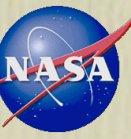


# *AC&C Activity 4: Future Scenarios*



Jean-François Lamarque and Drew Shindell

IPCC AR5 runs by composition modeling groups (early 2009?)  
fixed SSTs climatology, SSTs from previous runs or fully  
coupled (GCM run in advance, SSTs to all?)

## Scientific questions

RF, atmospheric heating, & climate response

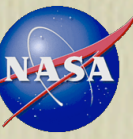
STE (relative roles of ozone recovery and circulation change)

## Diagnostics

Extending PCMDI-style archive to composition (ACC-MIP)



# *AC&C Activity 4: Future Scenarios*



Demand from climate models to 4D climatology of gases and aerosols

Average of all, multiple sets, average of 'best'

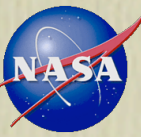
Troposphere-only vs Strat+Trop models

(definition of tropopause)

Bulk aerosol properties only?

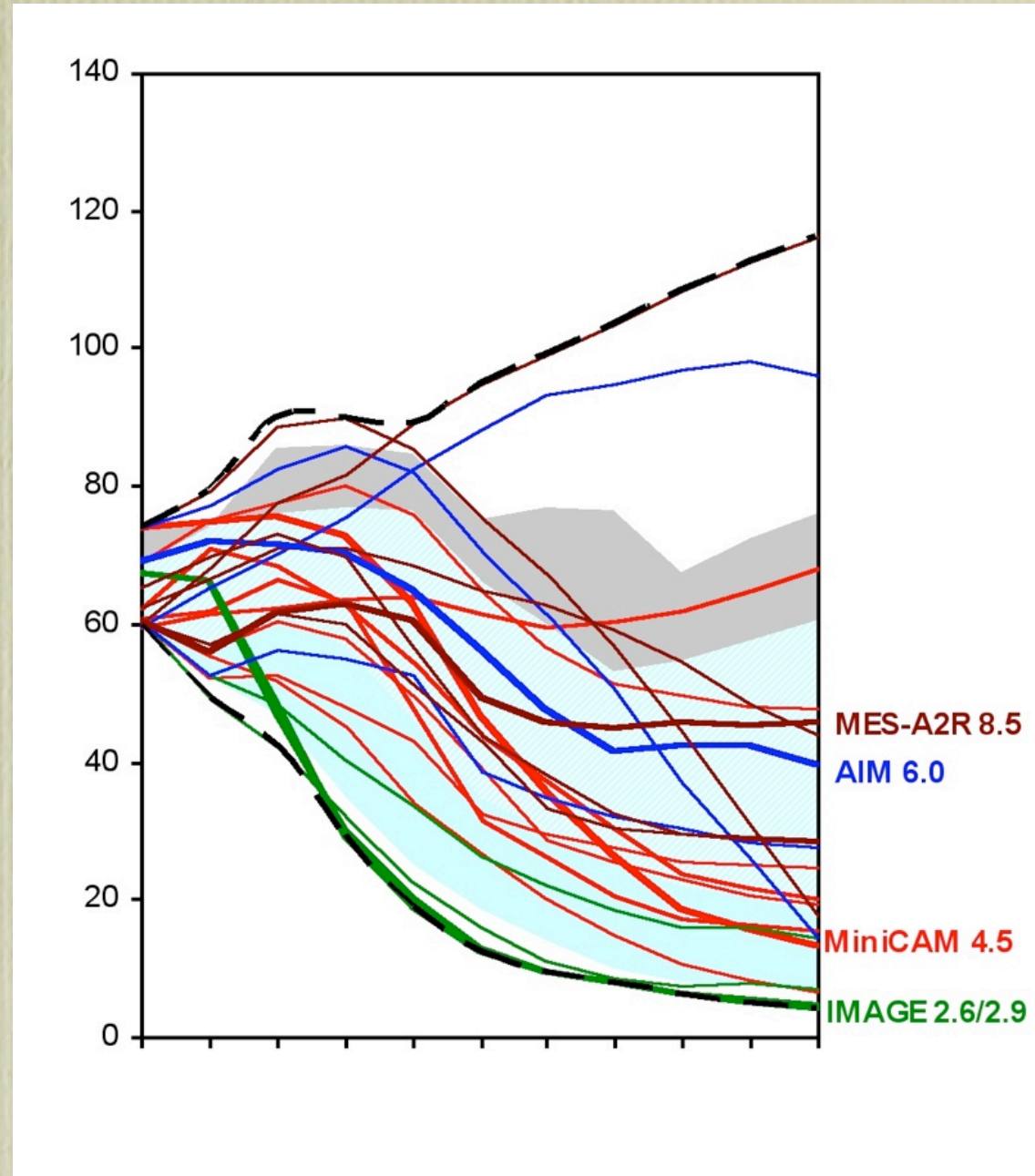


# Post-AR5 runs: Uncertainties



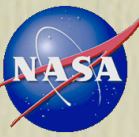
1) IAMs generate emissions from all four IPCC scenarios (RCPs).

Additional simulations using different emissions for the same RCP? (aerosols, ozone, methane?)





# *Post-AR5 runs: Uncertainties*

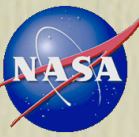


- 2) Variation in climate response from:
  - (a) GCM climate sensitivity
  - (b) different 3D aerosol fields
  - (c) Aerosol impact on climate (due to location wrt clouds, water uptake, natural aerosols, mixing state, etc)

Simulations with the aerosol/chemical constituent climatology (#1) would allow separation of 'b' (done with fixed SSTs?)



# *Post-AR5 runs: Uncertainties*



## 3) Diagnostics

burdens

absorbing and reflective AODs both clear- and all-sky

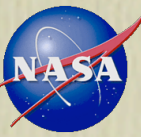
radiative forcing by species both clear- and all-sky

Adequate for #2?

Insufficient for AIE (additional runs?)



# *Post-AR5 runs: Uncertainties*



## 4) Alternative scenarios

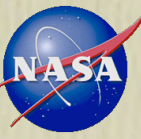
IAMs for IPCC do not emphasize short-lived pollutants (e.g. they have no adverse impact from poor air quality).

2100 RF target

Alternatives from emissions researchers (e.g. IIASA, ANL).  
IIASA 2030 CLE & MFR done though, so low priority?



# *Post-AR5 runs: Uncertainties*



5) We have to be sure that the list of simulations does not become excessive!