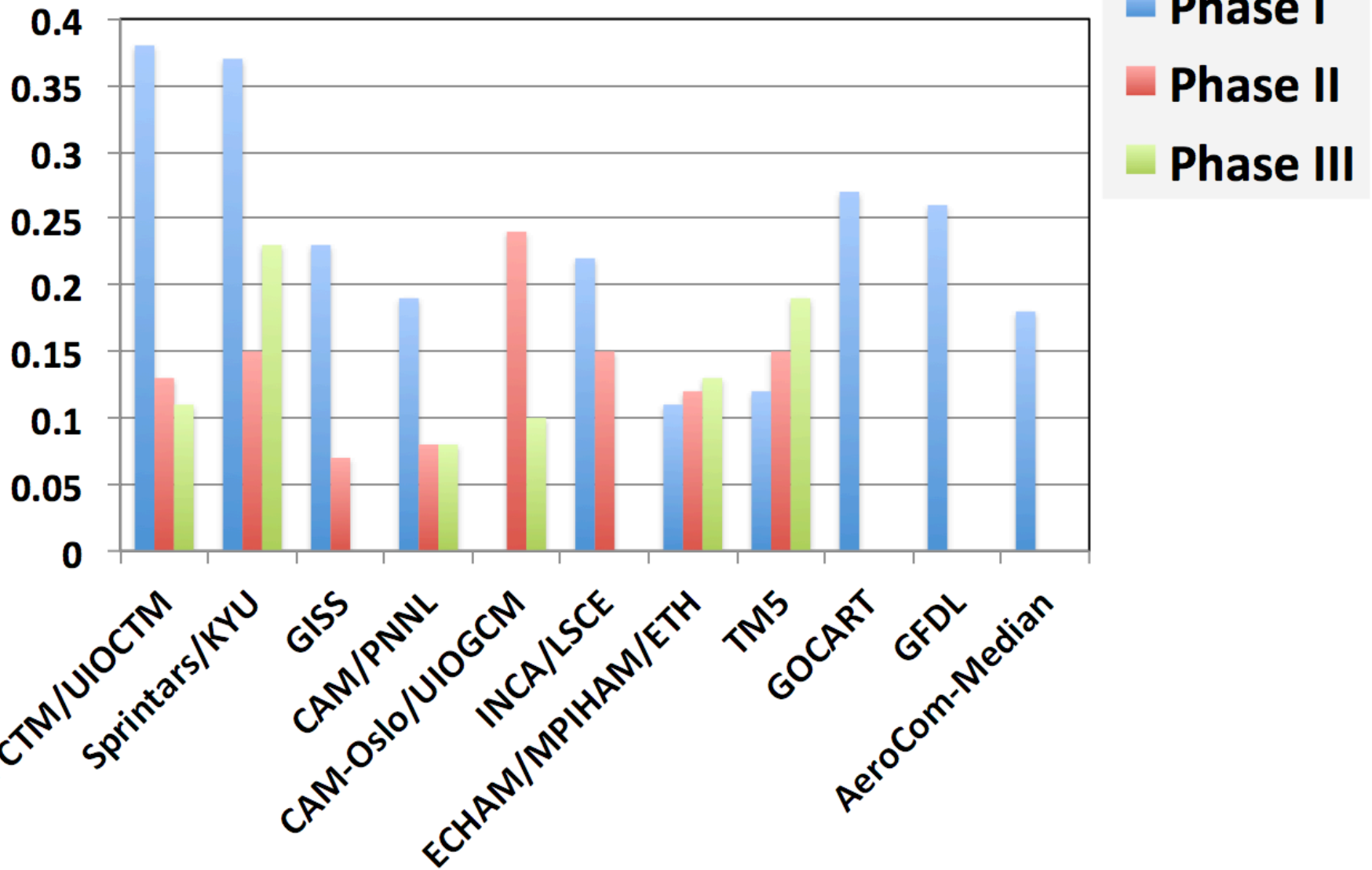


source: AEROCOM

source: AEROCOM

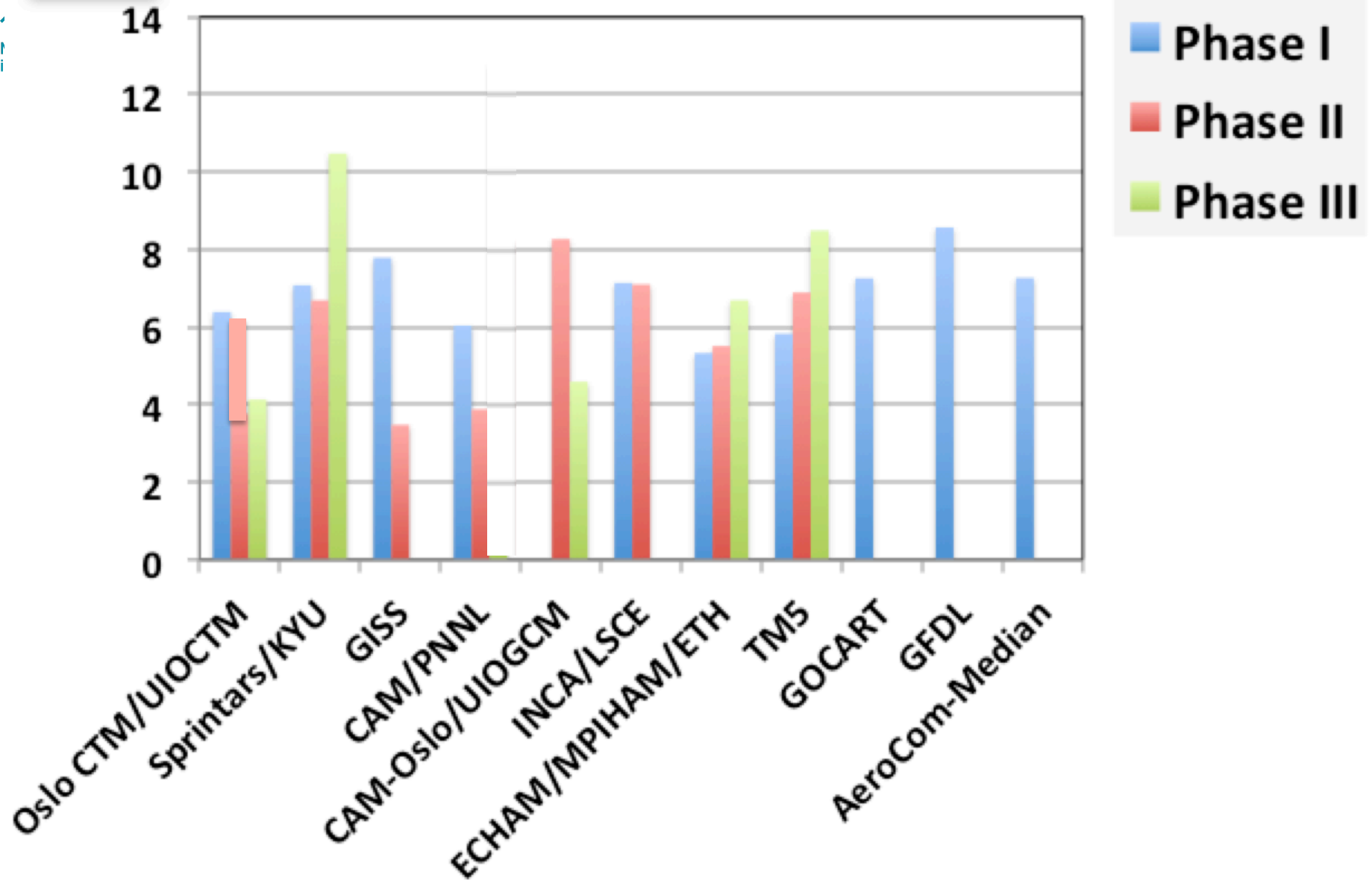
Global Average Load of Black Carbon [Tg]

(
/
ii



Global Black Carbon Lifetime [days]

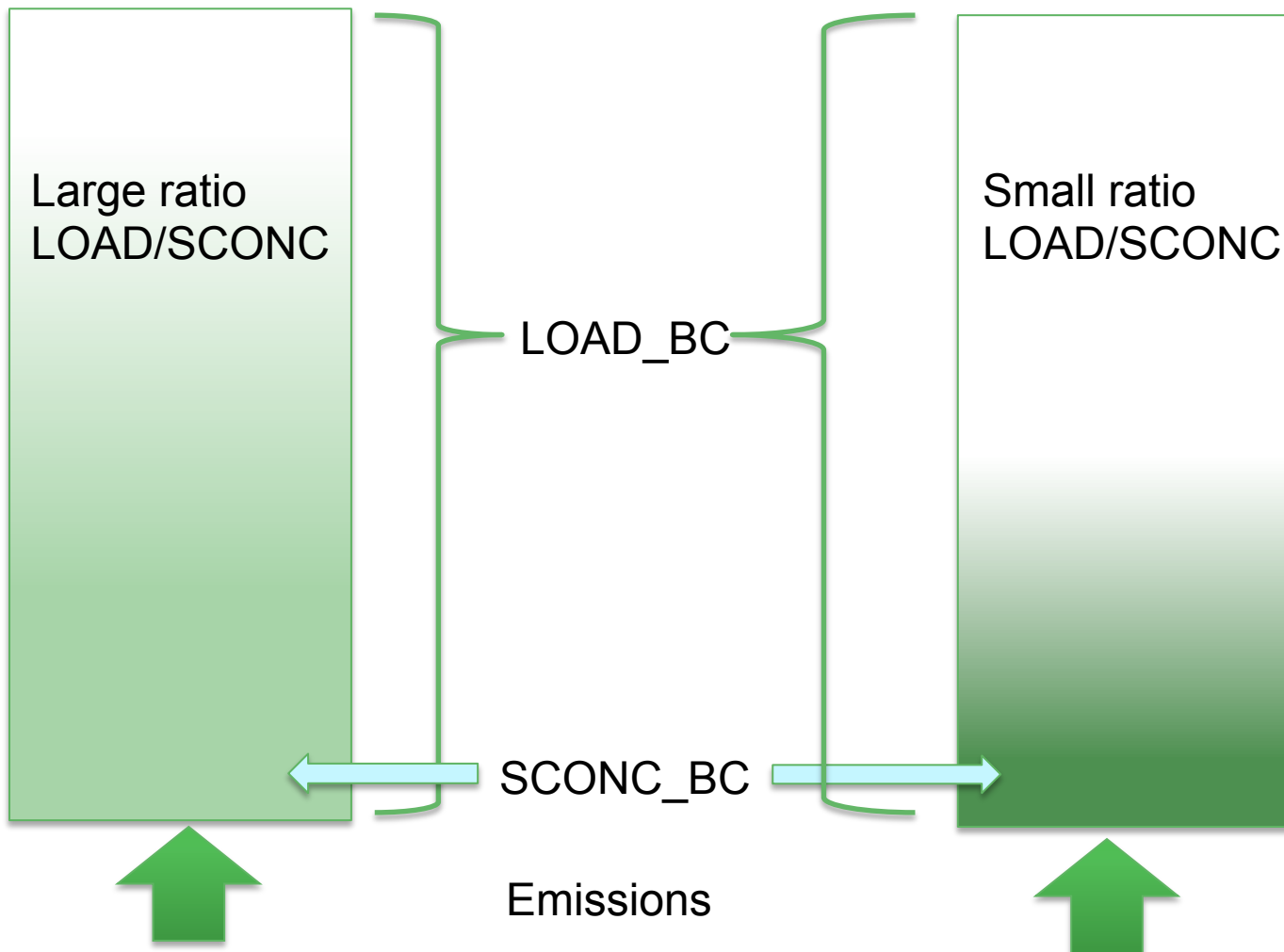
Chart Area





Model A

Model C



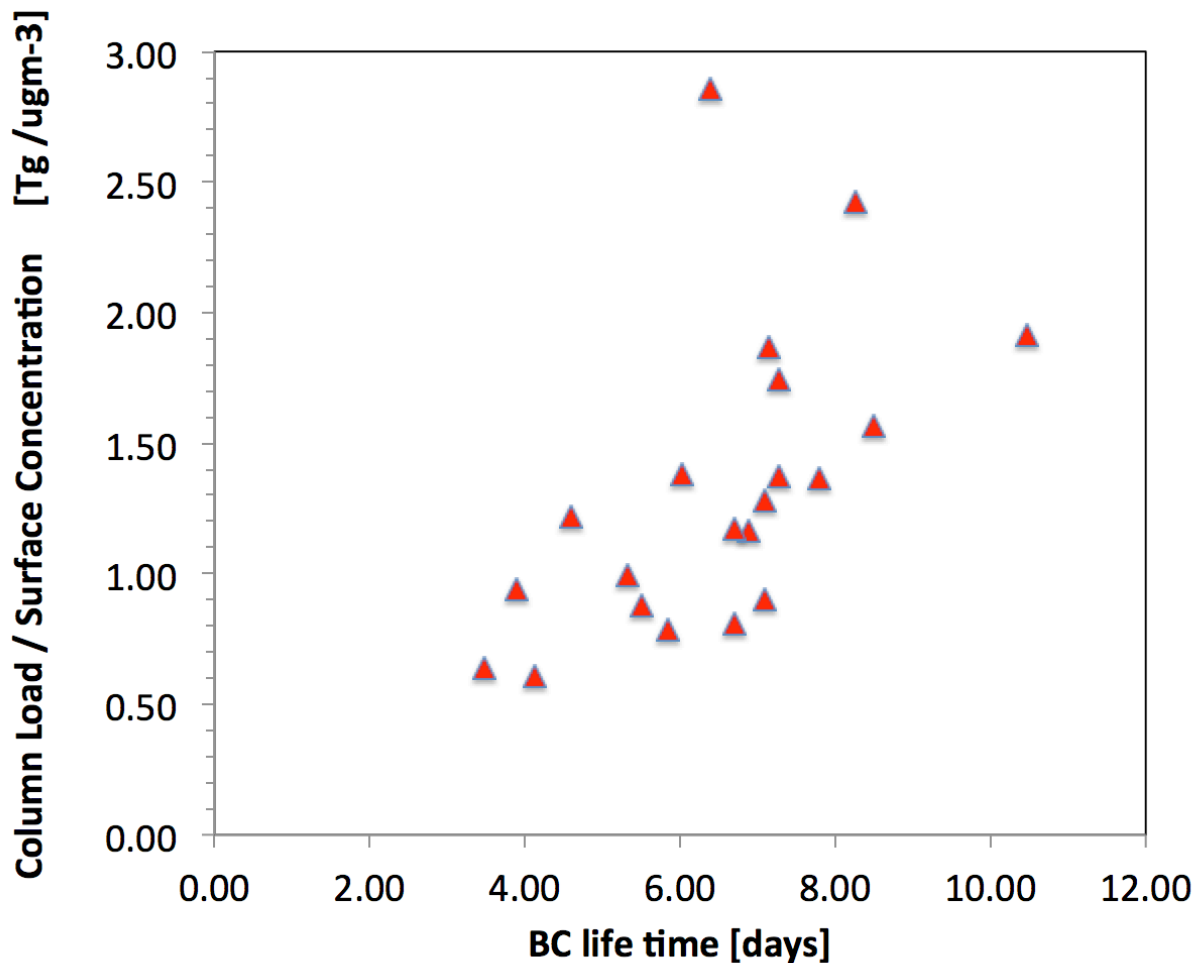


LOAD/SCONC is an aerosol height indicator

Life time and aerosol height are correlated



ALL CTRL EXPERIMENTS AEROCOM A, PH II+III





Resumee CTRL 2015 experiment



- Surface concentration are not a constraint for model loads
- CTRL complements the other experiments
- Allows comparison to earlier publications and work
- Inter-model Variance has not decreased
for most parameters looked upon
- Models do not evolve in the same direction,
are they unconstrained?
- CTRL experiment may provide check for model development



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, no assimilation
and its speciation (BC, SO₄, DUST, OA, SS, Rest)
Submission 15. September 2016

Funding: Crowdsourcing campaign soon to be launched

Jury: MMS+SSC



Thanks for your attention !