AeroCom model median

Gunnar Myhre

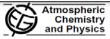
CICERO Center for International Climate and International Research - Oslo

Time history of aerosols and aerosol properties

CMIP5

 2010 – emissions and results from 1 aerosol model

Atmos. Chem. Phys., 10, 7017–7039, 2010 www.atmos-chem-phys.net/10/7017/2010/ doi:10.5194/acp-10-7017-2010 © Author(s) 2010. CC Attribution 3.0 License



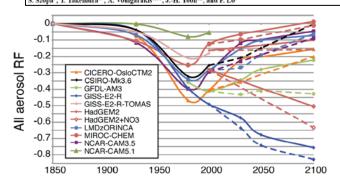
Historical (1850–2000) gridded anthropogenic and biomass burning emissions of reactive gases and aerosols: methodology and application

J.-F. Lamarque¹, T. C. Bond², V. Eyring³, C. Granier^{4,5,6}, A. Heil⁷, Z. Klimont⁸, D. Lee⁹, C. Liousse¹⁰, A. Mieville⁶, B. Owen⁹, M. G. Schultz², D. Shindell¹¹, S. J. Smith¹², E. Stehfest¹³, J. Van Aardenne¹⁴, O. R. Cooper⁴, M. Kainuma¹⁵, N. Mahowaldl¹⁶, J. R. McConnell¹⁷, V. Nalik⁸, K. Rijahl⁸, and D. P. van Vuuren¹³

• 2013 – ACCMIP results

Radiative forcing in the ACCMIP historical and future climate simulations

D. T. Shindell¹, J.-F. Lamarque², M. Schulz³, M. Flanner⁴, C. Jiao⁴, M. Chin⁵, P. J. Young^{6,8}, Y. H. Lee¹, L. Rotstayn⁷, N. Mahowald³, G. Milly¹, G. Faluvegl¹, Y. Balkanski⁹, W. J. Collins^{10,1,4}, A. J. Conley², S. Dalsoren¹¹, R. Easter¹², S. Ghan¹², L. Horowitz¹³, X. Liu¹², G. Myhre¹¹, T. Nagashima¹⁴, Y. Naik¹⁵, S. T. Rumbold¹⁰, R. Skeis¹¹, K. Sudo¹⁶, S. Szopa², T. Takemura¹⁷, A. Voulgarafski^{1,18}, J.-H. Youn¹², and F. Lo⁸

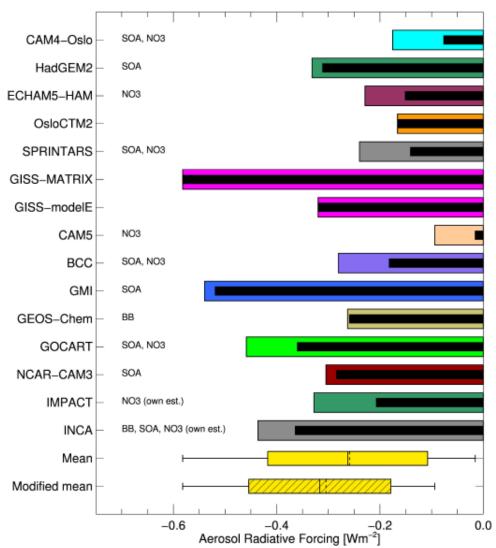


CMIP6

 Should we provide aerosol fields and aerosol optical properties from several models before the CMIP6 models complete the runs?

 AerChemMIP results will be analyzed for the CMIP6 simulations before IPCC AR6

Why provide aerosol model mean products?



Atmos. Chem. Phys., 13, 1853–1877, 2013 www.atmos-chem-phys.net/13/1853/2013/ doi:10.5194/acp-13-1853-2013 © Author(s) 2013. CC Attribution 3.0 License.

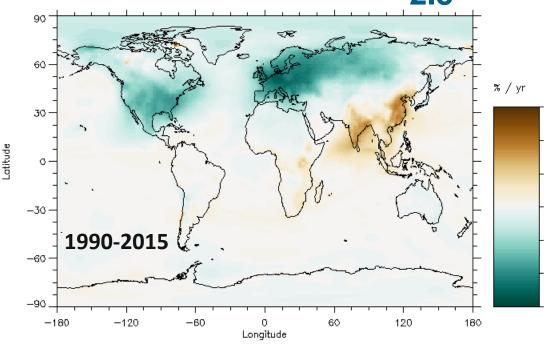




Radiative forcing of the direct aerosol effect from AeroCom Phase II simulations

G. Myhre¹, B. H. Samset¹, M. Schulz², Y. Balkanski³, S. Bauer⁴, T. K. Berntsen¹, H. Bian⁵, N. Bellouin^{6,*}, M. Chin⁷, T. Diehl^{7,8}, R. C. Easter⁹, J. Feichter¹⁰, S. J. Ghan⁹, D. Hauglustaine³, T. Iversen^{2,11}, S. Kinne¹⁰, A. Kirkevåg², J.-F. Lamarque¹², G. Lin¹³, X. Liu⁸, M. T. Lund¹, G. Luo¹⁴, X. Ma¹⁴, T. van Noije¹⁵, J. E. Penner¹³, P. J. Rasch⁹, A. Ruiz^{15,16}, Ø. Seland², R. B. Skeie¹, P. Stier¹⁷, T. Takemura¹⁸, K. Tsigaridis⁴, P. Wang¹⁵, Z. Wang¹⁹, L. Xu^{13,20}, H. Yu⁵, F. Yu¹⁴, J.-H. Yoon⁹, K. Zhang¹⁹, H. Zhang²¹, and C. Zhou¹⁵

Surface PM_{2.5}



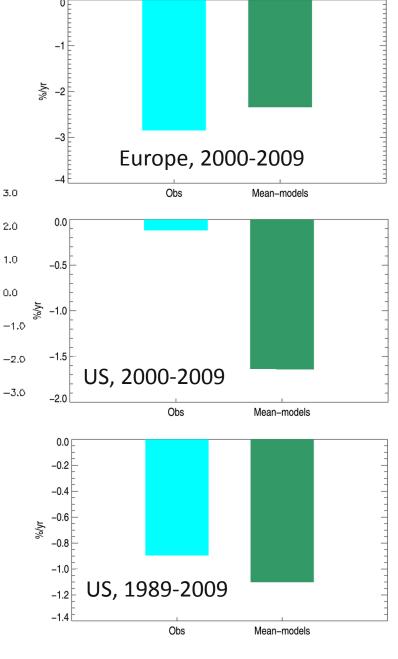
Models:

Mean of 5 global aerosol models: CESM-CAM5, EMEP, GISS, OsloCTM2, SPRINTARS

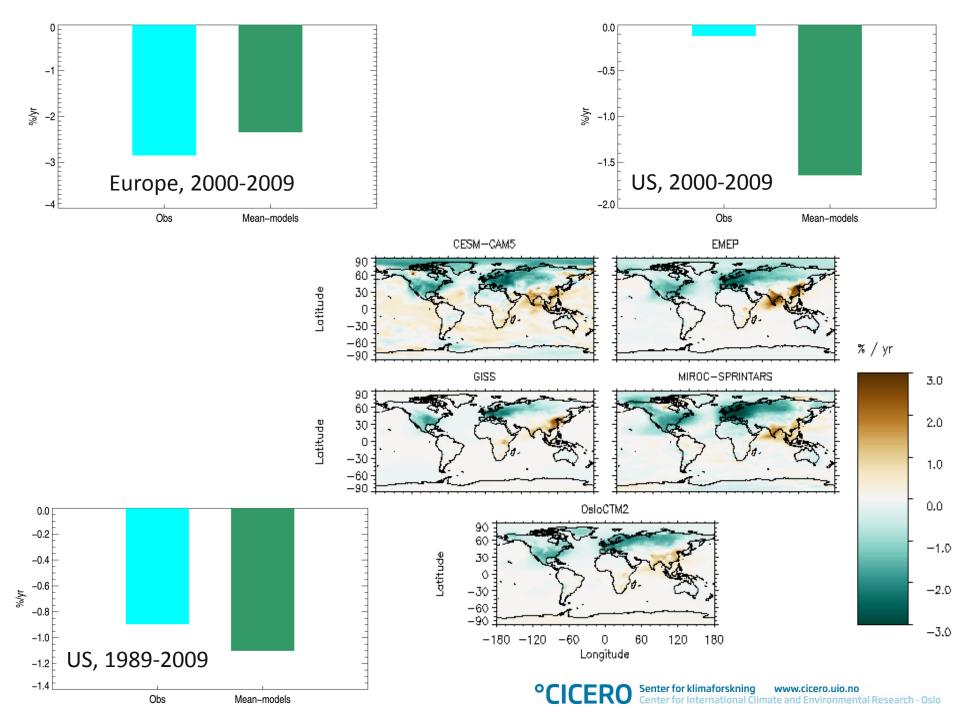
Observations:

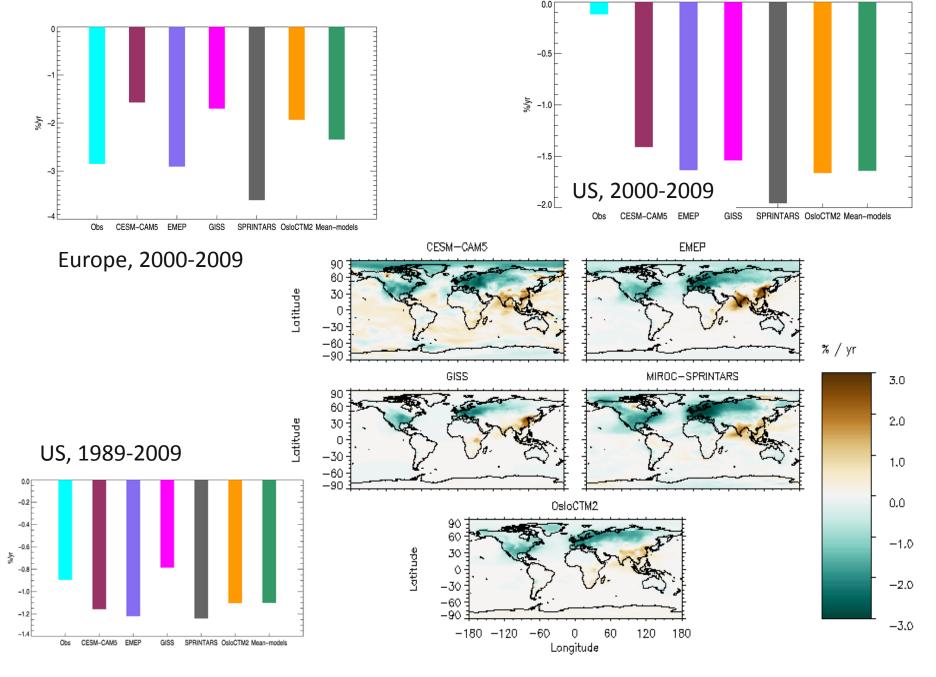
Europe: EMEP (Tørseth et al., 2012), 13 stations US: IMPROVE (Hand et al., 2011), 58 stations (25

for 1989-2009)







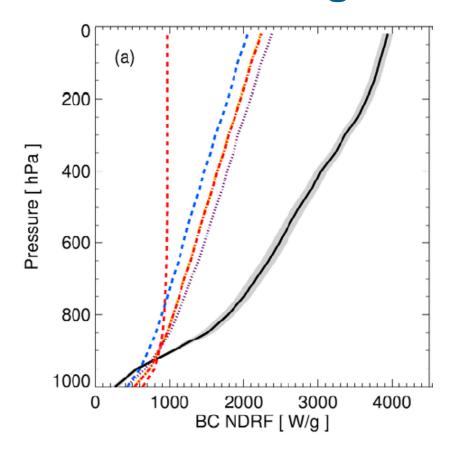


Standard observational data to compare with models

- Surface PM_{2.5}
- Surface concentration of key aerosol types such as sulphate, BC and OC
- Surface extinction and absorption?
- AOD
- AAOD?

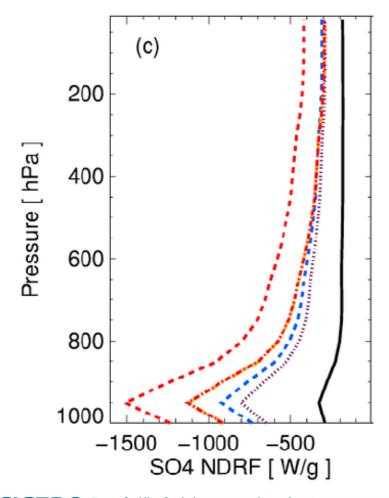
Climatology and trends

Aerosol fields can be converted to radiative forcing



GEOPHYSICAL RESEARCH LETTERS, VOL. 38, L24802, doi:10.1029/2011GL049697, 2011 Vertical dependence of black carbon, sulphate and biomass burning aerosol radiative forcing

Bjørn H. Samset¹ and Gunnar Myhre¹



Plans

- Perform aerosol simulations 1850-2015 for a range of typical AeroCom models
- Serve as a benchmark for CMIP6 models, but not an official CMIP6 product
- Models fields will be regridded to common 1x1 degree format and together with model-mean made easily available for download
- Provide aerosol fields and aerosol optical properties for main anthropogenic aerosol types
- Perform simplified radiative forcing calculations
- Can be used in the analysis of AerChemMIP simulations and to observational data

Timeline

- Need commitment from modelling groups end of 2015
- Most of simulations by 2016
- Paper ready by summer 2017

