BASELINE

phase3 properties

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& and model output providers

why ?

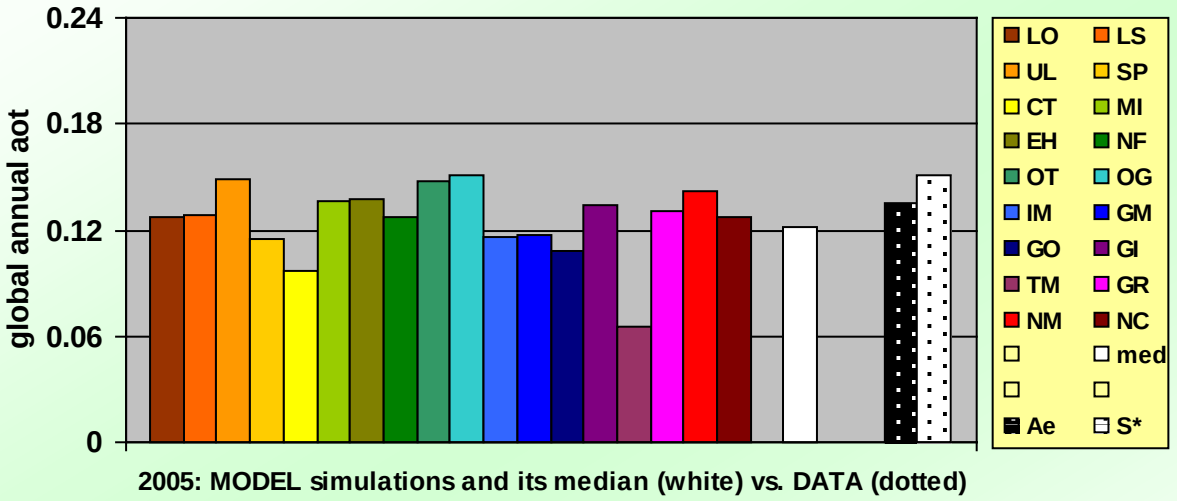
- initially (10 years ago) …any model contributing to AeroCom had to demonstrate its skill.
- now …new submissions (of updated and new models) are mainly checked for format … NOT for content! this has to change
- recently an attempt to create a median model yielded strange global maps
  - because submitted data were not checked
  - because submitted ctrl RUNs were too few
- ctrl RUNs (monthly PD,PI) are necessary! each year!

tested phase 3 baseline models

- CA - CAM5 AP3 / control 2015
- CH - Chaser / base
- CN - CNRM CM6.2 t127 / control 2015
- EC - ECHAM SALSA AP3 / control 2015
- ET - ETHZ ECHAM6 – HAM2 / control 2015
- GE - GEOS Chem v10 01 AP3 / control 2015
- GI - GISS OMA NGLO / base
- GM - GMI v4 / base
- O2 - OLSO CTM 2 / base
- O3 - OSLO CTM 3 AP3 / control 2015
- SP - Sprintars T106 – AP3 / control 2015
- TM - TM5 AP3 / control 2015

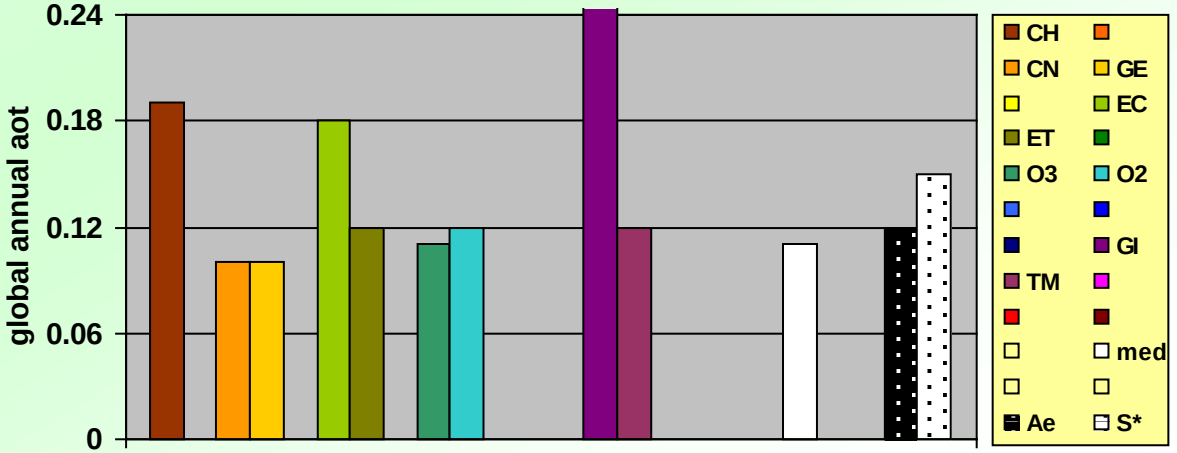
AOD (global annual)

- **2005**
  - **AC phase 1**



2005: MODEL simulations and its median (white) vs. DATA (dotted)

- **2016**
  - **AC phase 3**

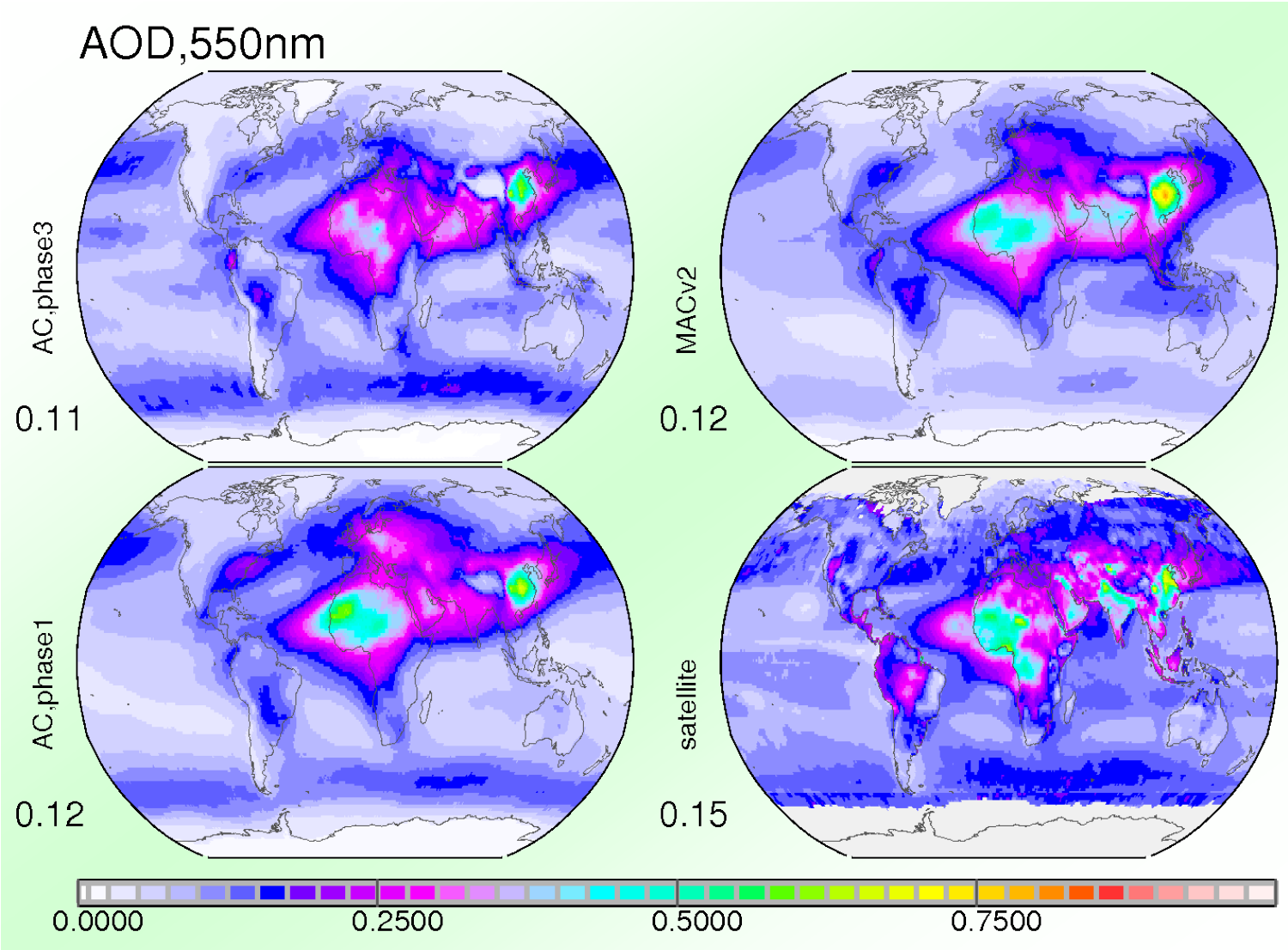


2016: model simulations and its median (white) vs data (dotted)

fewer submissions
more high AOD outliers
(we should be concerned)

total AOD

SS +
DU –
SU -

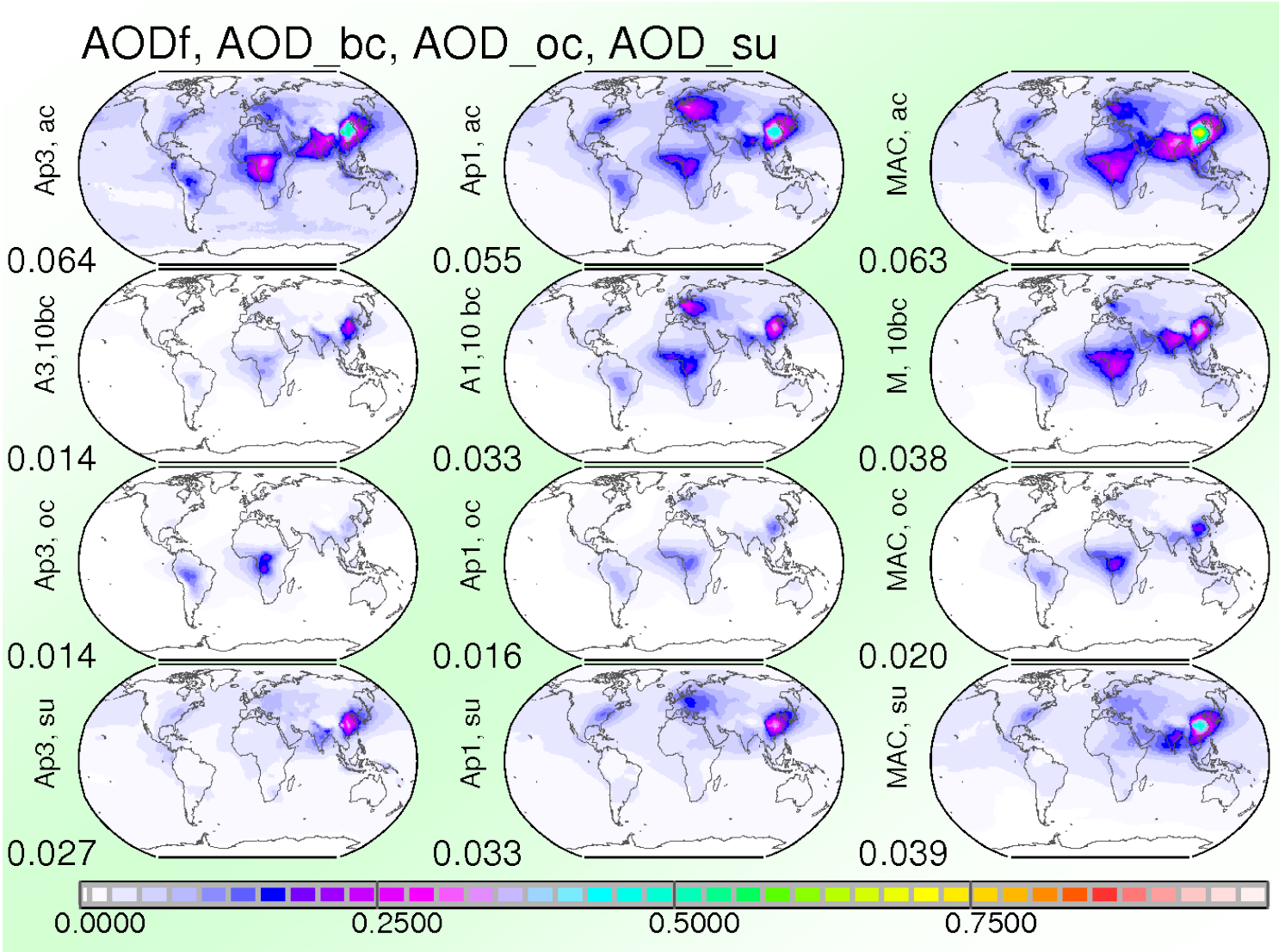


AOD by component

- compared will be
  - The Phase 3 median
  - The Phase 1 median
  - MACv2 climatology (Phase1 + AERONET/MAN)
- fine-mode AOD
  - sulfate, organic and black carbon components
- coarse-mode AOD
  - dust and sea-salt components

fine-AOD and components

phase 3 **phase1** **MACv2**



fine AOD

BC *10 AOD

OC AOD

SU AOD

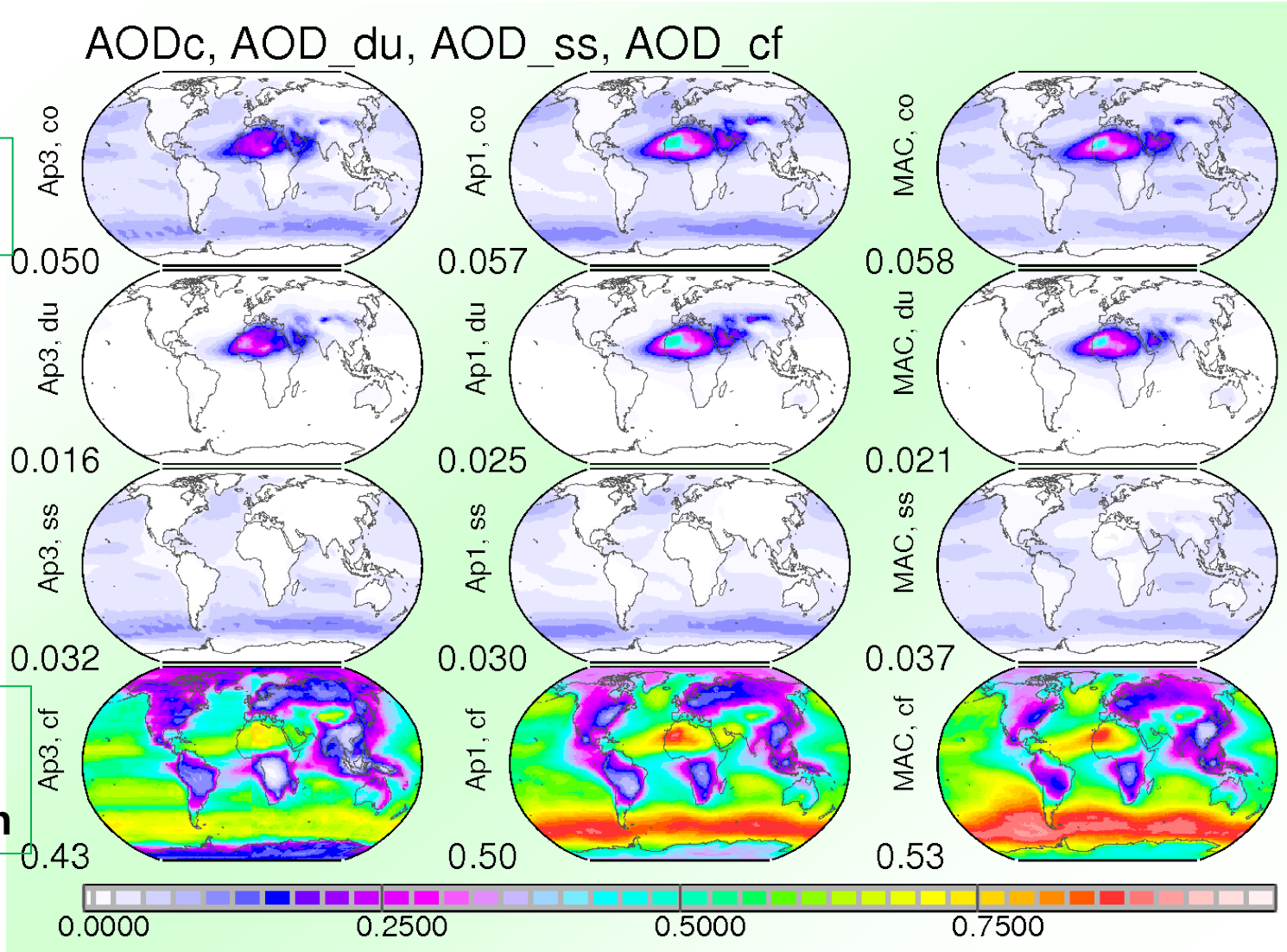
new ph 3:

NH3 SOA

BC -

coarse AOD and components

phase 3 **phase1** **MACv2**



coarse AOD

DU AOD

SS AOD

coarse AOD fraction

DU -

lower AODc fraction

initial impressions / requests

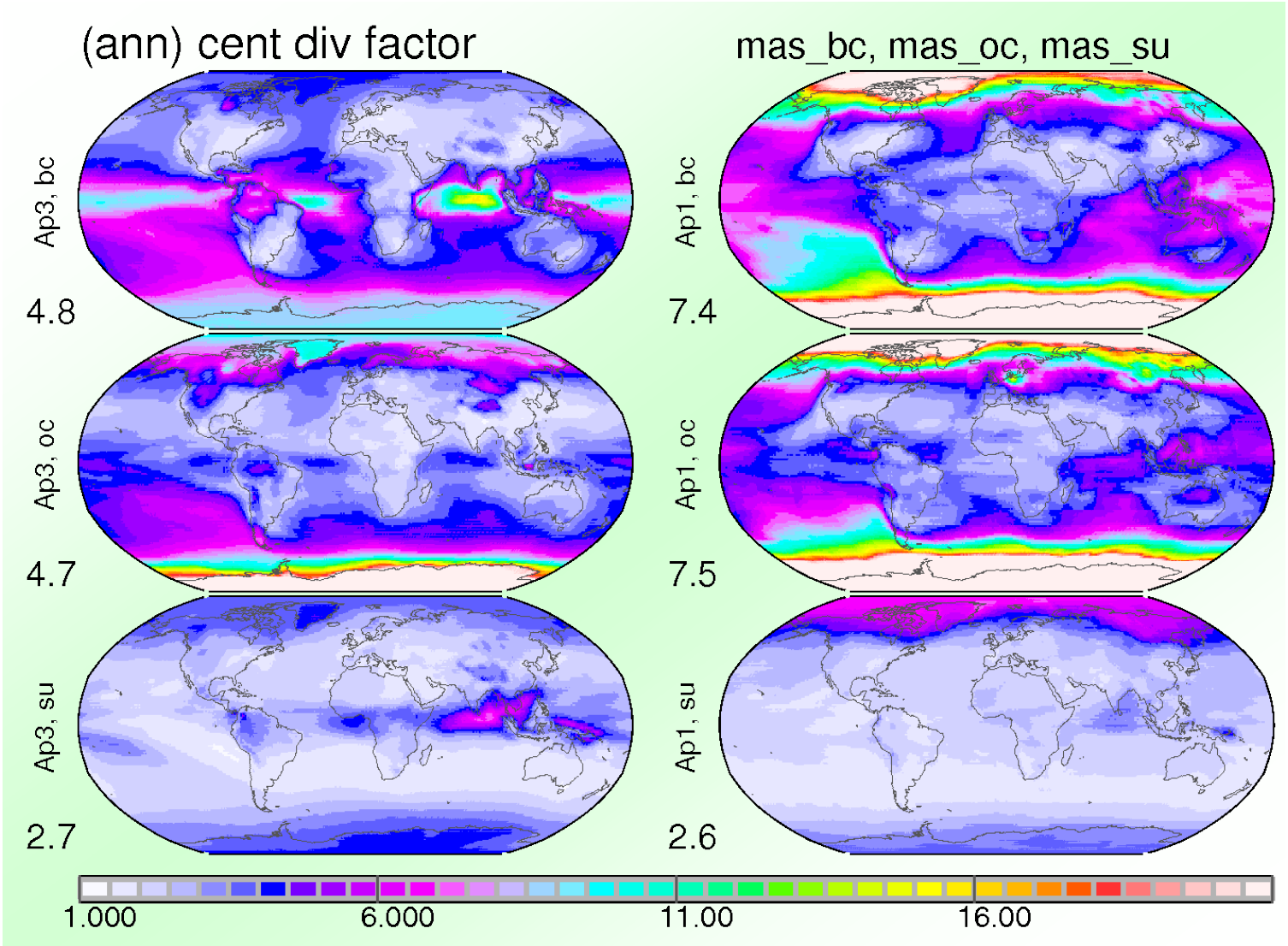
- the phase 3 median has significant differences
- added nitrate and SOA components have increased the fine-mode fraction
- DU and BC AOD contributions have decreased
- it would be nice to have more / all models (that participate in experiments) contribute with ctrl (reference) simulations (mass/optics PD and PI)

fine-mode diversity

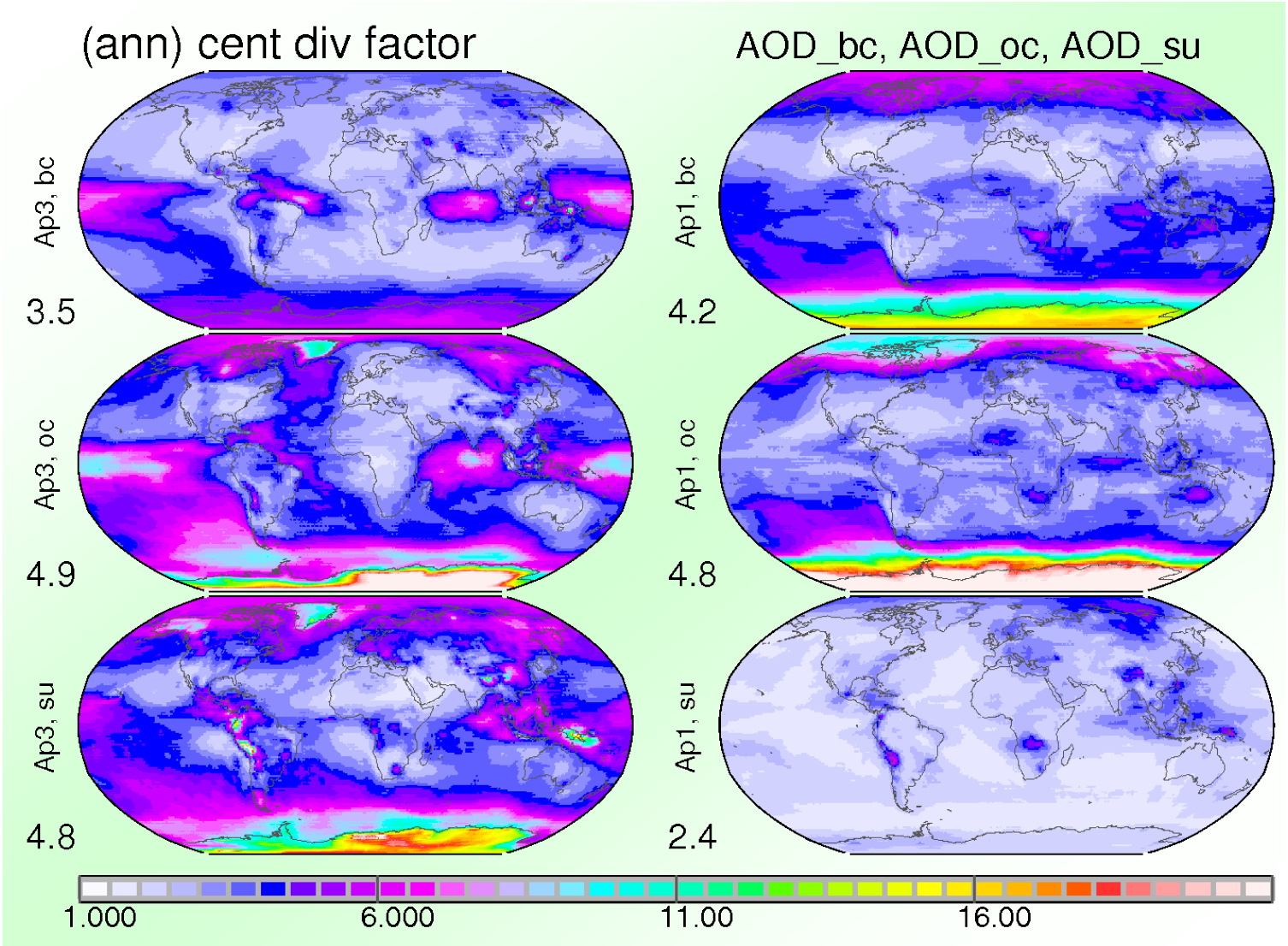
- did the central diversity (= 83%pdf / 16%pdf) change for the fine mode AOD components?
  - PHASE 3 (2015) vs. PHASE 1 (2005)
- Mass
  - BC, OC, SU
- AOD
  - BC, OC, SU

mass fine

phase 3 phase1



AOD fine


(ann) cent div factor
AOD_bc, AOD_oc, AOD_su
BC
diff
OC
~
SU
+
Ap3, bc
3.5
Ap3, oc
4.9
Ap3, su
4.8
Ap1, bc
4.2
Ap1, oc
4.8
Ap1, su
2.4
1.000
6.000
11.00
16.00

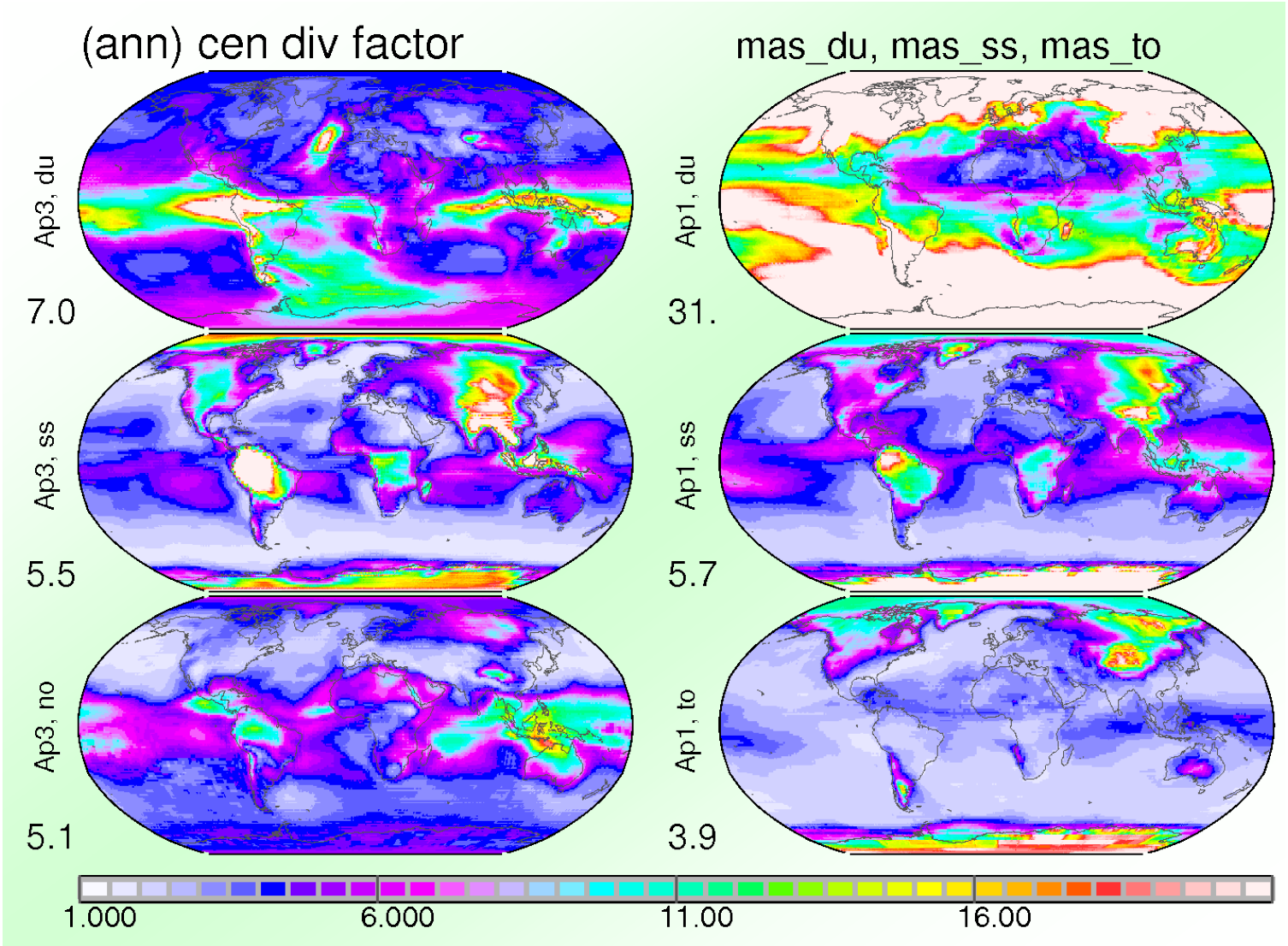
mode diversity

- did the central diversity (= 83%pdf / 16%pdf) change for coarse mode AOD & components?
  - PHASE 3 (2015) vs. PHASE 1 (2005)
- Mass
  - DU, SS, NO/TO
- AOD
  - DU, SS, TO

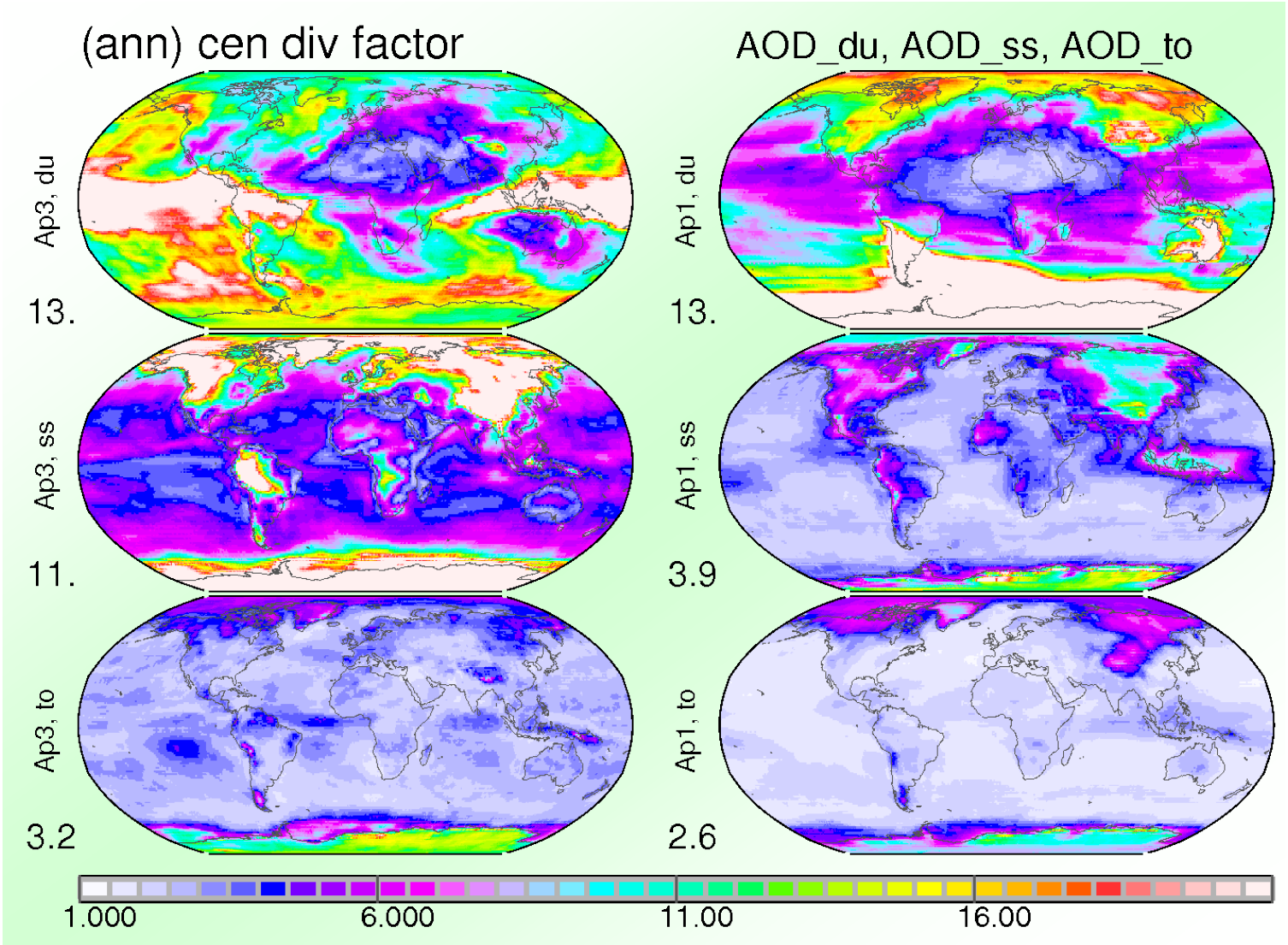
mass coarse

DI
--

SS
~



AOD coarse and total



summary

– comparing phase 3 and phase 1:

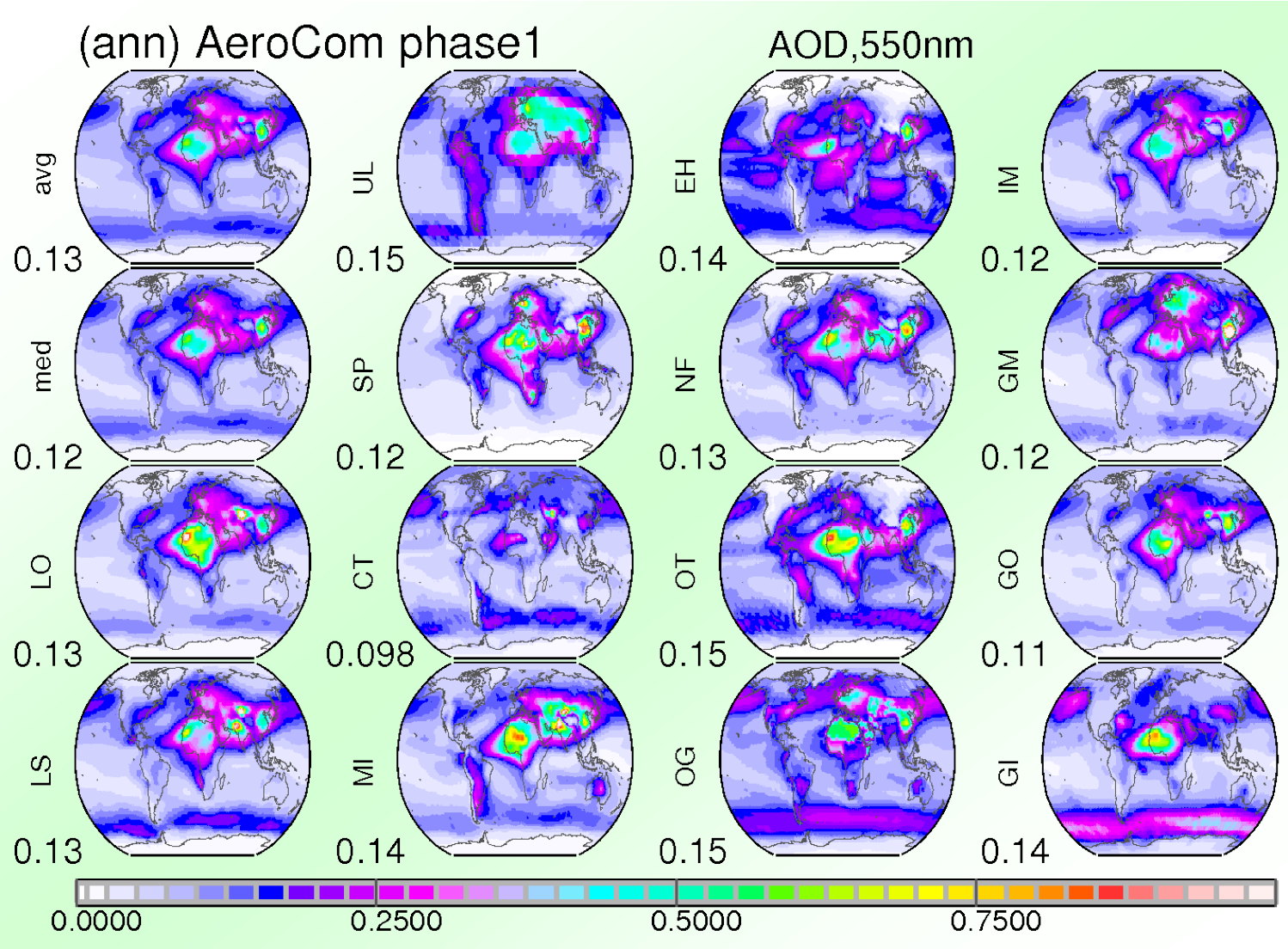
- component mass diversity is similar
  - OC mass diversity is even better
- component aod diversity is (much) larger !
  - size assumption ?
  - water assumptions ?

my plea ... to modeling groups

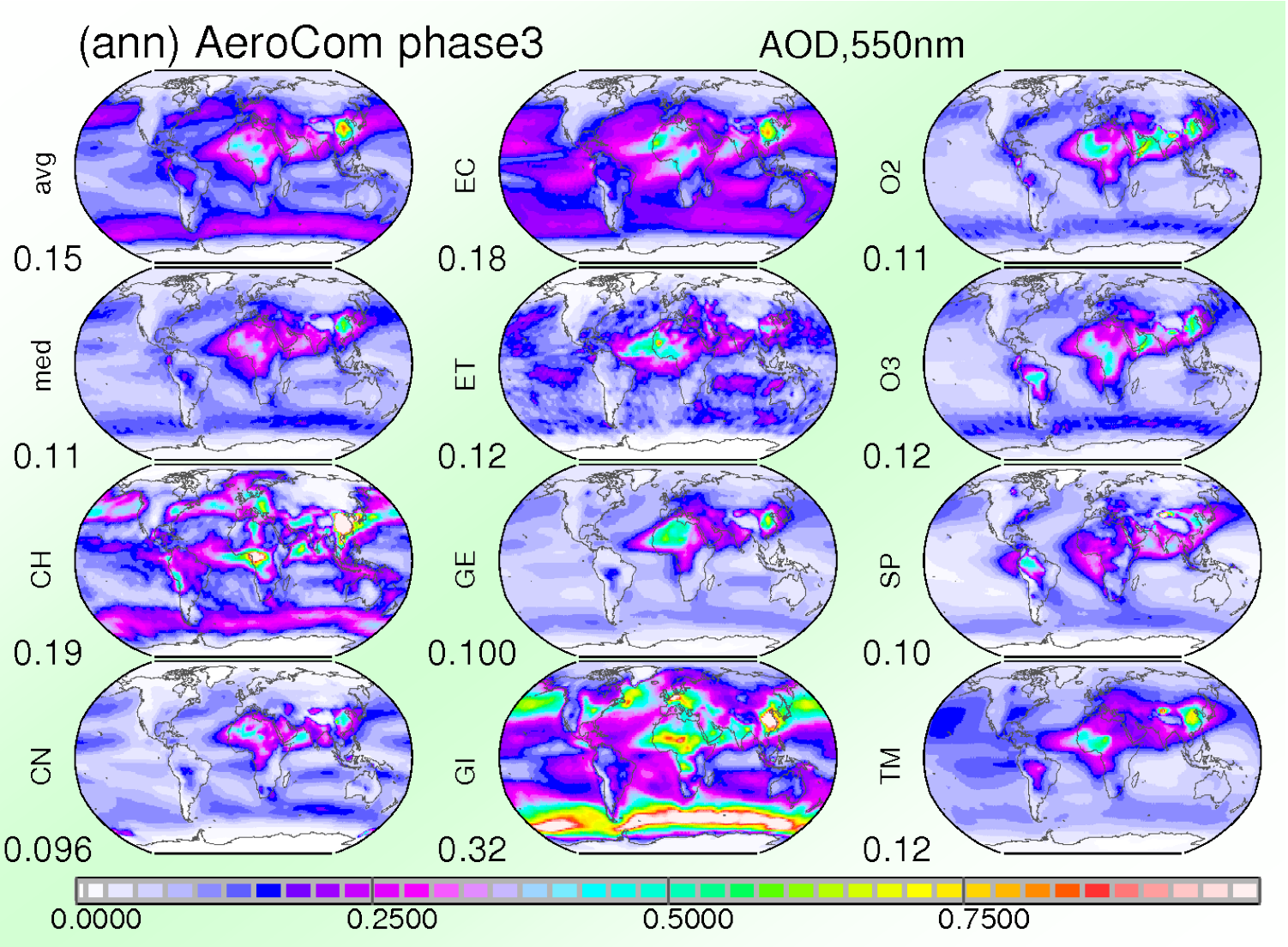
- regular Ctrl simulations are needed / requested
  - how frequent
    - any time when participating in an experiment
    - at least annual
  - what property (monthly) maps
    - AOD, AAOD by size-mode (column)
    - mass by component (column & surface)
    - PD minimum … for PI (forcing) would be nice
  - why
    - direct comparisons to available data
    - provide immediate feedback to model groups

extras

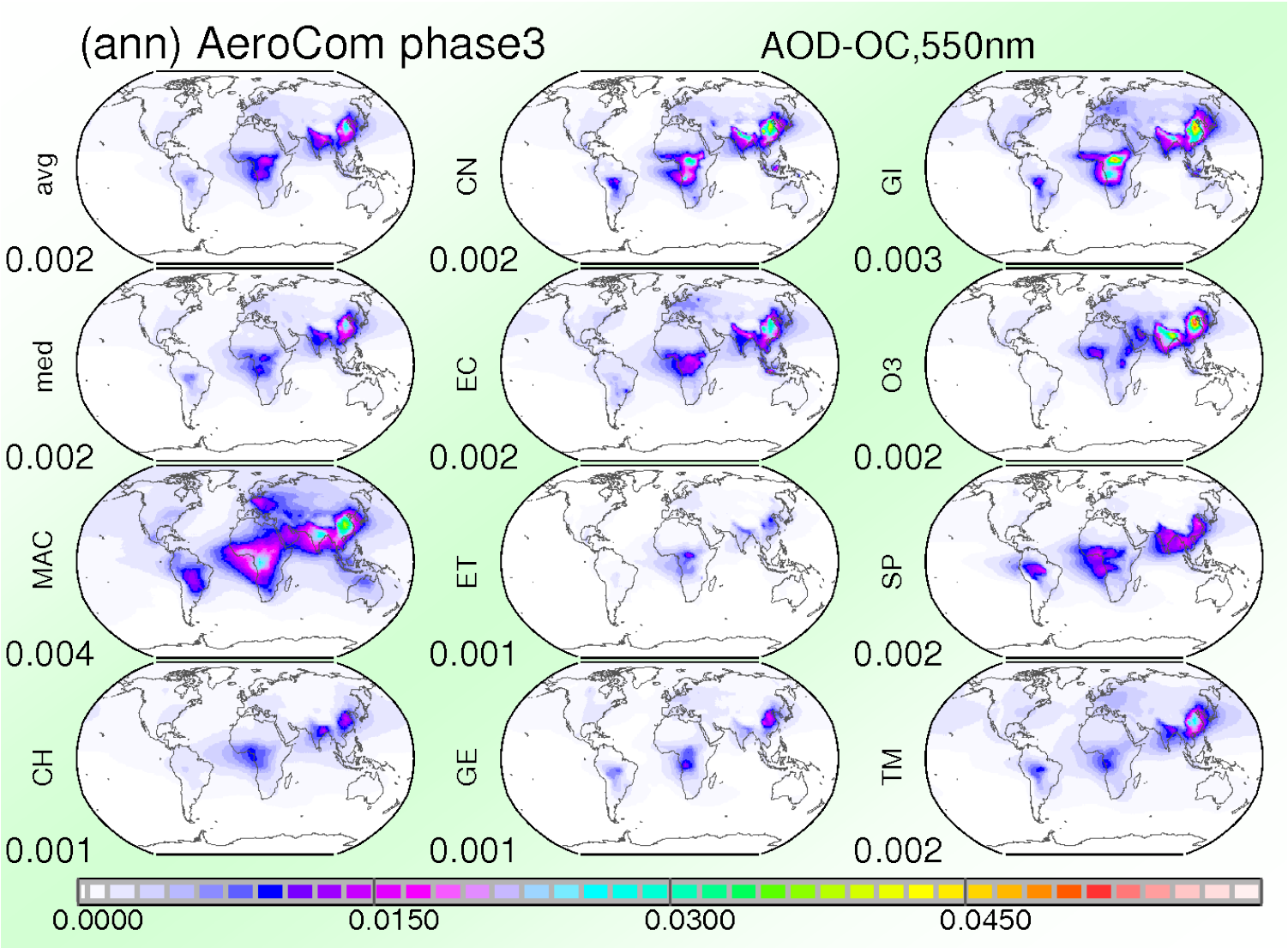
AOD total – phase 1



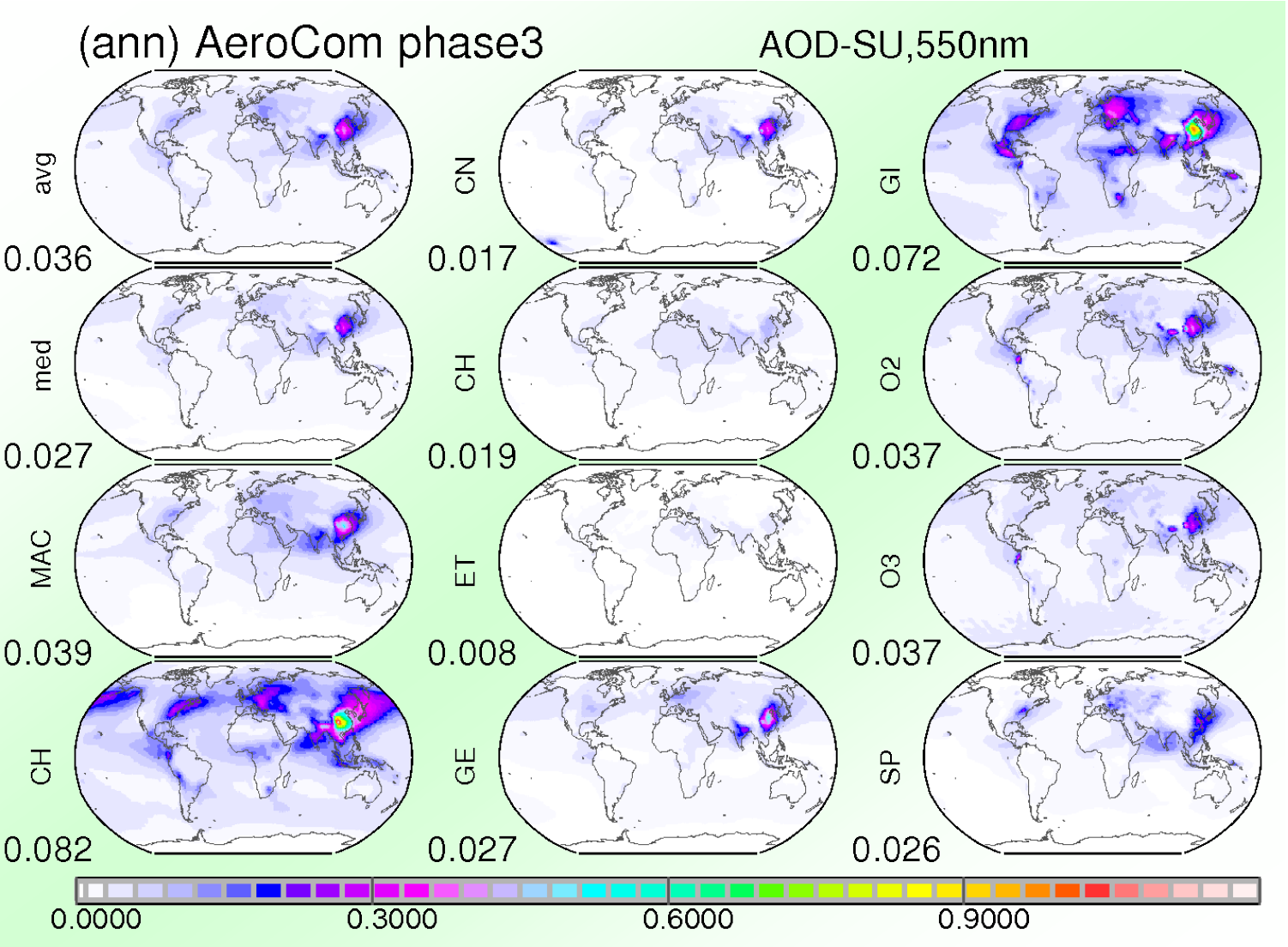
AOD total – phase 3



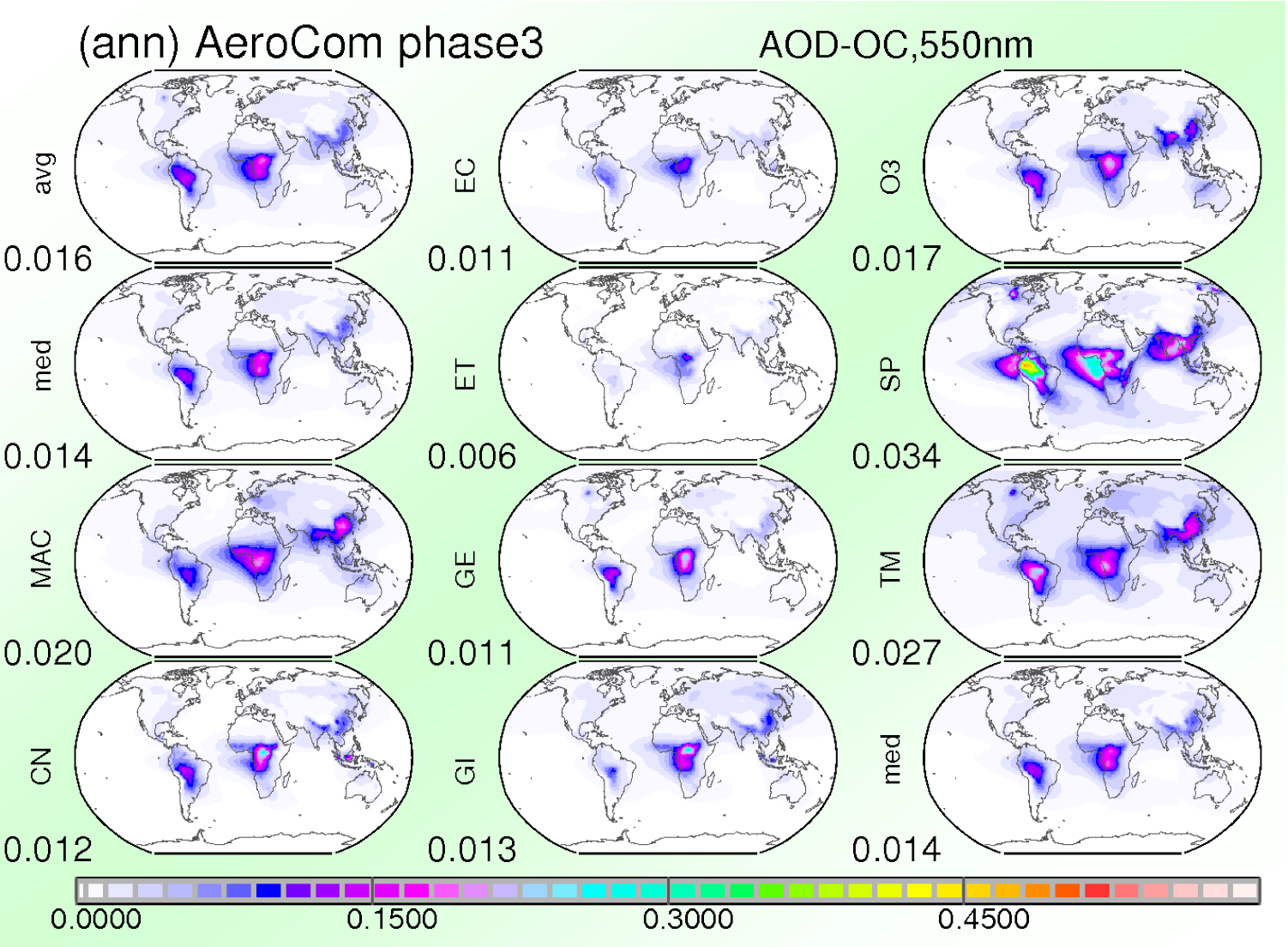
BC


(ann) AeroCom phase3
AOD-OC,550nm
avg
0.002
CN
0.002
GI
0.003
med
0.002
EC
0.002
O3
0.002
MAC
0.004
ET
0.001
SP
0.002
CH
0.001
GE
0.001
TM
0.002
0.0000
0.0150
0.0300
0.0450

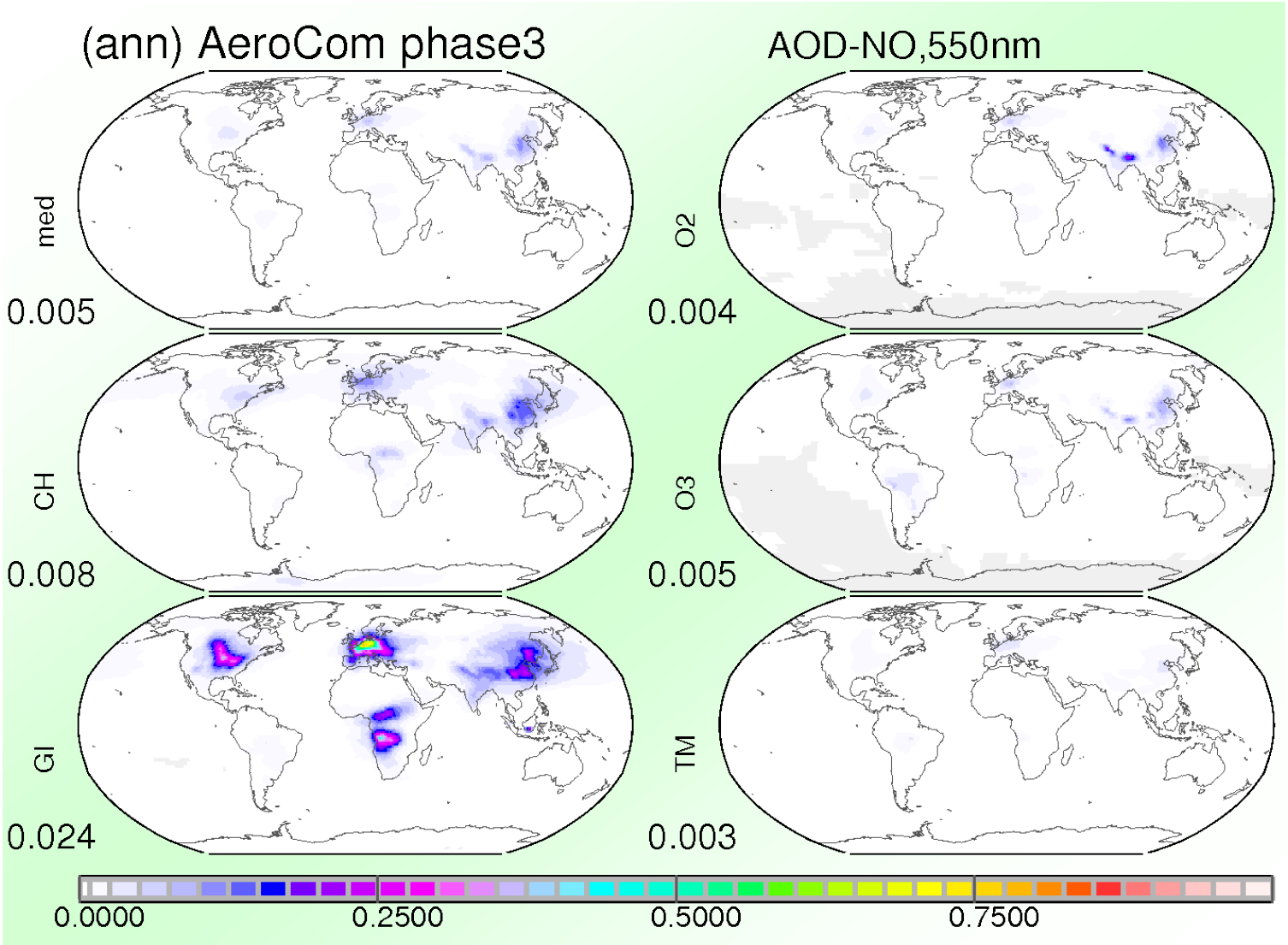
SU


(ann) AeroCom phase3
AOD-SU,550nm
avg
0.036
CN
0.017
GI
0.072
med
0.027
CH
0.019
O2
0.037
MAC
0.039
ET
0.008
O3
0.037
CH
0.082
GE
0.027
SP
0.026
0.0000
0.3000
0.6000
0.9000

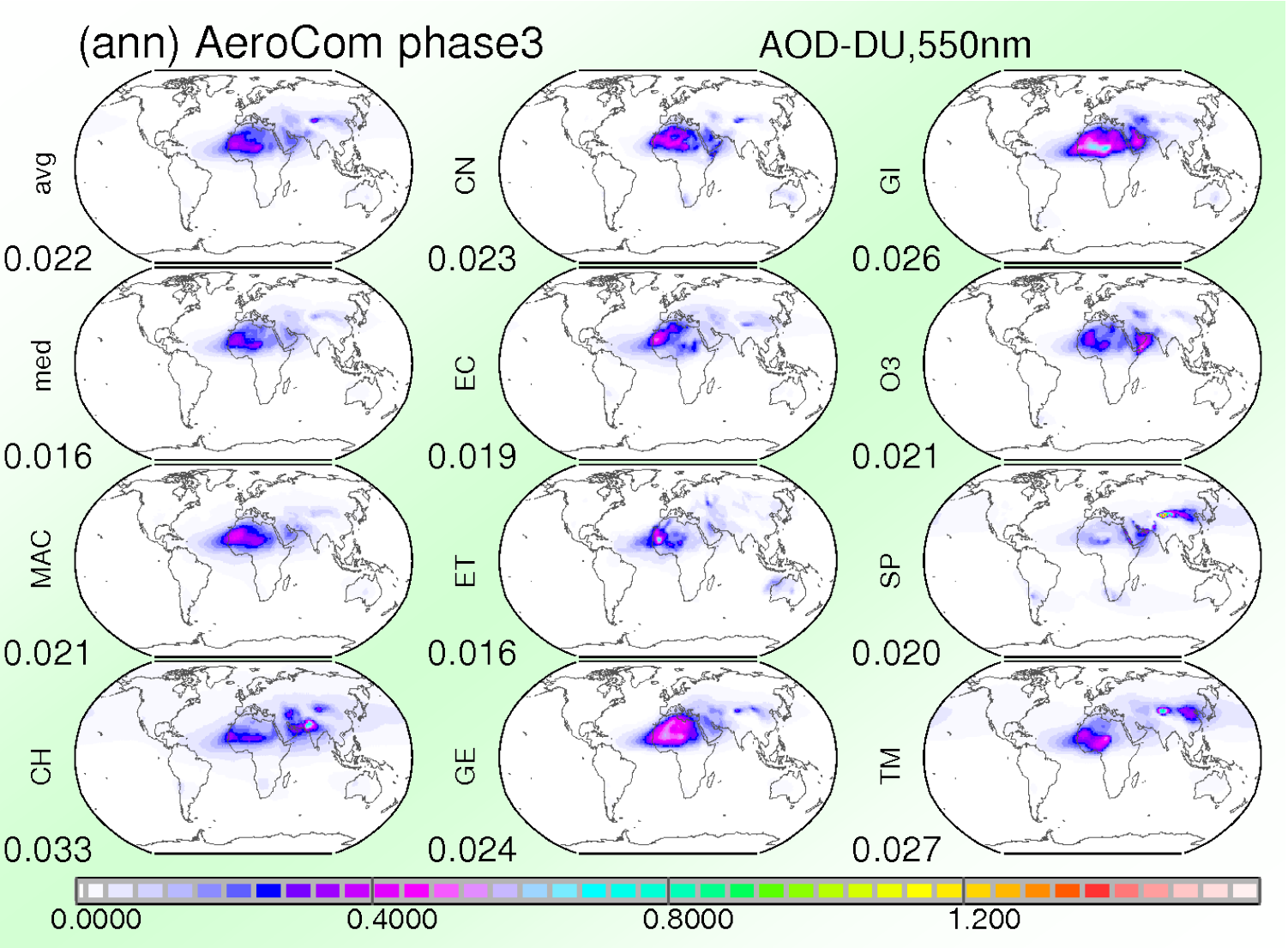
OC


(ann) AeroCom phase3
AOD-OC,550nm
avg
0.016
EC
0.011
O3
0.017
med
0.014
ET
0.006
SP
0.034
MAC
0.020
GE
0.011
TM
0.027
CN
0.012
GI
0.013
med
0.014
0.0000
0.1500
0.3000
0.4500

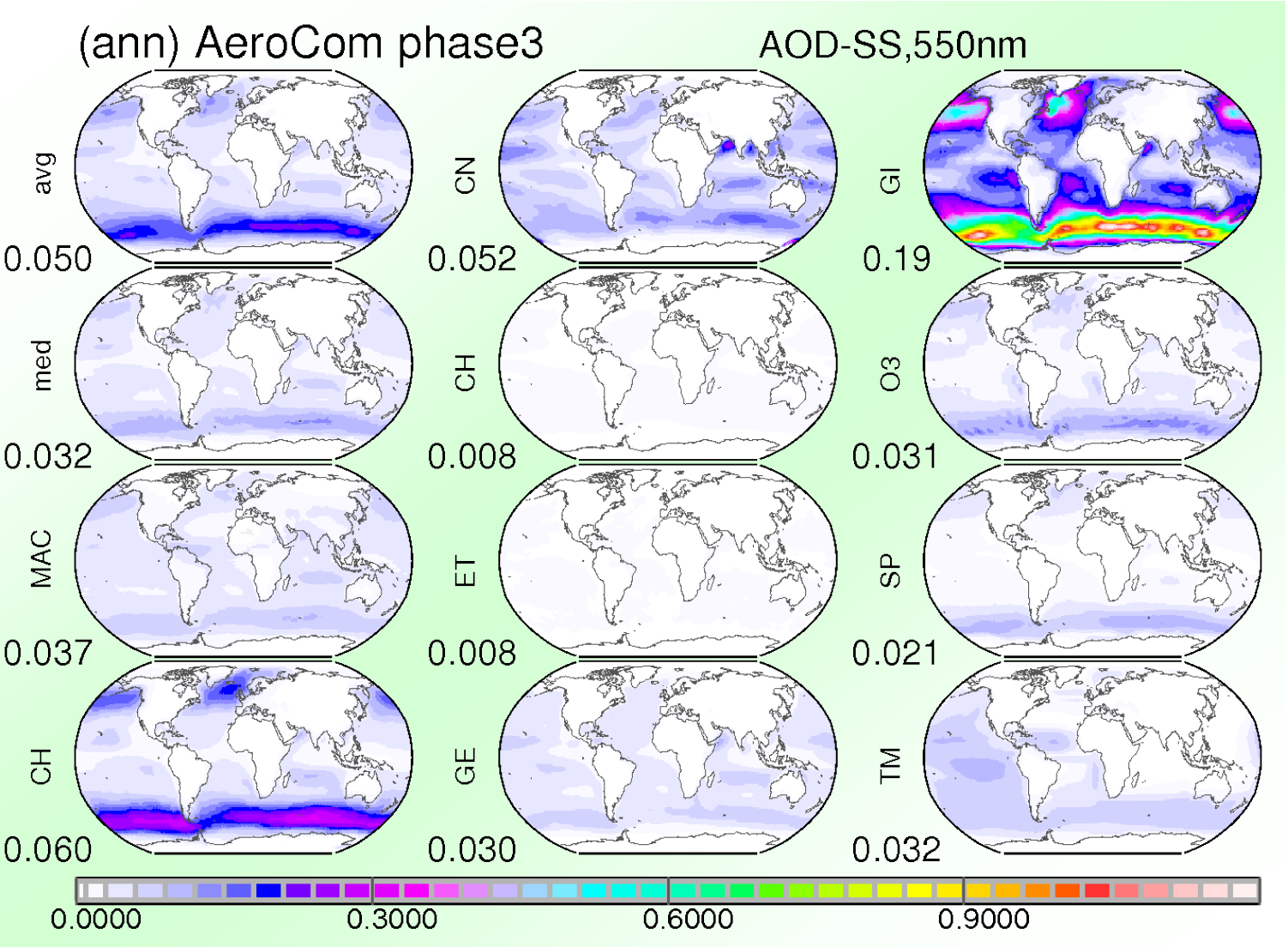
NO


(ann) AeroCom phase3
AOD-NO,550nm
med
0.005
CH
0.008
GI
0.024
O2
0.004
O3
0.005
TM
0.003
0.0000
0.2500
0.5000
0.7500

DU


(ann) AeroCom phase3
AOD-DU,550nm
avg
0.022
CN
0.023
GI
0.026
med
0.016
EC
0.019
O3
0.021
MAC
0.021
ET
0.016
SP
0.020
CH
0.033
GE
0.024
TM
0.027
0.0000
0.4000
0.8000
1.200

SS


(ann) AeroCom phase3
AOD-SS,550nm
avg
0.050
CN
0.052
GI
0.19
med
0.032
CH
0.008
O3
0.031
MAC
0.037
ET
0.008
SP
0.021
CH
0.060
GE
0.030
TM
0.032
0.0000
0.3000
0.6000
0.9000