

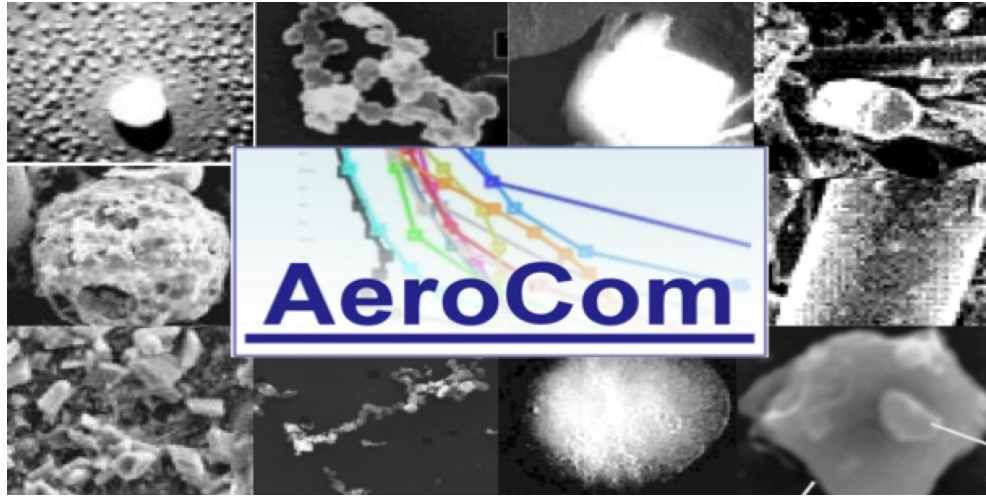
AeroCom future future future



Barcelona 15 June 2015



Barcelona 25 Sep 2019



<https://twitter.com/AeroComMetno>



AeroCom DUGNAD 2019/2020



- *AeroCom 2019 workshop presentations on web (please react when we send around draft)*
- *new workshop planning*

- *Telecons since last AeroCom workshop /
SSC Mian, Stefan, Kostas, Bjørn, Gunnar, Michael, + ????*
- *Minutes send around to experiment/analysis responsables*

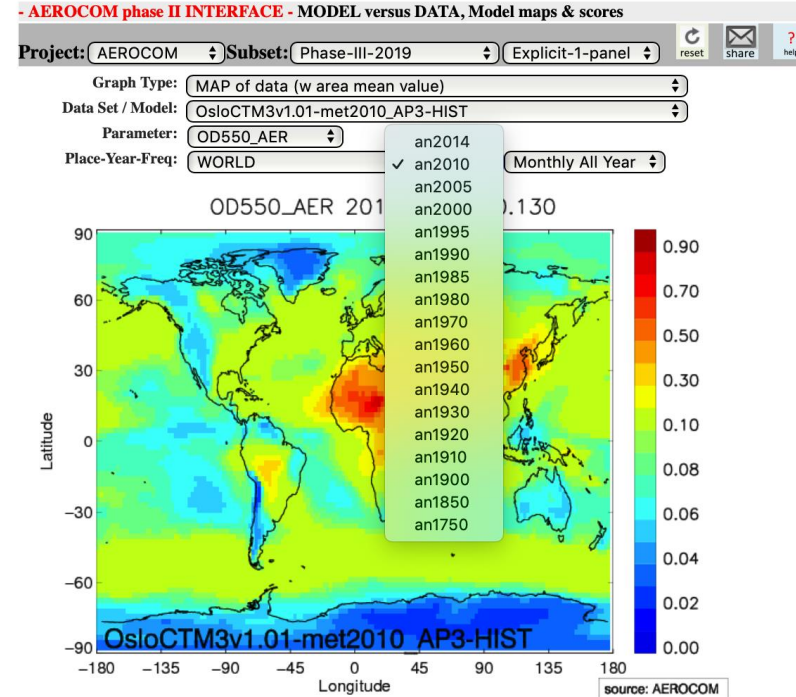
- *++ Special telecons to discuss papers, experiments with larger rounds
(please propose, SSC will organise)*

ALL: Document Models, Papers, Simulations... / Correct output of model





- Database at the Norwegian Meteorological Institute (MetNo) with attached linux user server
- now 250 users with account
- 45 TB, with 2 security copies
- email lists *aerocom-modeller: 233*
aerocomc: 429
aerchemmip: 93
- Workup at MetNo by *pyaerocom* python tool (*githuk*)
- Old Quicklook maintained
- Two new web interfaces for evaluation and trends (see presentations *Gliss and Mortier*)



https://aerocom.met.no/cgi-bin/surfobs_annualrs.pl



AeroCom DUGNAD 2019/2020



Can we think of AeroCom products?

Database,

Code repository,

Publication list, website,

Assessment papers, ...?

How to reward those doing dugnad ?

eg Harmonization of data, coordination, documentation



Joint AeroCom papers

AerChemMIP and RFMIP Planned Papers

This document provides a summary of papers planned using AerChemMIP/RFMIP multi-model output. Papers are divided under two themes - 1) Forcing, Response & Feedbacks and 2) Atmospheric Composition and Air Quality. Information provided below includes a tentative title with lead author, submission date, science questions being covered, simulations being analyzed, and a point of contact.

Authorship Policy for AerChemMIP/RFMIP papers: Modelers should be given co-authorship on papers that use their model output at least for those submitted in 2019. It is expected that authors will adhere to the [CMIP6 Terms of Use](#) and citation requirements.

<https://wiki.met.no/aerocom/aerchemmip/start>



Effective Radiative Forcing and Rapid Adjustments in CMIP6 Models (Chris Smith et al) - submission by December 31, 2019

Uses RFMIP Tier 1 experiments to assess ERF, IRF and rapid adjustments to components of present-day forcing

Will provide an update of methods for diagnosing ERF

Comparison of methods to determine cloud rapid adjustments

Contact: c.j.smith1@leeds.ac.uk

Effective Radiative forcing from emissions of reactive gases and aerosols (Gill Thornhill et al) - submission by December 31, 2019

Quantifying the ERFs from pre-I to present emission changes in reactive gases and aerosols (concentration changes for CH₄, N₂O and Halocarbons).

Quantifying the contributions to these emission-driven ERFs through changes in aerosol AOD, ozone (trop and strat) burden, methane lifetime

Will use AerChemMIP piClim-xx

Contacts: g.thornhill@reading.ac.uk; w.collins@reading.ac.uk



Historical aerosol forcing diagnosis and analysis in CMIP6, AerChemMIP and AeroCom models (Michael Schulz, Gunnar Myhre et al) - submission before December 31, 2019

Document available historical aerosol forcing estimates (ERF, IRFs, double call results) available in CMIP6, AerChemMIP, RFMIP and AeroCom 2019 simulations

Analysis of forcing efficiency wrt to lifetime, load, optics and emission evolution

Relate to aerosol evaluation and comparison to observed aerosol trends (see below)

Investigate impact of natural aerosols on forcing history

Contact: michaels@met.no

Other papers evaluating aerosol properties and trends in historical and PD conditions / AeroCom+AerChemMIP submission intended before December 31, 2019

PD optical properties (Jonas Gliss et al. jonasg@met.no)

Regional aerosol trends (Augustin Mortier et al. augustinm@met.no)

Absorption by aerosols (Bjørn Samset et al. b.h.samset@cicero.oslo.no)

Aircraft data on vertical distribution (duncan.watson-parris@physics.ox.ac.uk)

ATOM experiment (Huisheng Bian, huisheng.bian@nasa.gov)

TOA fluxes aerosol effect (Wenying Su, wenying.su-1@nasa.gov)

Multiple satellite data w exact colocation (Nick Schutgens, n.a.j.schutgens@vu.nl)

In-situ optical properties (Betsy Andrews, Betsy.Andrews@noaa.gov)

Anthropogenic dust (Paul Ginoux, paul.ginoux@noaa.gov)

Volcanic ACI experiment (Florent Malavelle F.Malavelle@exeter.ac.uk)



Effective Radiative forcing from emissions of reactive gases and aerosols (Gill Thornhill et al) - submission by December 31, 2019

Pre-industrial to present-day forcing in the UKESM model (Fiona O'Connor et al - mostly UK Met Office authors) - submission by December 31, 2019

The HadGEM3 radiative kernel and the importance of a well-resolved stratosphere (Chris Smith, Ryan Kramer) - submission before December 31, 2019

Ozone forcing history (Ragnhild Skeie, G Myhre et al) - submission before December 31, 2019

Towards a better understanding of the spread in anthropogenic aerosol forcing and response with RFMIP-SpAer (Stephanie Fiedler et al) - submission by December 31, 2019

Impact of near term climate forcers and aerosols on 20th century climate (Robert Allen et al) - December 2019 submission goal

Tentative title: 21st century climate impact of air pollution policies (Robert Allen et al) - December submission goal

Chemistry and aerosol climate feedbacks in Earth system models (Gill Thornhill et al) - submission by December 2019

Other papers diagnosing and characterizing earth system BGC feedbacks - submission intended before December 31, 2019:

Oceanic emissions (Dirk Olivie et al. dirkjlo@met.no)

Dust emissions (Ramiro Checa-Garcia et al. ramiro.checa-garcia@lsce.ipsl.fr)

Sea-salt emissions (GFDL-ESM4; Fabien Paulot et al. Fabien.Paulot@noaa.gov)

BVOC emissions (Catherine Scott et al. C.E.Scott@leeds.ac.uk)



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BVOC emissions (Catherine Scott et al.
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Constraining uncertainty in aerosol direct forcing (Duncan Watson-Parris et al.) - submission by December 2019

Benchmark calculation of radiative forcing by greenhouse gases (Pincus et al.) submission by December 2019

An investigation into sources of solar radiative parameterization biases in the determination of model aerosol instantaneous radiative effect (S. Freidenreich, et al.) - submission by December 31, 2019

Theme 2: Composition and Air Quality

Pre-industrial to end 21st century projections of tropospheric ozone from the Aerosols and Chemistry Model Intercomparison Project. (Griffiths et al) - submission by December 31, 2019

Tropospheric ozone trends, radiative forcing and attribution to emissions in Aerosols and Chemistry Model Intercomparison Project. (Lee Murray et al) - submission by December 31, 2019



“AeroCom” Papers 2019

Set up a similar google doc sheet

with Title + Lead author/contact + submission deadline ambition + 3 bullet points

More detailed outlines by end of October (tables, figures, structure)

Focus telecons for papers 2019 (SSG:

- Evaluation PD and Control

- Forcing history and Control (ERF and direct effect)

- Trends

- Absorption

- Aircraft evaluation

- In-situ and hygroscopicity

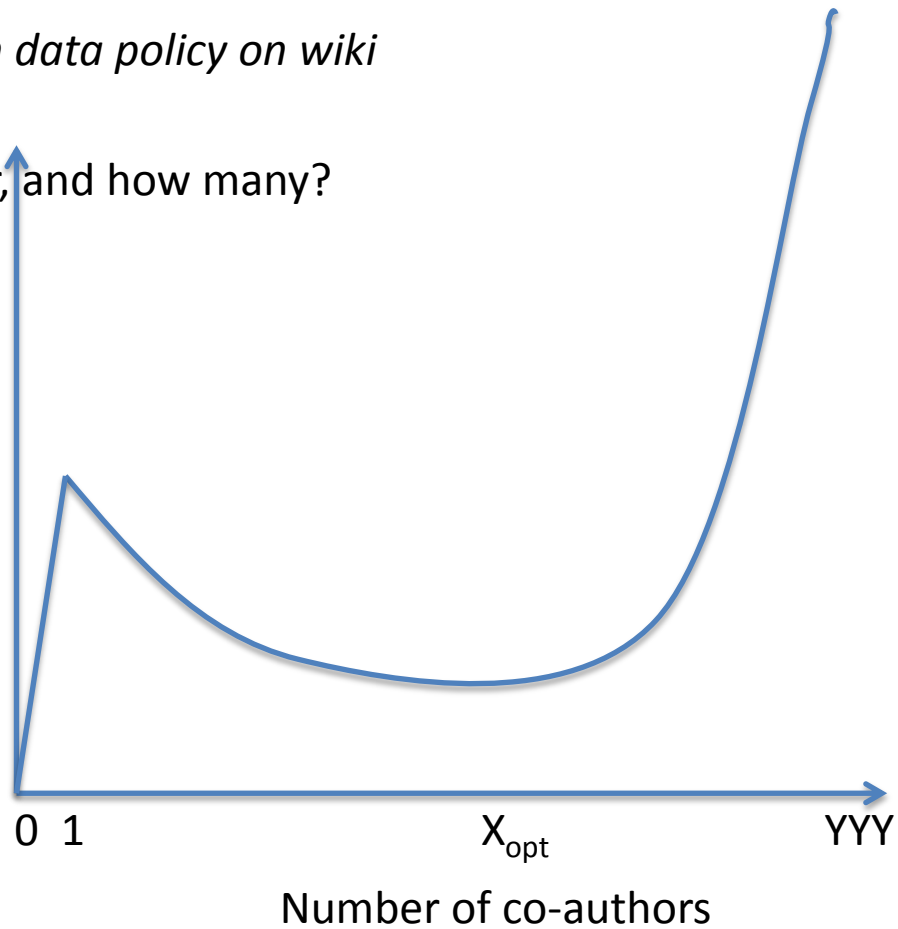
- Dust



Reminder: look into the AeroCom data policy on wiki

Who should be co-author, and how many?

Rejection
Likelihood
of Paper



How to make progress ? AeroCom phase IV ?

Consolidate, Consolidate, Consolidate

Few, Few , Few experiments (*not many with few models...*)

Coordinate, coordinate, coordinate (citation Philip Stier)

How to focus on unsolved issues?

Constraints on hygroscopicity, cnc, cloud albedo, indirect effects, cloud PPE
global dust, composition, anthropogenic,
vertical profile, size, absorption, removal, lifetime,

Modellers : can you stick to a fixed model version for 2-3 years?
(eg we complete the 2019 submissions until 2020/2021)

Experiments : engagement versus strict coordination

Should we have a telecon where experiments are proposed and decided upon



AeroCom diagnostics CTRL+X 2018/2019 v28.02.2019 /// Google sheet see link on wiki

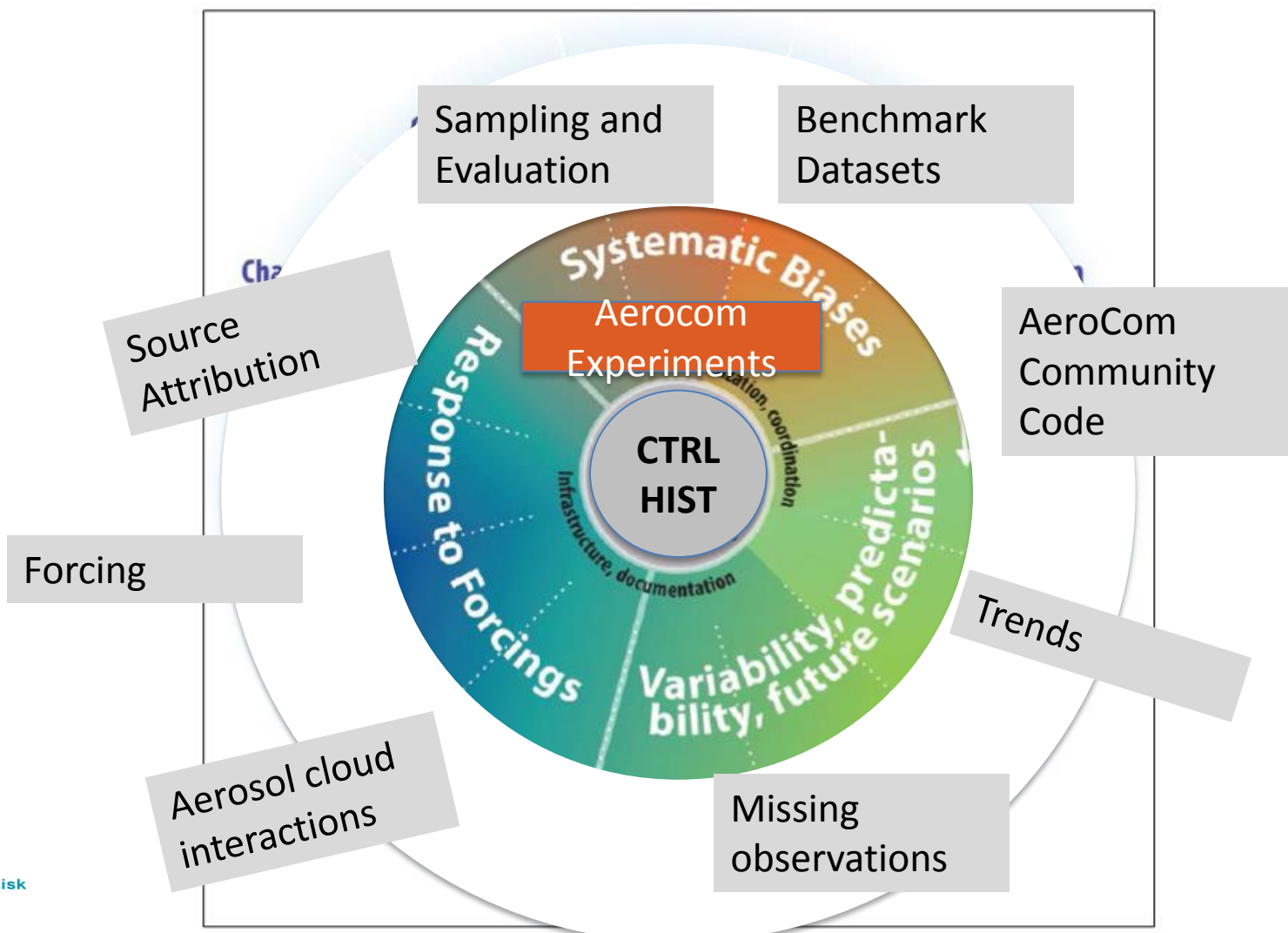
the magic new filename

*aerocom3_<ModelName>-<MeteoConfigSpecifier>_<ExperimentName>-<PerturbationName>
<VariableName><VerticalCoordinateType>_<Period>_<Frequency>.nc*

Time periods of currently proposed AeroCom III model experiments

| Experiments: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | POC | | | | | | | | | | | | | | | |
|---|---|------|----------|------|------|------|-----------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------------|------------------------|------------|--|
| | 1750 | 1850 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | | | | |
| AP3-CTRL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | M Schulz | | |
| HIST | * | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | G Myhre | | |
| ACRI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | M Chin | | |
| UTLS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | M Chin | | |
| Aircraft-Baseline | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | D Watson-Paris/P Stier | | |
| Aircraft-ATom | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | H Bian/C Williamson | | |
| AnthroDust | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | P Ginoux | | | |
| VolcACI | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | F Malavelle/T Yuan | | | |
| BBEIH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | R Kahn/X Pan | | |
| InSitu-RH | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | E Andrews/P Zieger | | |
| InSitu-PNSD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | M Fiebig/S Platt | | | |
| TOA-flux | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | W Su | | |
| Additional analysis: (using model simulations from the above experiments; no additional simulation required) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| ABS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | B Samset | | |
| TADD | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | H Yu | |
| RemoteSens | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | N Shutgens | |
| | Required | | Optional | | | | Additionally required | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Note: | Model output file name: aerocom3_<ModelName>-<MeteoConfigSpecifier>_<ExperimentName>-<PerturbationName>_<VariableName>_<VerticalCoordinateType>_<Period>_<Frequency>.nc. Filenames shall have exactly 6 underscores in name. e.g., aerocom3_GOCART-met2010_AP3-CTRL-od550aer_Column_1850_monthly.nc, aerocom3_GOCART-SST2000_ACRI-BASE-od550aer_Column_2000_monthly.nc | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | All participating models should submit the AP3-CTRL simulation for 2010 and 1850. If 2010 is a part of the specific model experiment, the 2010 global output should be linked to the model name with "AP3-CTRL" as a part of the model output name (e.g., "aerocom3_GOCART-AP3-CTRL-od550aer_Column_2010_monthly.nc" should be linked to or copied from "aerocom3_GOCART-SST2010_UTLS-BASE-od550aer_Column_2010_monthly.nc"). If the specific model experiment does not include the year 2010, additional simulation of 2010 with the same model version is required. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |





AeroCom III model experiments:

- Sign up sheet of participating in model experiments and timeline
- Maximize the benefits and optimize the model simulation strategy
- Example below: one BASE simulations, specific perturbations

Common BASE simulations with un-common perturbations:

| Experiments: | | | | | | | | | | | | | | | | | | | | | | Base Perturbation Runs: | | | | | | | | | | | | |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|--------------------------------|------|------|--|-------|-----------------------|--------|------|--------|--------|--------|--------|--------|
| Short Name | 1750 | 1850 | 1980 | 1990 | 1995 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | (BASE = simulation with all emissions) | | | | | | | | | |
| HIST* | | | | | | | | | | | | | | | | | | | | | | | | | | BASE | VOL0 | FIR0 | ANT0 | EAS0 | SAS0 | | | |
| UTLS | | | | | | | | | | | | | | | | | | | | | | | | | | BASE | | | | | | | | |
| Aircraft-Baseline | | | | | | | | | | | | | | | | | | | | | | | | | | BASE | | | | | | | | |
| Aircraft-ATom | | | | | | | | | | | | | | | | | | | | | | | | | | BASE | ExpA | ExpB | ExpC | ExpNuc | ExpSO2 | ExpIon | ExpTer | ExpOrg |
| VolcACI | | | | | | | | | | | | | | | | | | | | | | | | | | CRTLv | Hol-CE | Kil-CE | | | | | | |
| BBEIH | | | | | | | | | | | | | | | | | | | | | | | | | | BASE | BBIH | NOBB | BBEM | | | | | |
| DustSR | | | | | | | | | | | | | | | | | | | | | | | | | | BASE | various regional tags | | | | | | | |

*1980-2015



Suggested near future effort:

- Effectively diagnose model differences:
 - Implement the CO50 transport tracer (required, min effort)
 - Implement the removal tracer Pb-210 (recommended)
 - A generic land source tracer with specified loss? (e.g. for dust transport diagnostics)
 - Hygroscopic growth and water fraction in AOD
- Collaborative effort between AeroCom and AeroSAT:
 - Dust – AeroSAT provides synthesized dust dataset for AeroCom model evaluations, comparing model and IASI 10 um AOD
 - Clear sky AOD and flux: finding a common ground/approach to compare the same fruit
 - Aerosol simulator for proper comparison between model and satellite data (limitations of type of satellite data that can be applied with the simulator?)



AeroCom workshop 2019

Special thanks

Carlos Pérez Garcia-Pando, Alexis Chantasack , and the BSC team
Stefan Kinne



Next AeroCom workshops

- New York City :: 2020 *Tsigaridis*
- Oslo/Stockholm :: 2021/2022 *Schulz/Storelvmo/Zieger*
- Nanjing :: 2021/2022 *Minghuai Wang*

