# *Optical properties evaluation in AeroCom*

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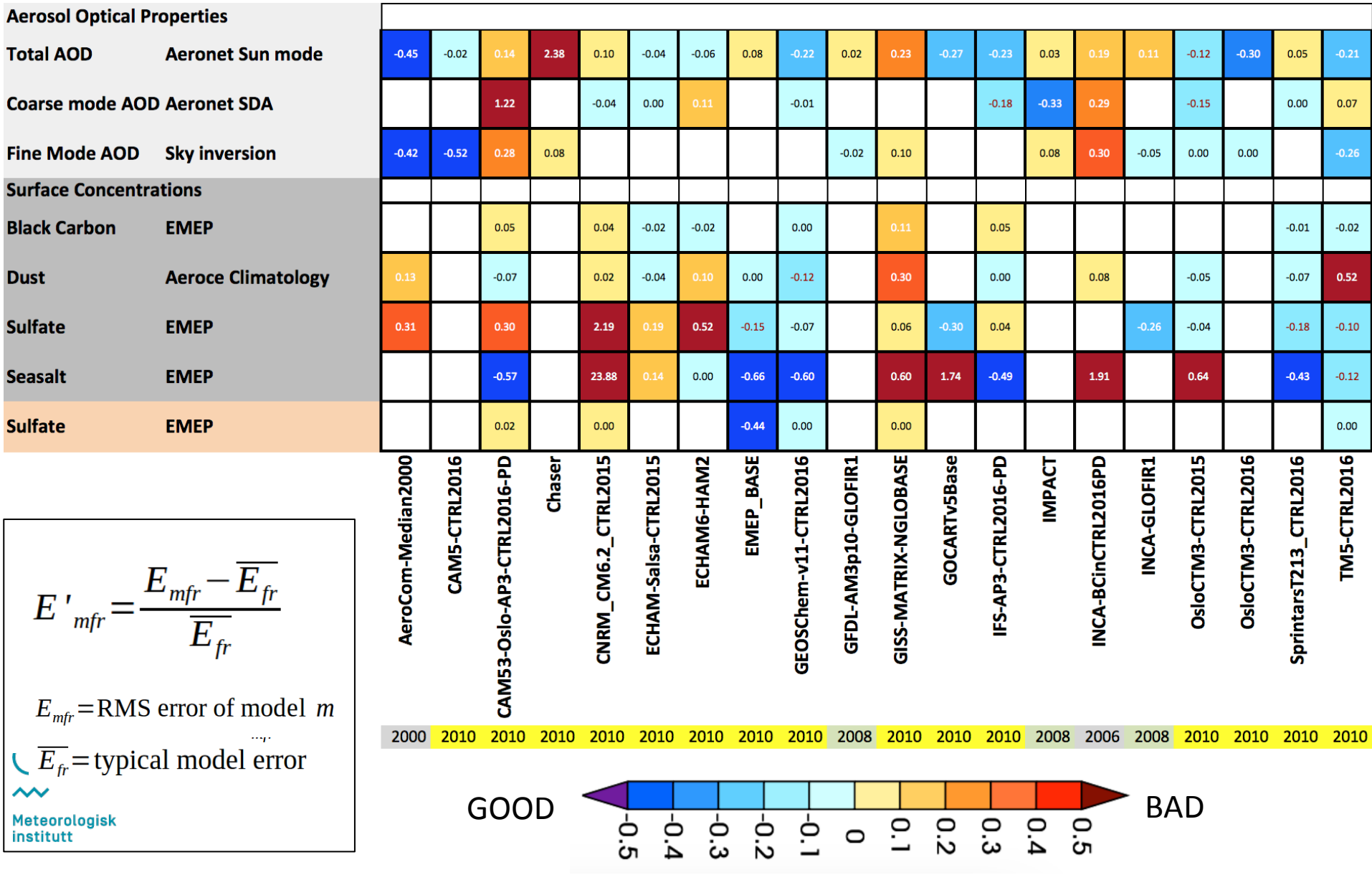
# Goals “optical properties evaluation”

- Evaluate/Document/Overview Control 2018/2019 experiment
- Evaluate history of ERF forcing in AeroCom/AerChemMIP
  = synergy with “historical experiment” (Gunnar)
- Compare AeroCom 1+2+3 model results − progress?
- Expand AOD evaluation to more parameters...
  closure ground, column, profile − link to other observables
- Get an overview of state of the art model performance
- Understand what works well in some models
- Establish bias of regional and global features in optical properties relevant for forcing
- Make the associated python based evaluation available
- Assess if models are fit for purpose (forcing, regional AQ, trends)

# Portrait Diagram Display of Relative Error Metrics

## AeroCom Phase III Models vs Multiple Observational datasets




$$E'_{mfr} = \frac{E_{mfr} - \overline{E_{fr}}}{\overline{E_{fr}}}$$

$E_{mfr}$ = RMS error of model $m$

$\overline{E_{fr}}$ = typical model error

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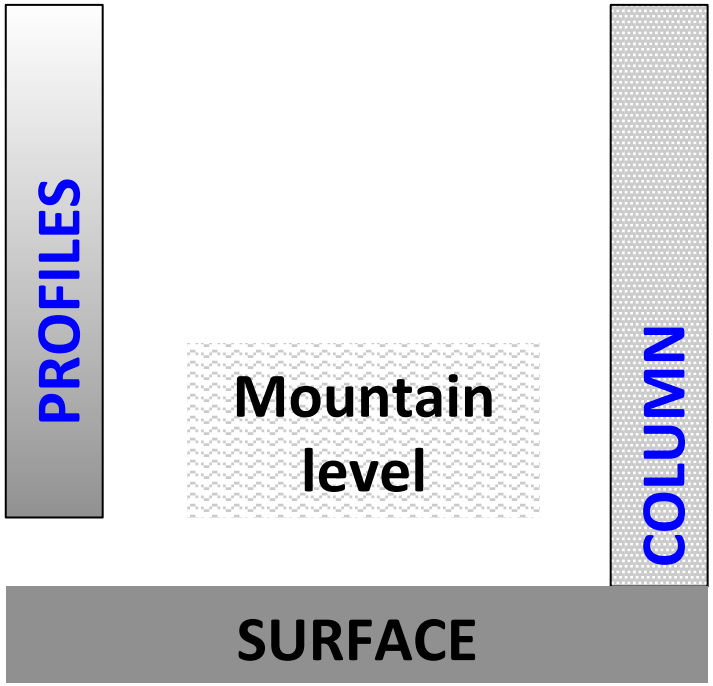
# Which optical measurements can be combined?

Caliop-Lidar

Remote sensing satellites

Lidars
Ceilometers




Sun/lunar photometers

**Aerosol**
**@AMBIENT RH**
**@DRY 50%RH**

In-situ scattering
and absorption measurements

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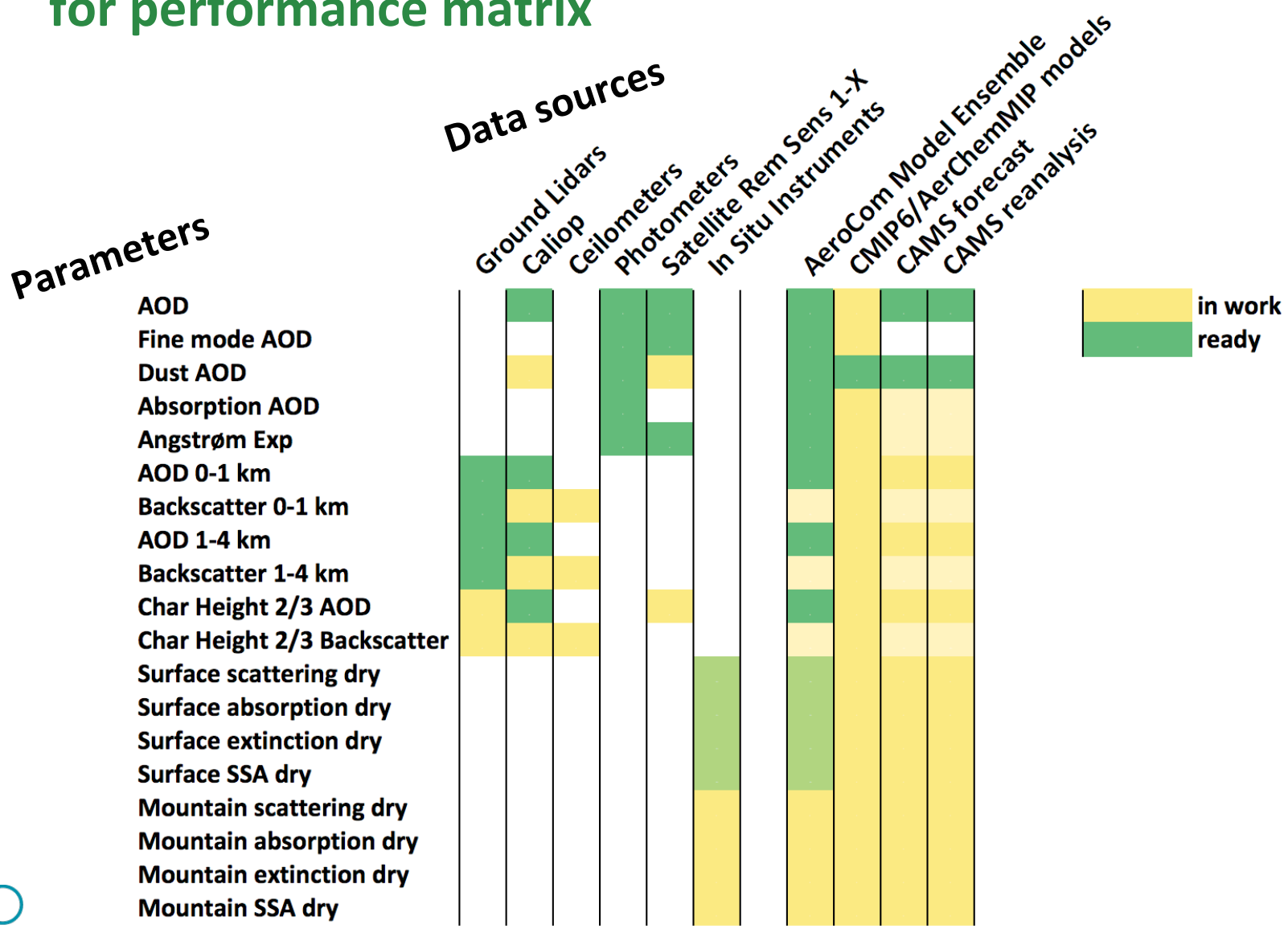
# Status of data and model workup for performance matrix

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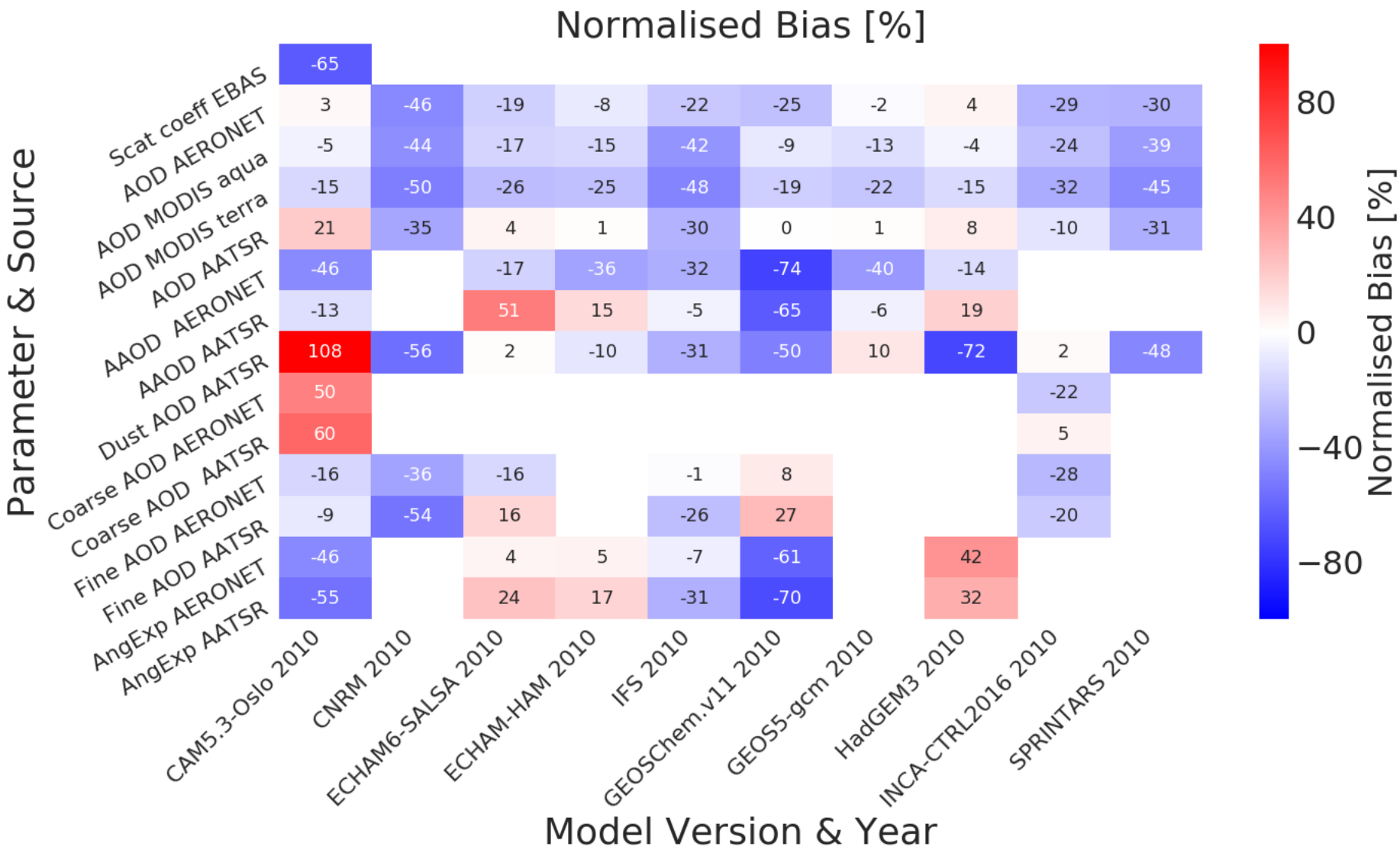


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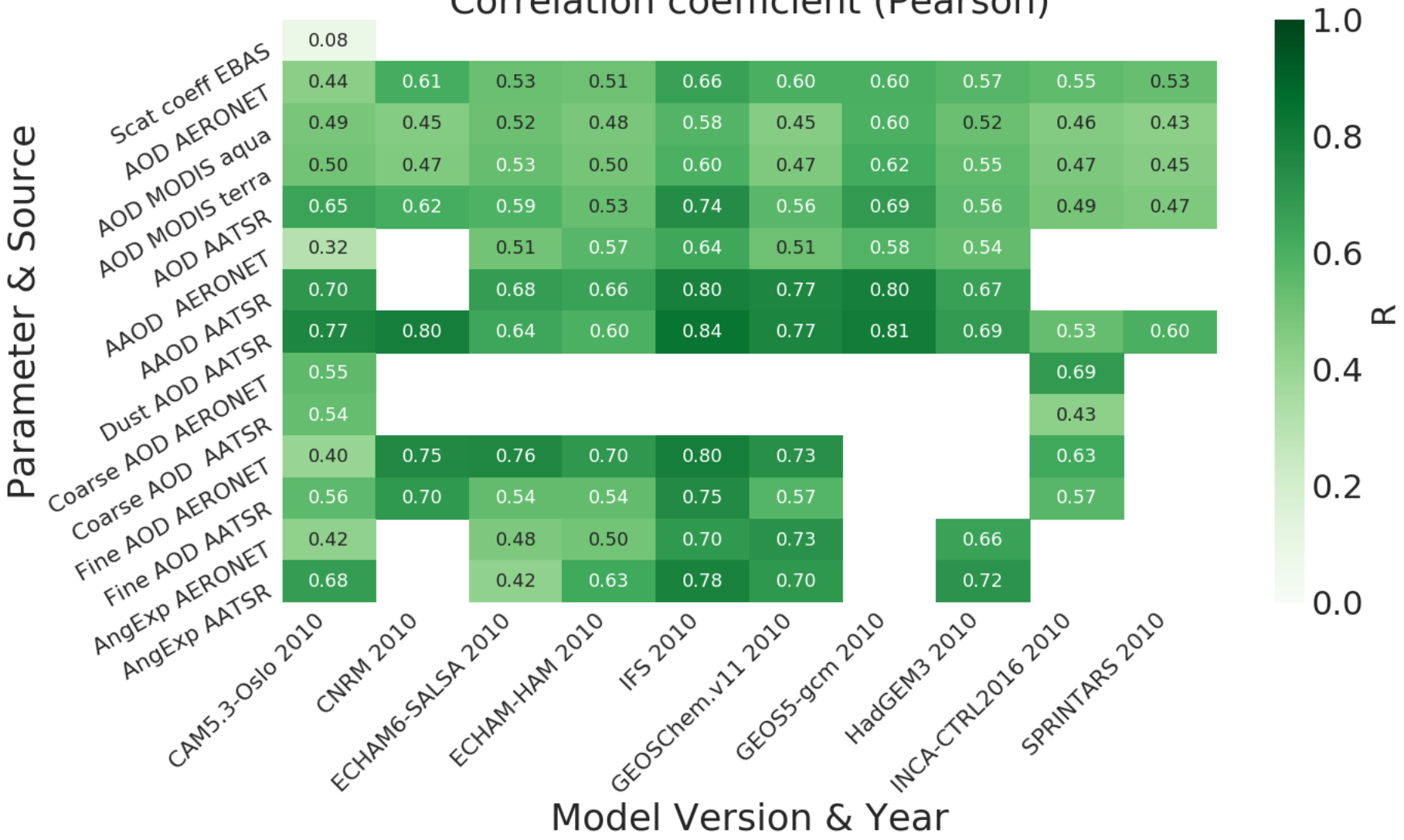


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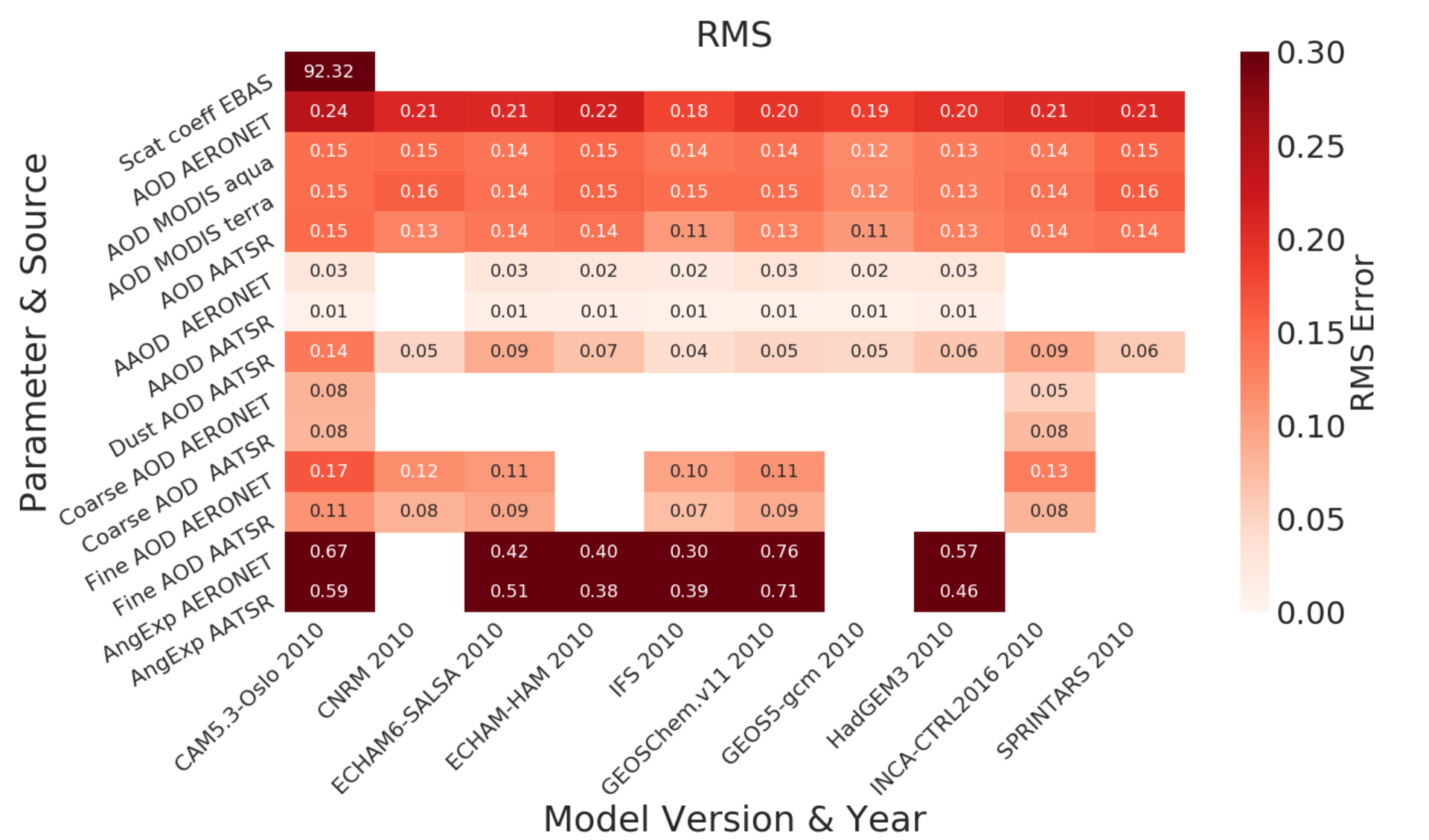


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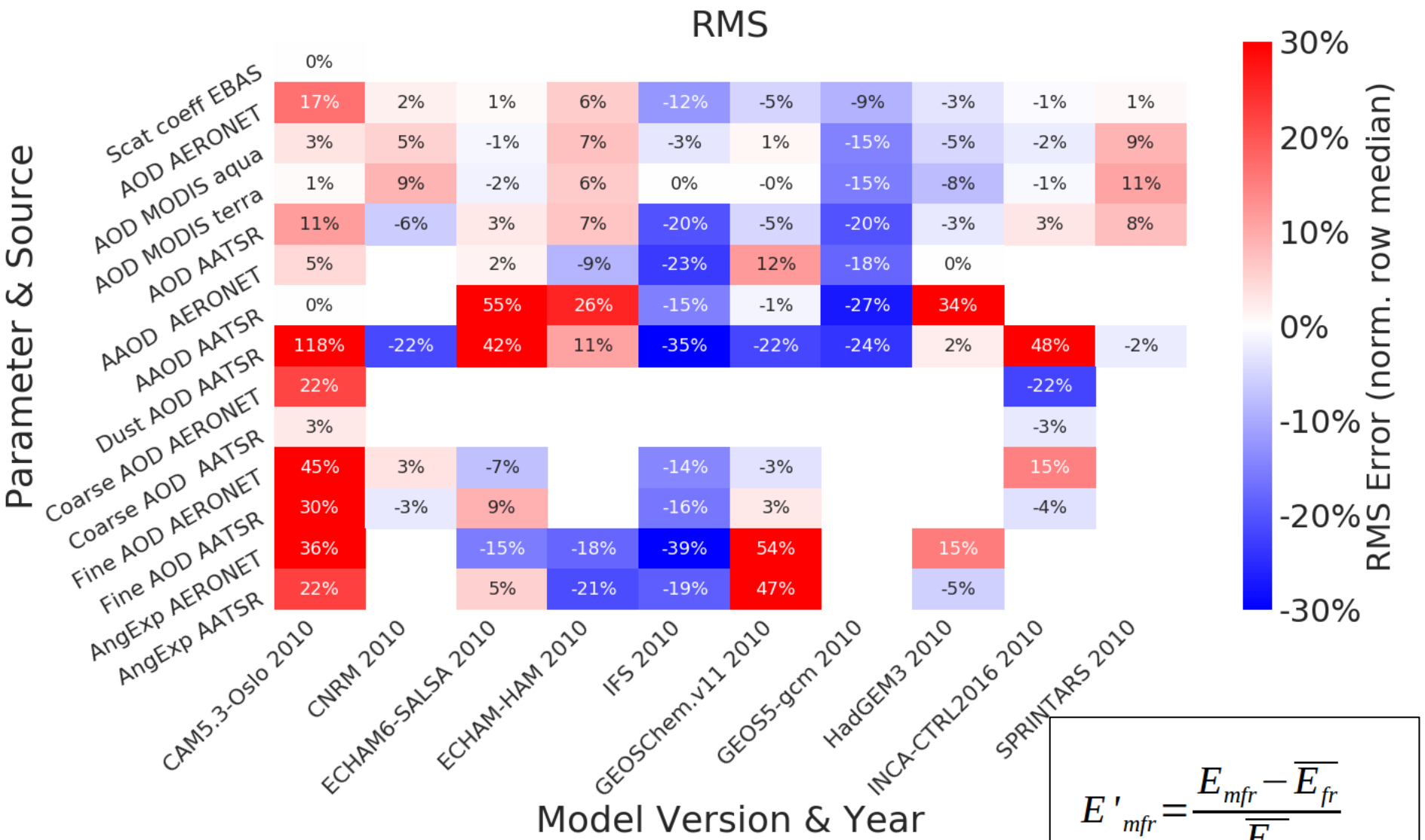


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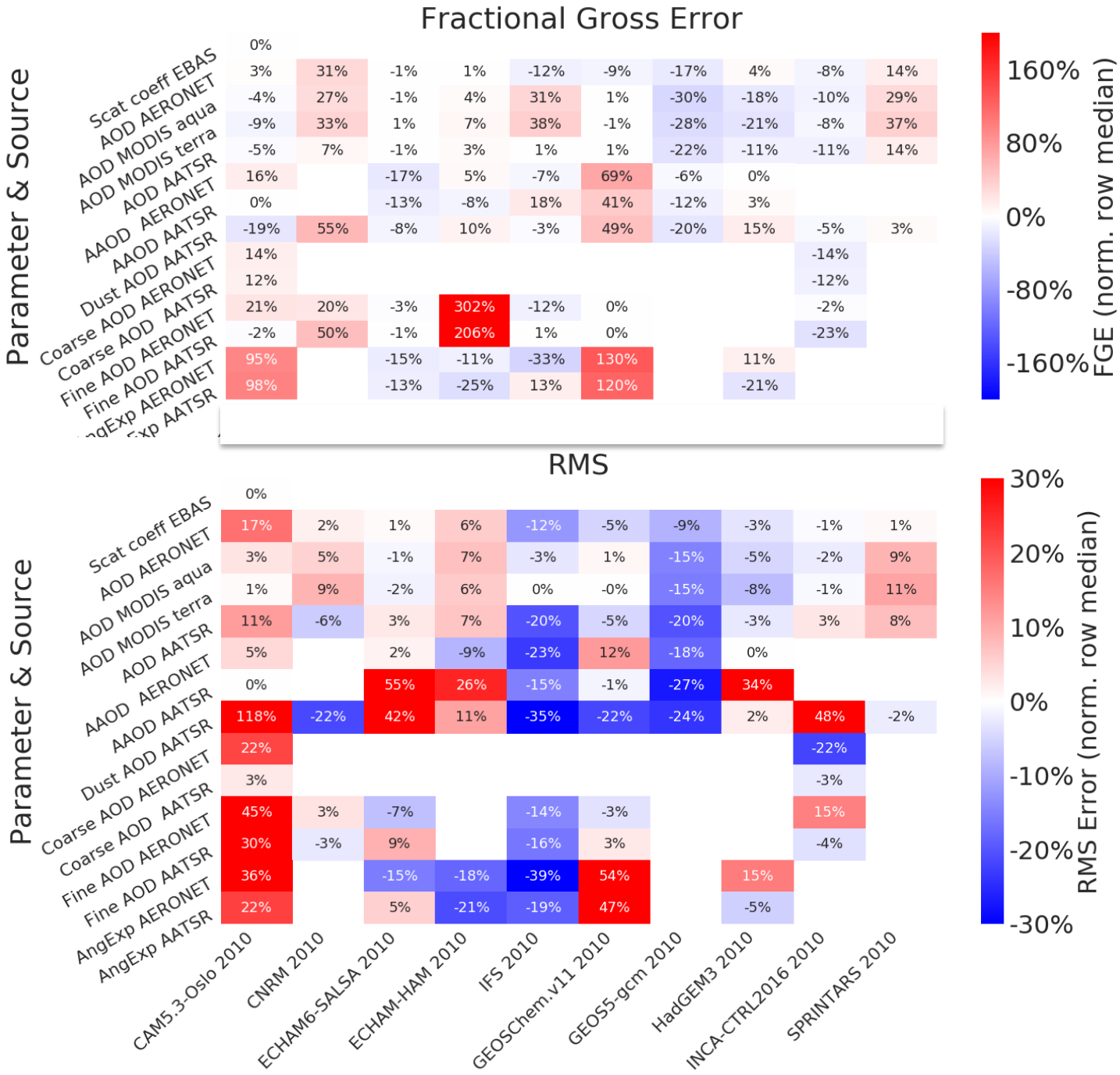


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# Summary – first evaluation tests

- A new set of control simulations can be analysed now quickly with pyaerocom tool against multiple measurements
  (challenges model completeness, vertical data, read of special data)
- Model bias against different observation sources of the same parameter (eg vs AOD Aeronet & satellite) is similar = robust
- Errors against AOD, AAOD, fine mode AOD, Angström Exp are not correlated among models – models can do better
- Different statistics provide similar performance pattern (eg FGE and RMS) => performance independent of metric
- *Model data are still with large gaps in AeroCom database => Control and historical experiment 2018/19 !!*

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Thanks for the attention