Aerosol radiative forcing remains uncertain…

AeroCom Workshop 2017

Finish Meteorological Institute

Helsinki

09/10/2017

Philip Stier

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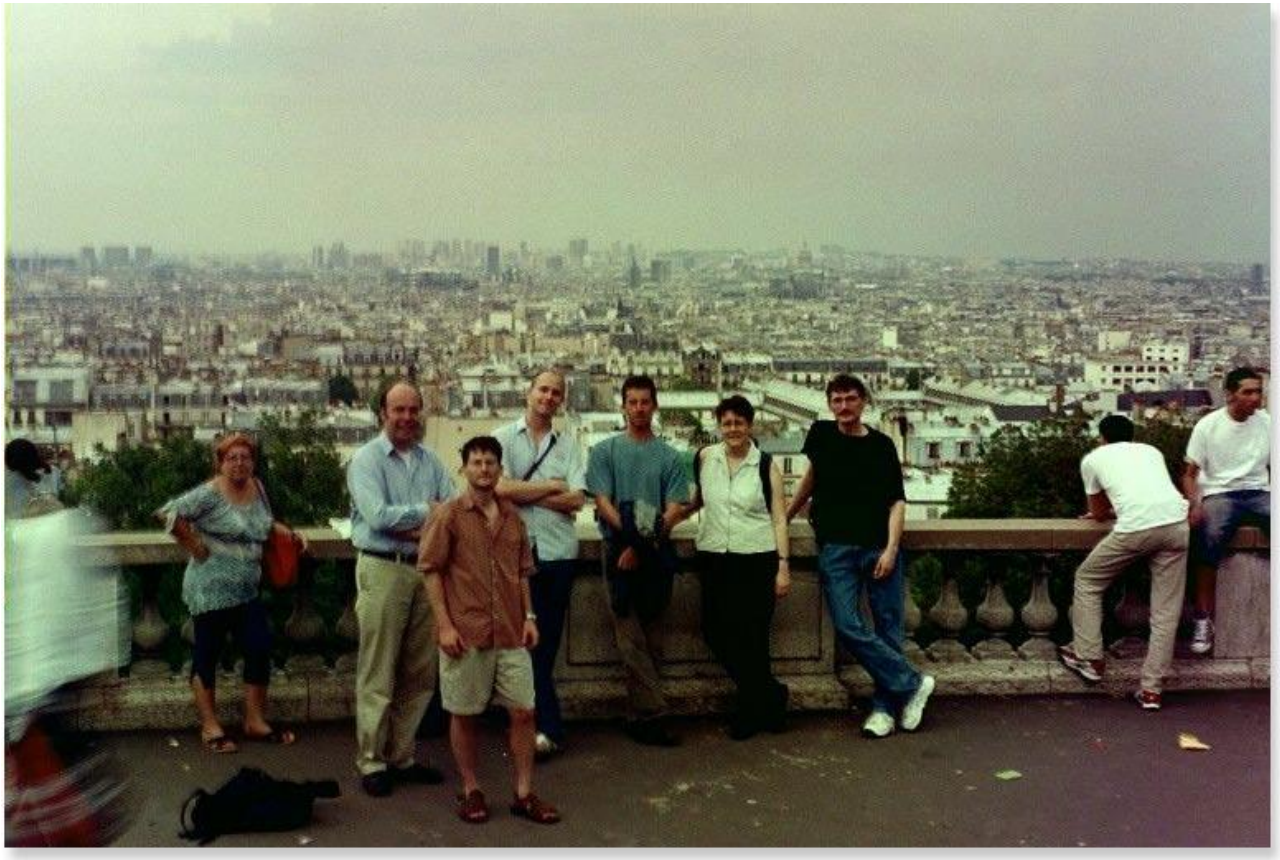
Aerosol radiative forcing remains uncertain…



AeroCom Workshop 2013 in Paris

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Aerosol radiative forcing remains uncertain…

What are we going to do about this?

Discussion: Constraining Forcing Uncertainty

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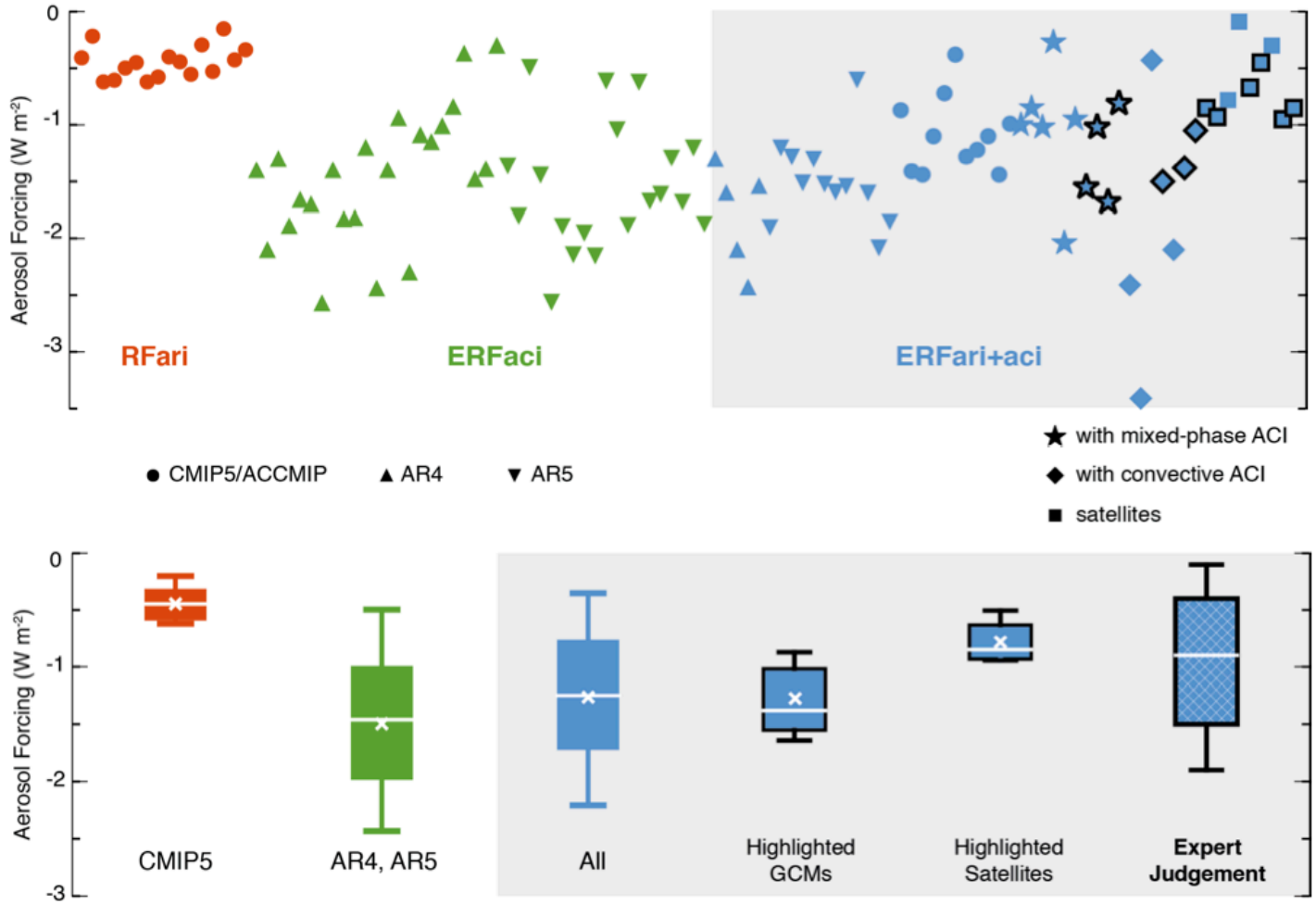
IPCC AR5 Aerosol Radiative Forcing



Climate Processes Group

(Boucher et al., IPCC AR5, Figure 7.19, 2013)

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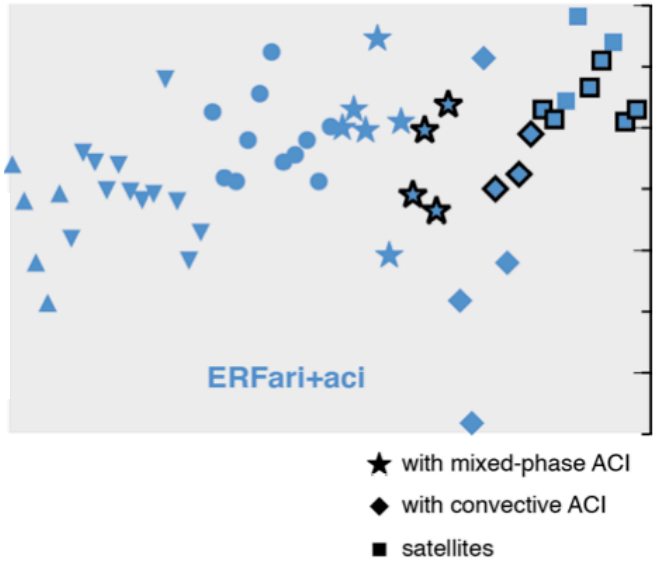
IPCC AR5 Aerosol Radiative Forcing

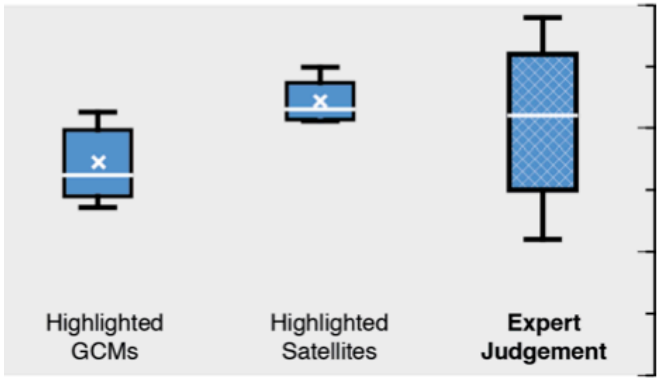
Models: - 1.38 Wm^{-2}

Satellites: - 0.85 Wm^{-2}



Experts: - 0.9 Wm^{-2}

Satellites: 91% weight



(Boucher et al., IPCC AR5, Figure 7.19, 2013)

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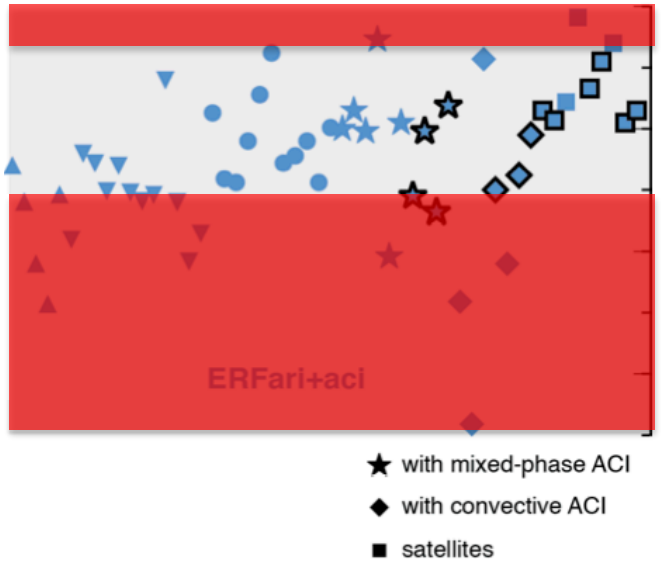

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Constraining Forcing Uncertainty

How can AeroCom help to constrain (or bound) forcing uncertainty?

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Constraining Forcing Uncertainty

How can AeroCom help to constrain forcing uncertainty?

Bottom up:

- Evaluation of ***base state***:
  AeroCom Control, In-situ, Nitrate, GASSP aircraft, CCN, Biomass Burning, RemoteSensing, Dust, UTLS, ACRI,…
- Evaluation of ***response of cloud processes***:
  Indirect I/II, …

Top-down:

- Constraints from ***transient temperature record***
- ***Broadband radiation*** observations (CERES, BSRN,…)
- ***Plausibility – Many modelling centers tuned down*** ERF_{aci}

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Constraining Forcing Uncertainty

How can AeroCom help to constrain forcing uncertainty?

Discussion on constraints:

1. Bottom-up
2. Top-down

How can we pull through the results from AeroCom bottom-up experiments to deliver actual constraints on forcing (for AR6)?

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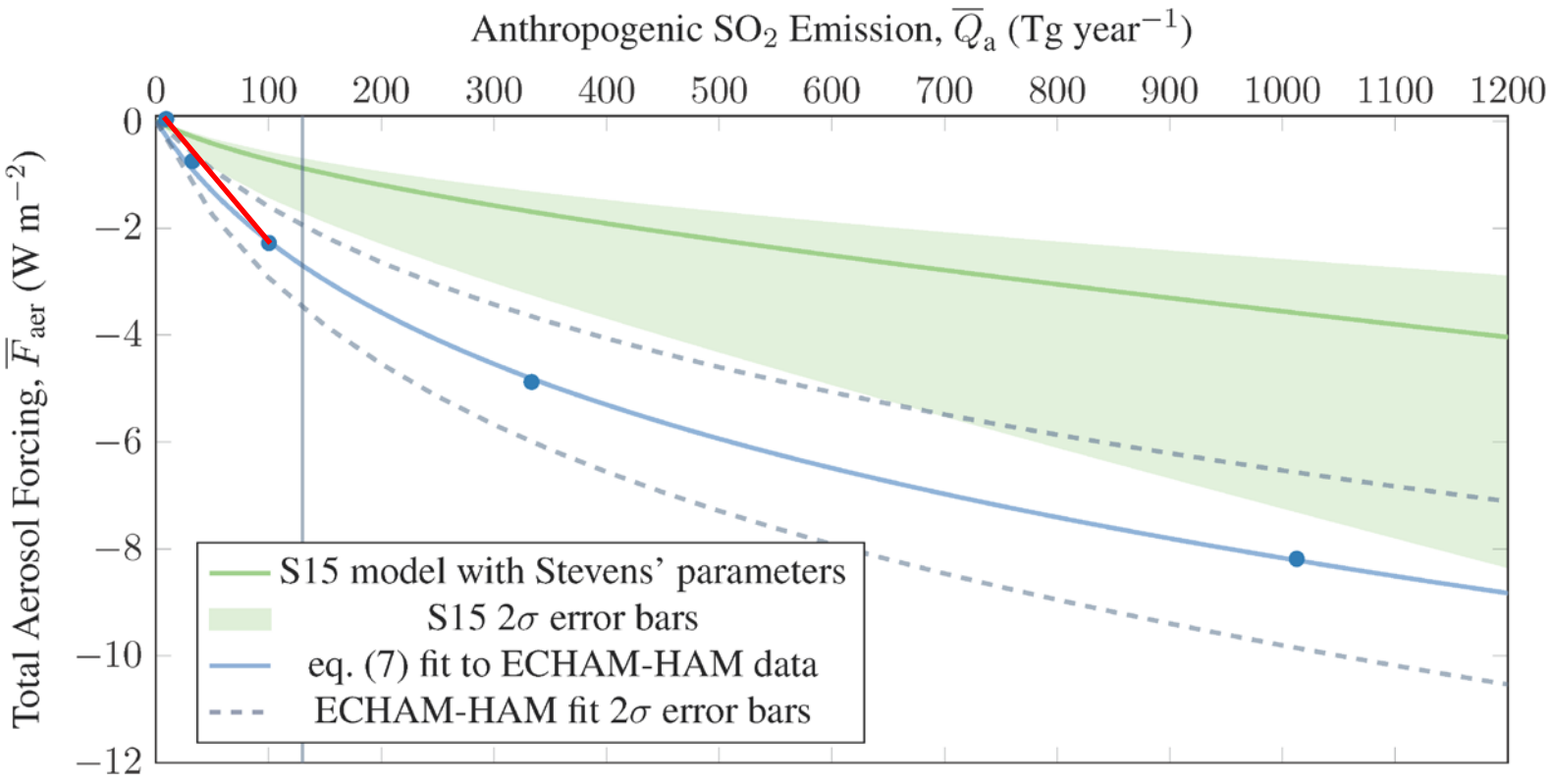
Constraining Forcing Uncertainty

Comparison of ECHAM-HAM and Stevens (2015):



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