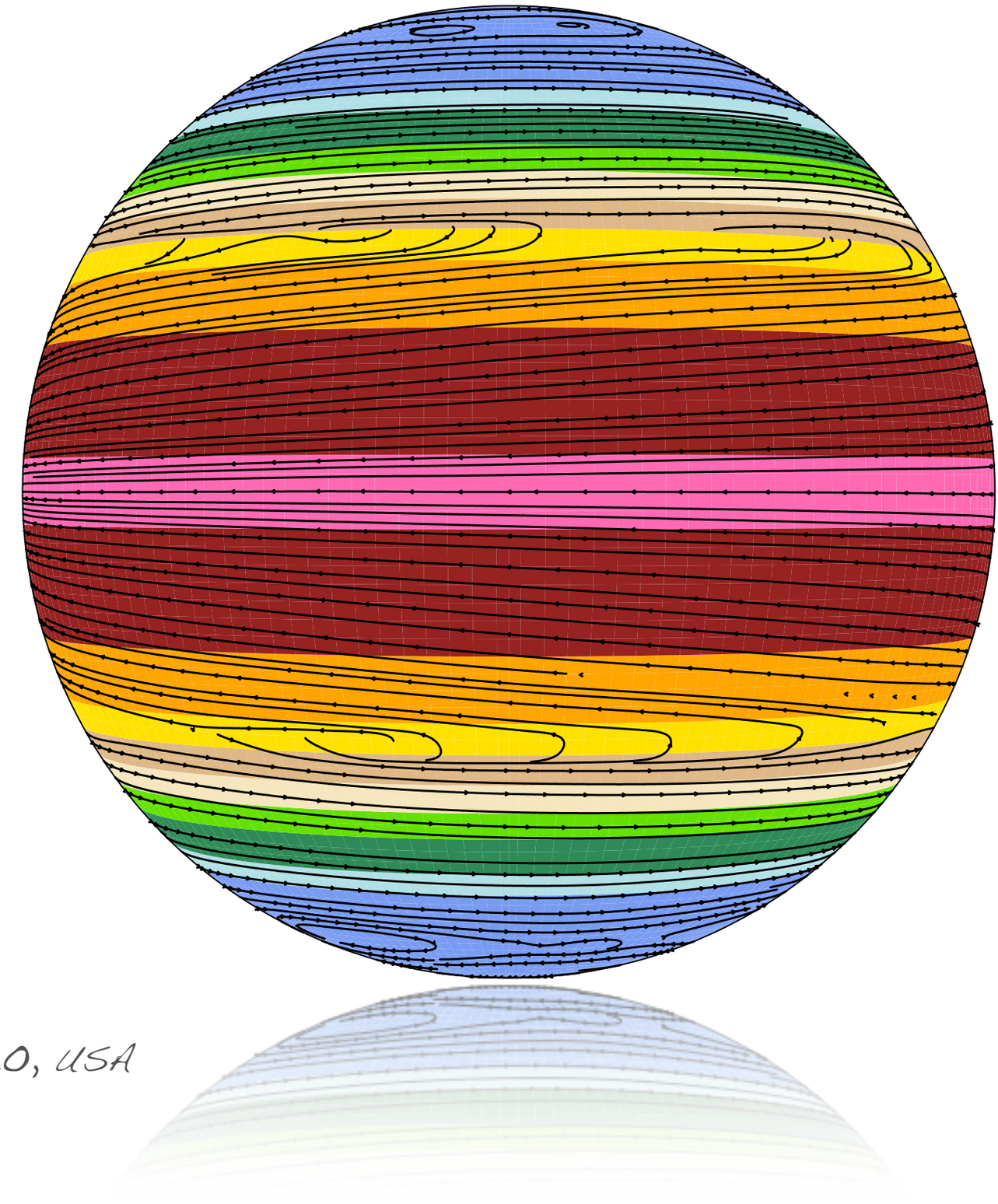
HAZY AQUAPLANET EXPERIMENTS WITH CAM5



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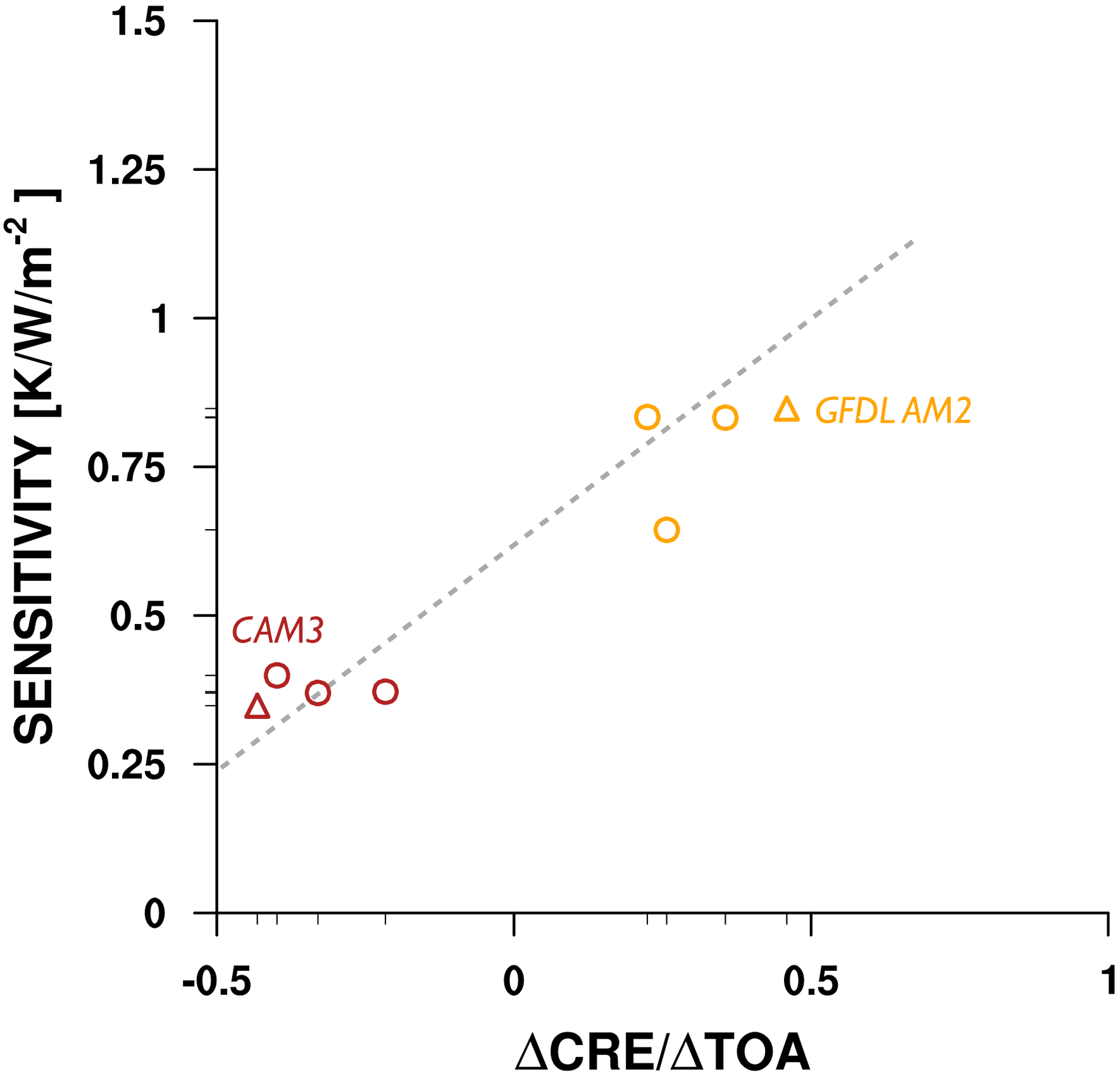
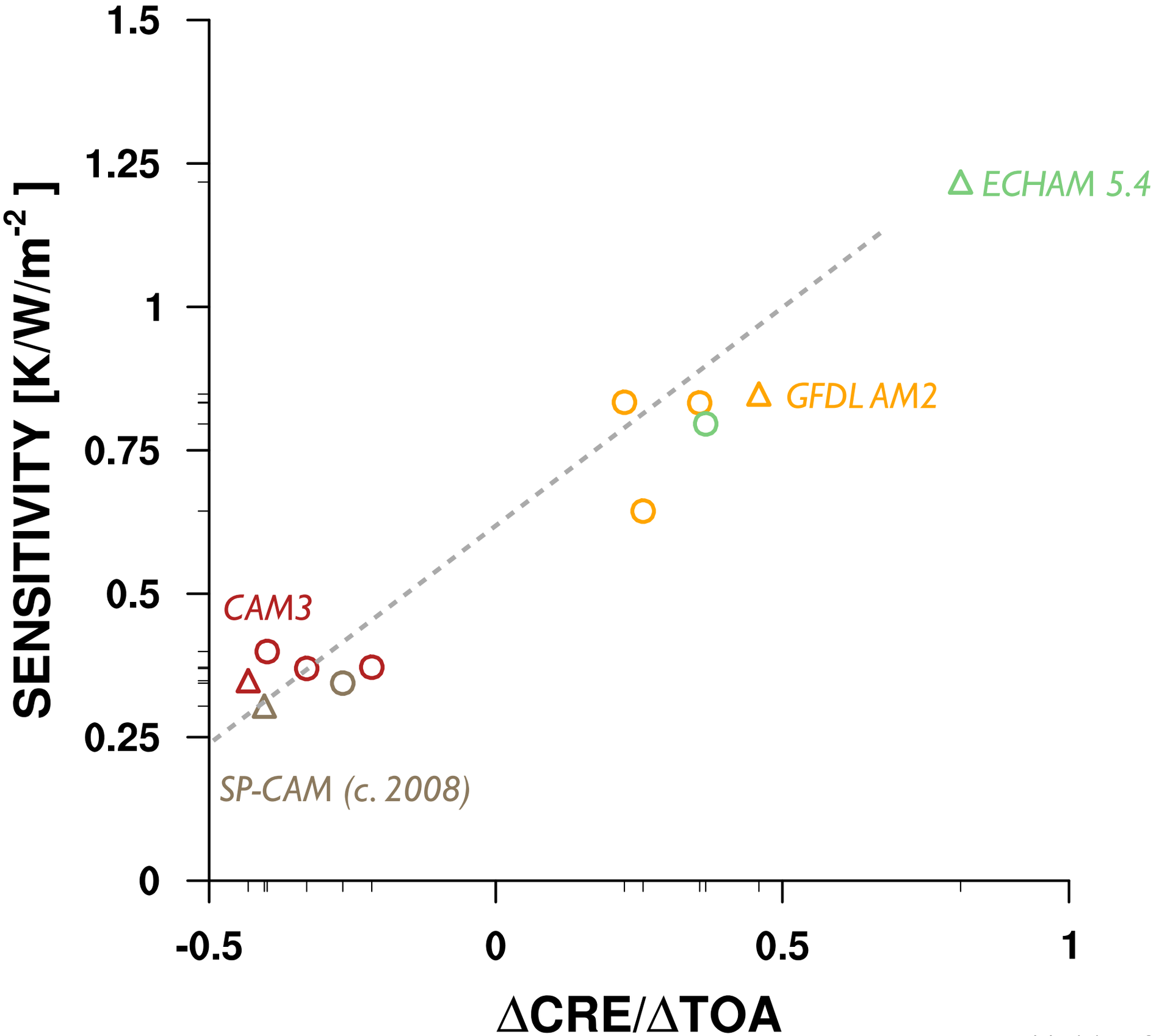
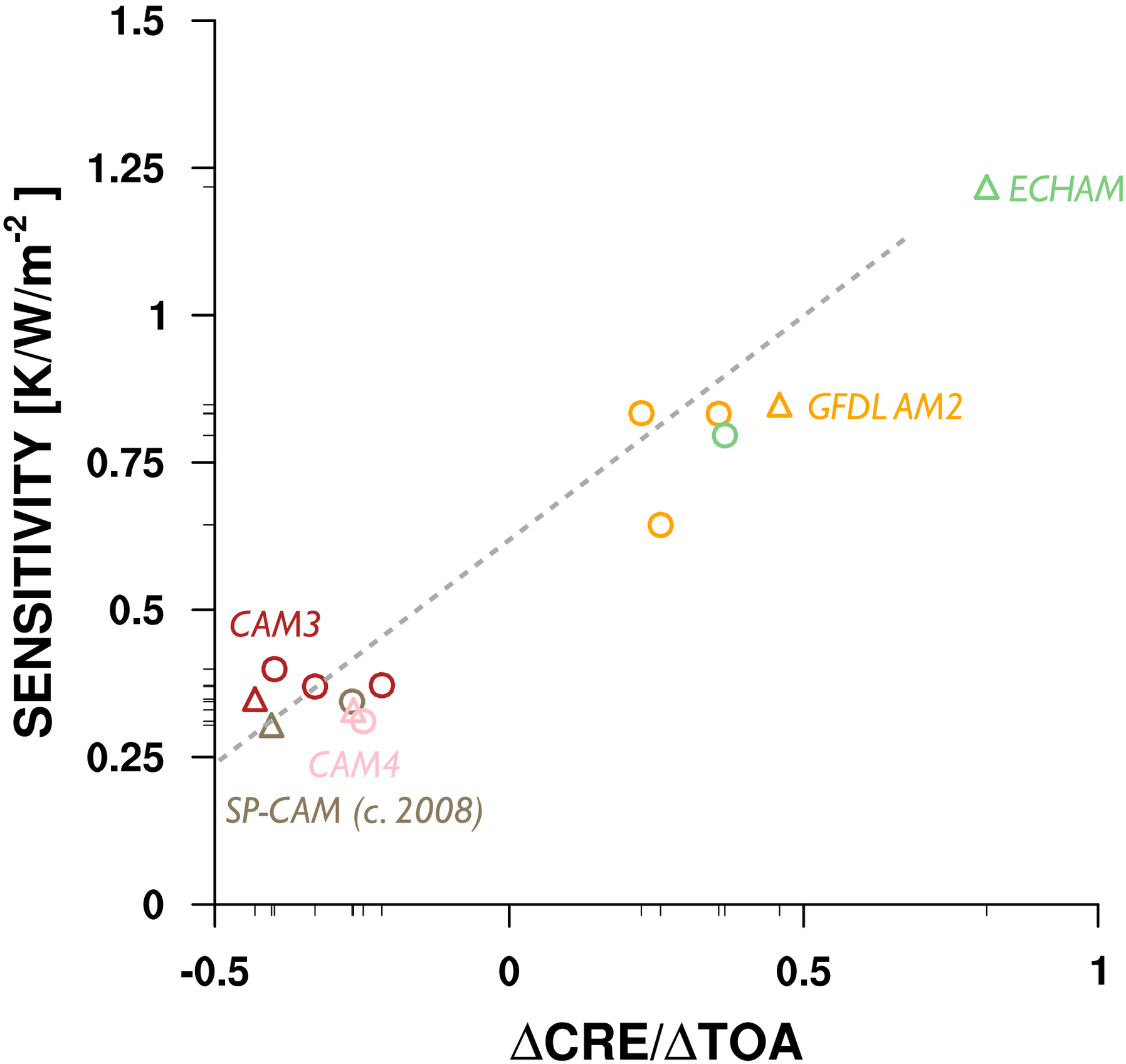
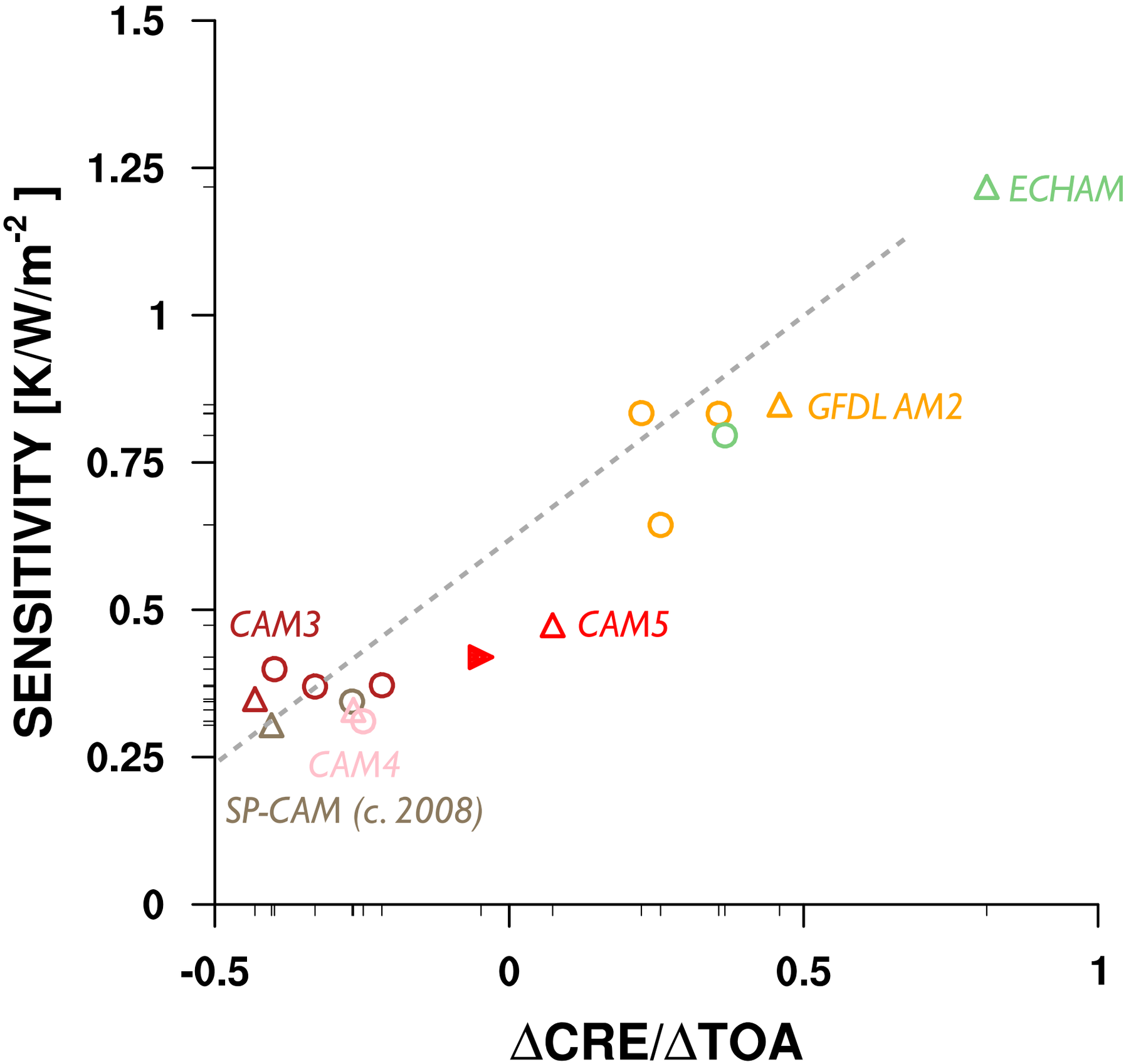


Medeiros et al. 2008
doi:10.1175/2008JCLI1995.1



Medeiros & Stevens 2011
doi:10.1007/s00382-009-0694-5


SENSITIVITY [K/W/m-2]
1.5
1.25
1
0.75
0.5
0.25
0
-0.5
0
0.5
1
ΔCRE/ΔTOA
ECHAM 5.4
GFDL AM2
CAM3
CAM4
SP-CAM (c. 2008)


SENSITIVITY [K/W/m-2]
1.5
1.25
1
0.75
0.5
0.25
0
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1
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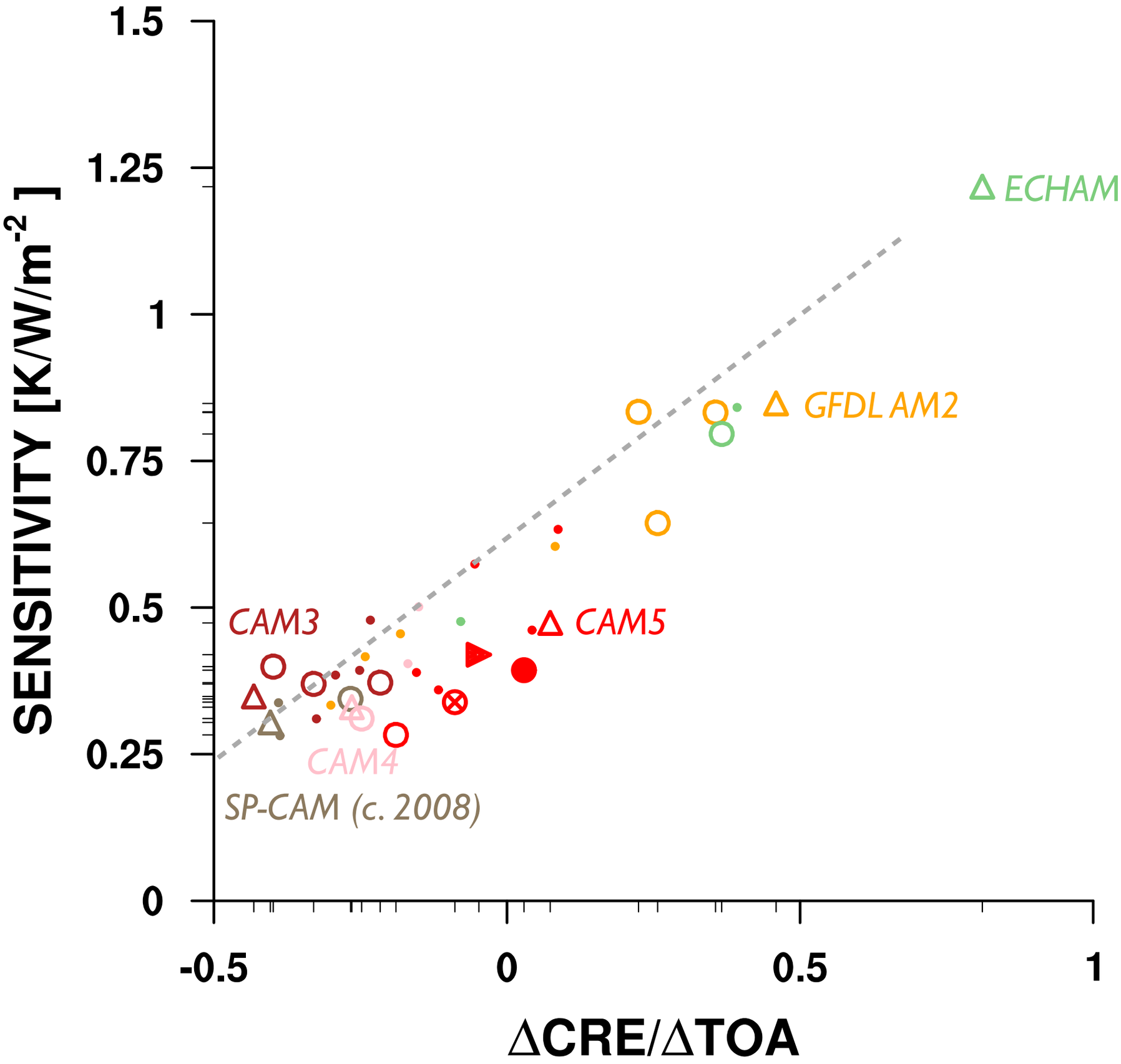
1.5
1.25
1
0.75
0.5
0.25
0
SENSITIVITY [K/W/m-2]
-0.5
0
0.5
1
ΔCRE/ΔTOA
ECHAM 5.4
GFDL AM2
CAM5
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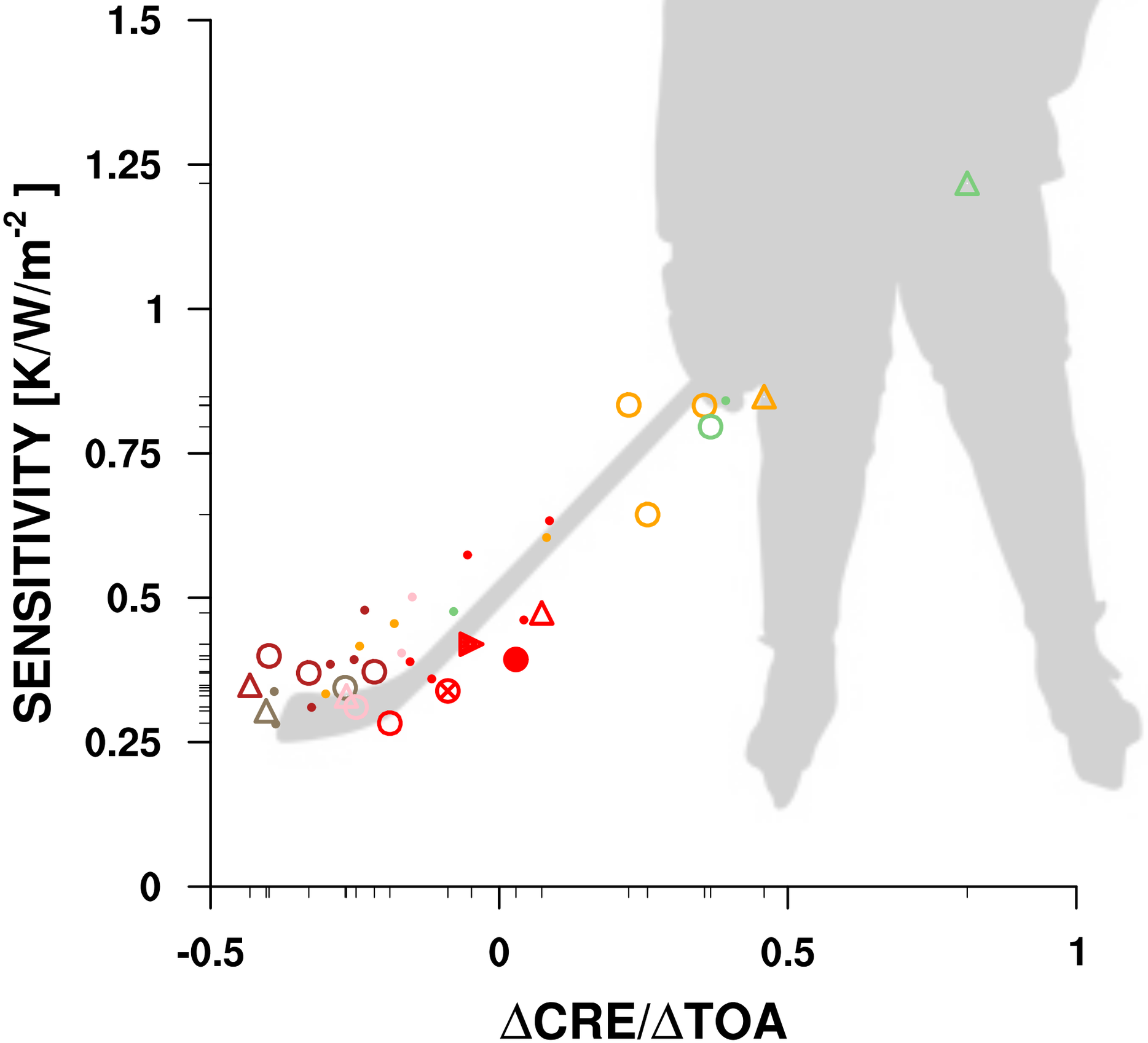
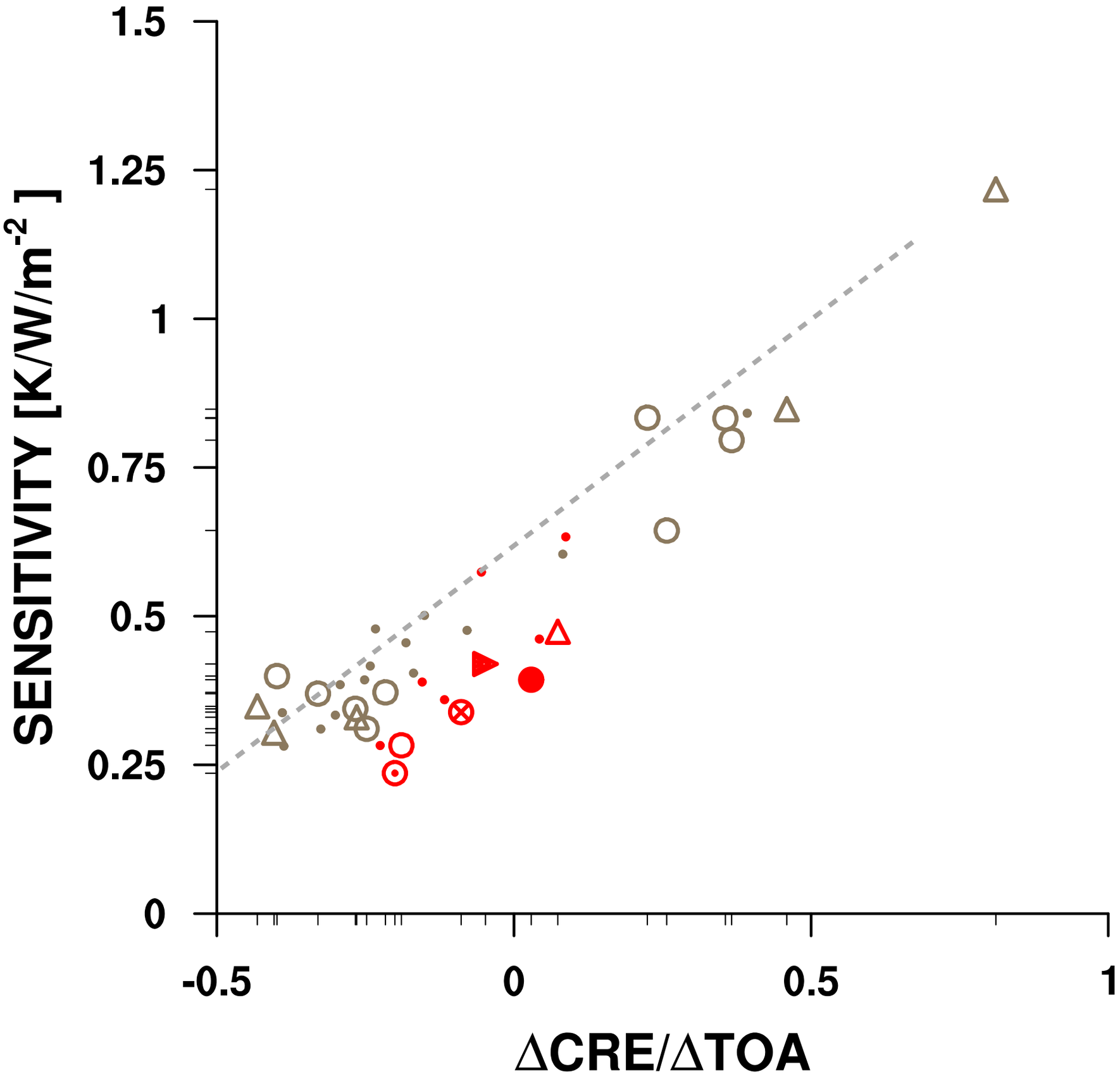
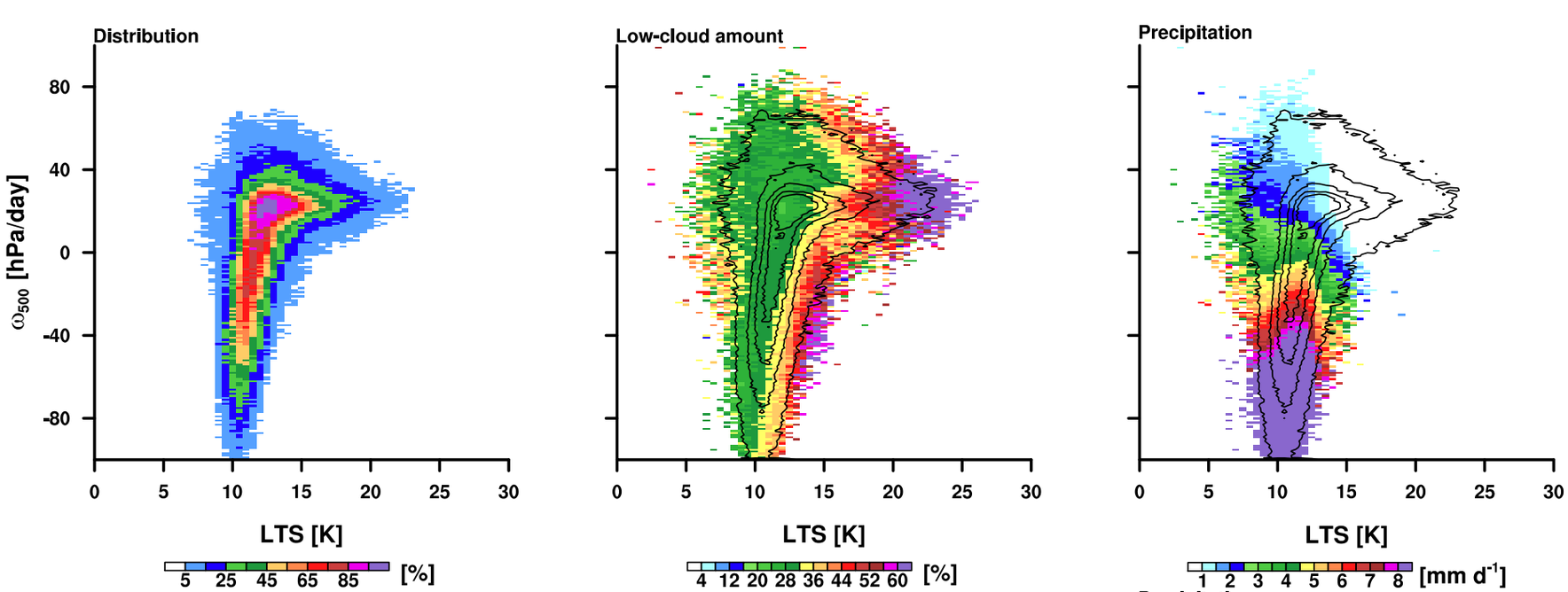
CAM4
SP-CAM (c. 2008)

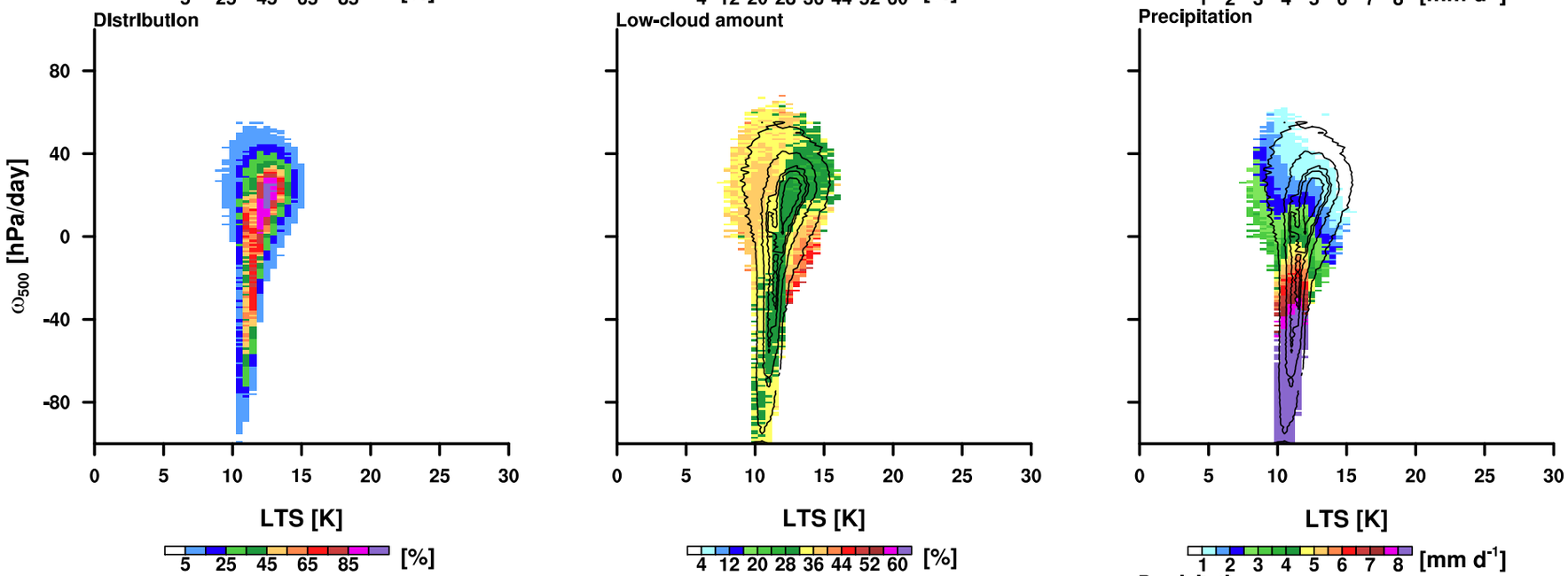

SENSITIVITY [K/W/m-2]
1.5
1.25
1
0.75
0.5
0.25
0
-0.5
0
0.5
1
ΔCRE/ΔTOA


1.5
1.25
1
0.75
0.5
0.25
0
SENSITIVITY [K/W/m-2]
-0.5
0
0.5
1
ΔCRE/ΔTOA

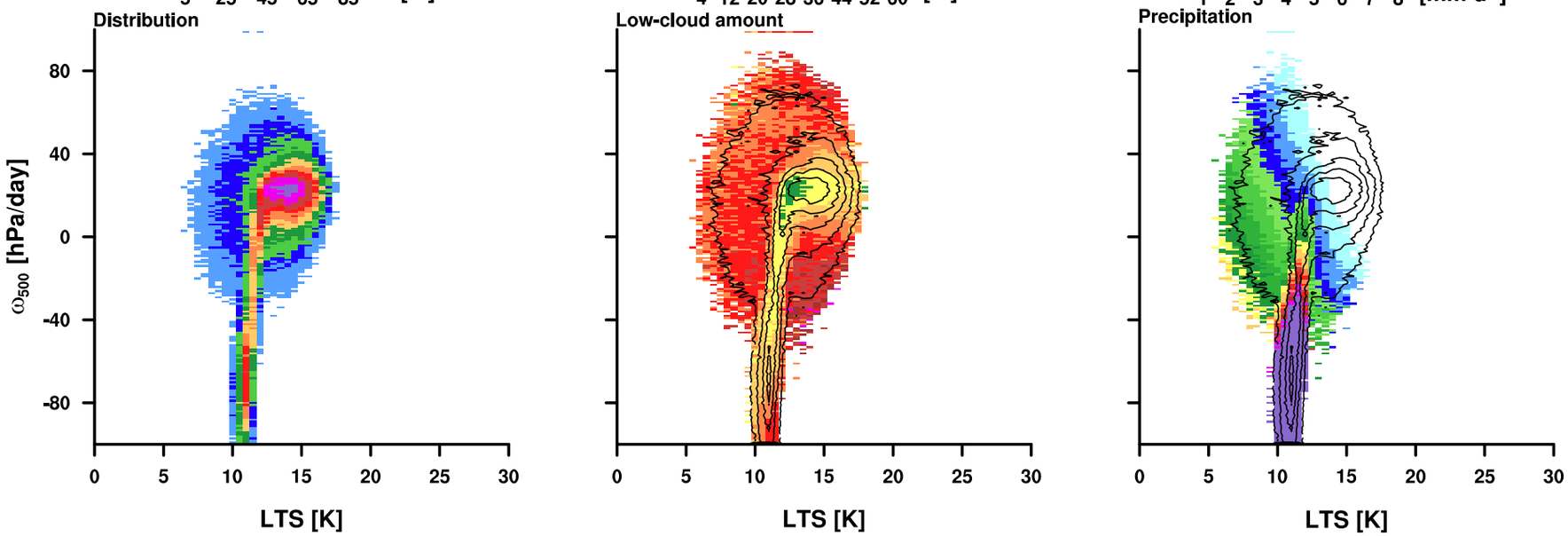
HOW DOES CAM5 ΔCRE FLIP SIGN SO EASILY?



CAM5
Earth

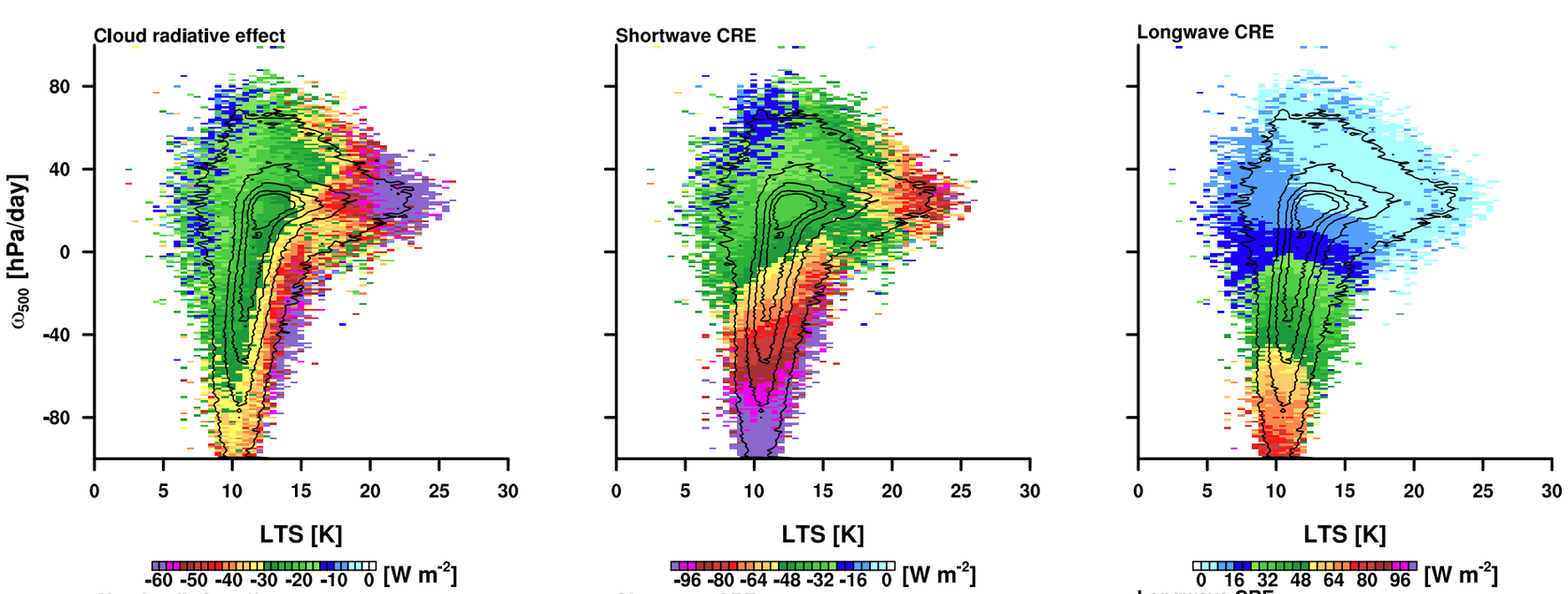


CAM5
"Qobs"

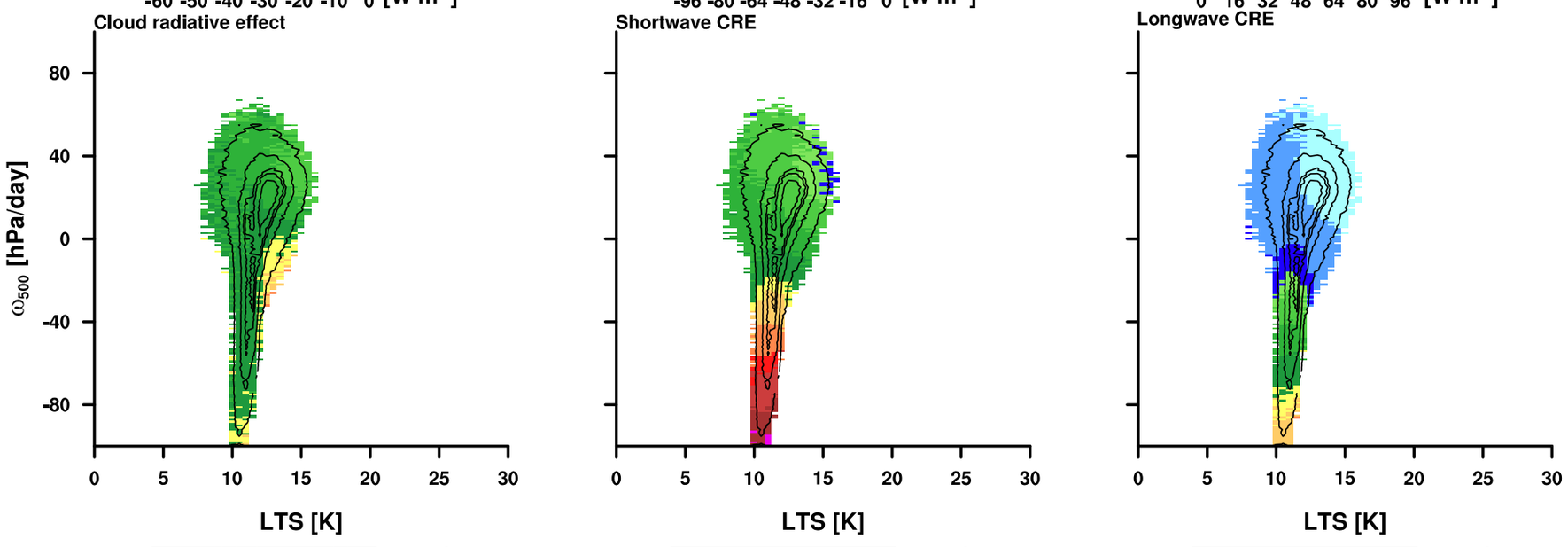


CAM5
"Aqua"

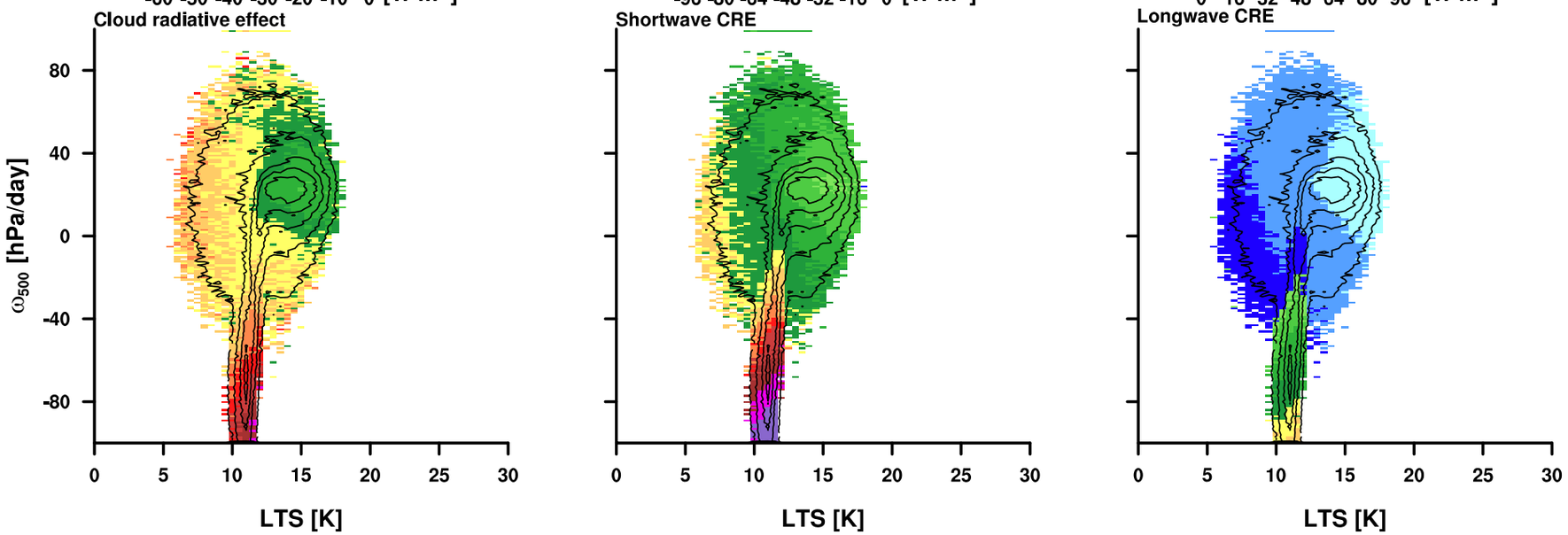
Medeiros & Stevens 2011
doi:10.1007/s00382-009-0694-5



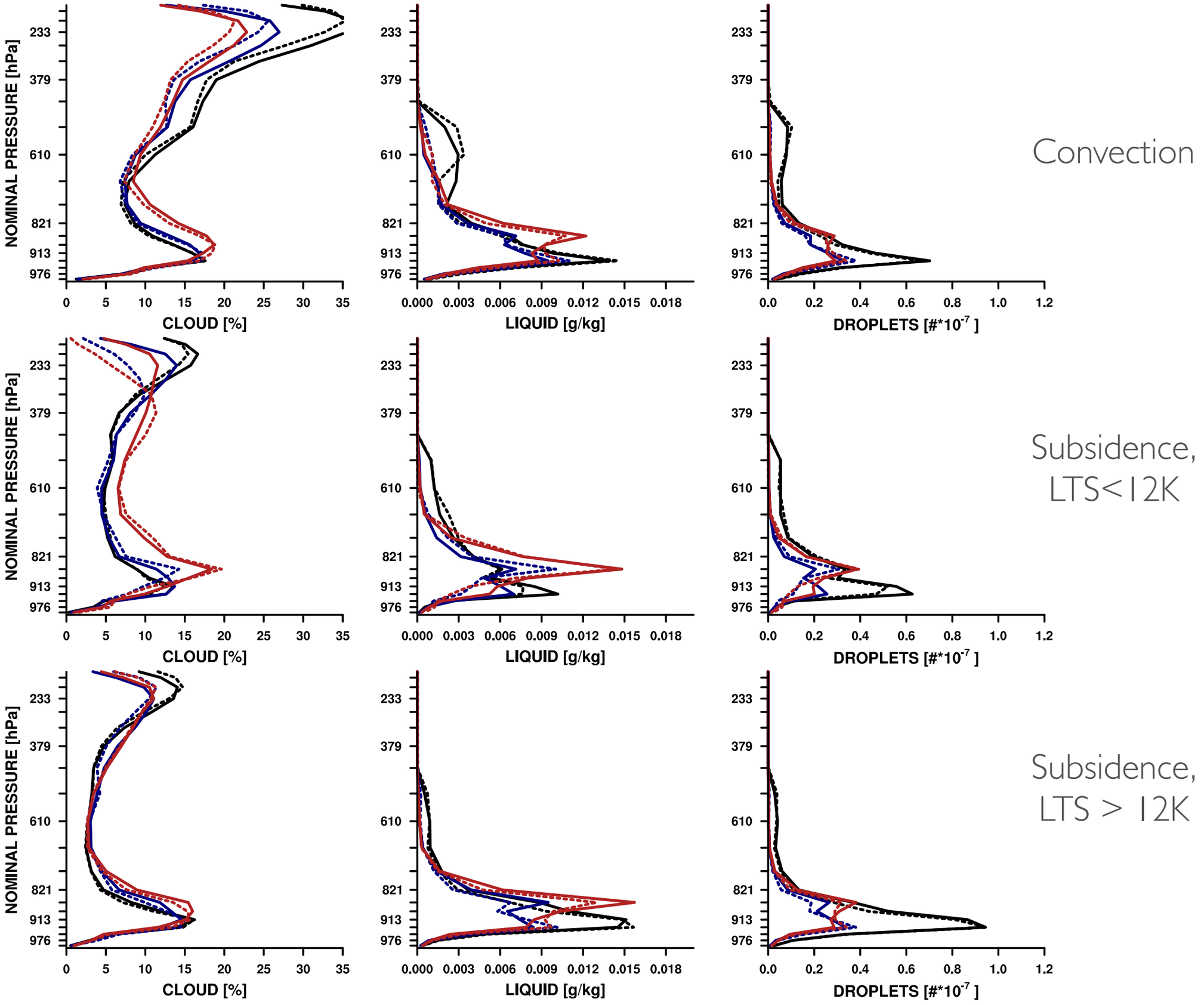
CAM5
Earth

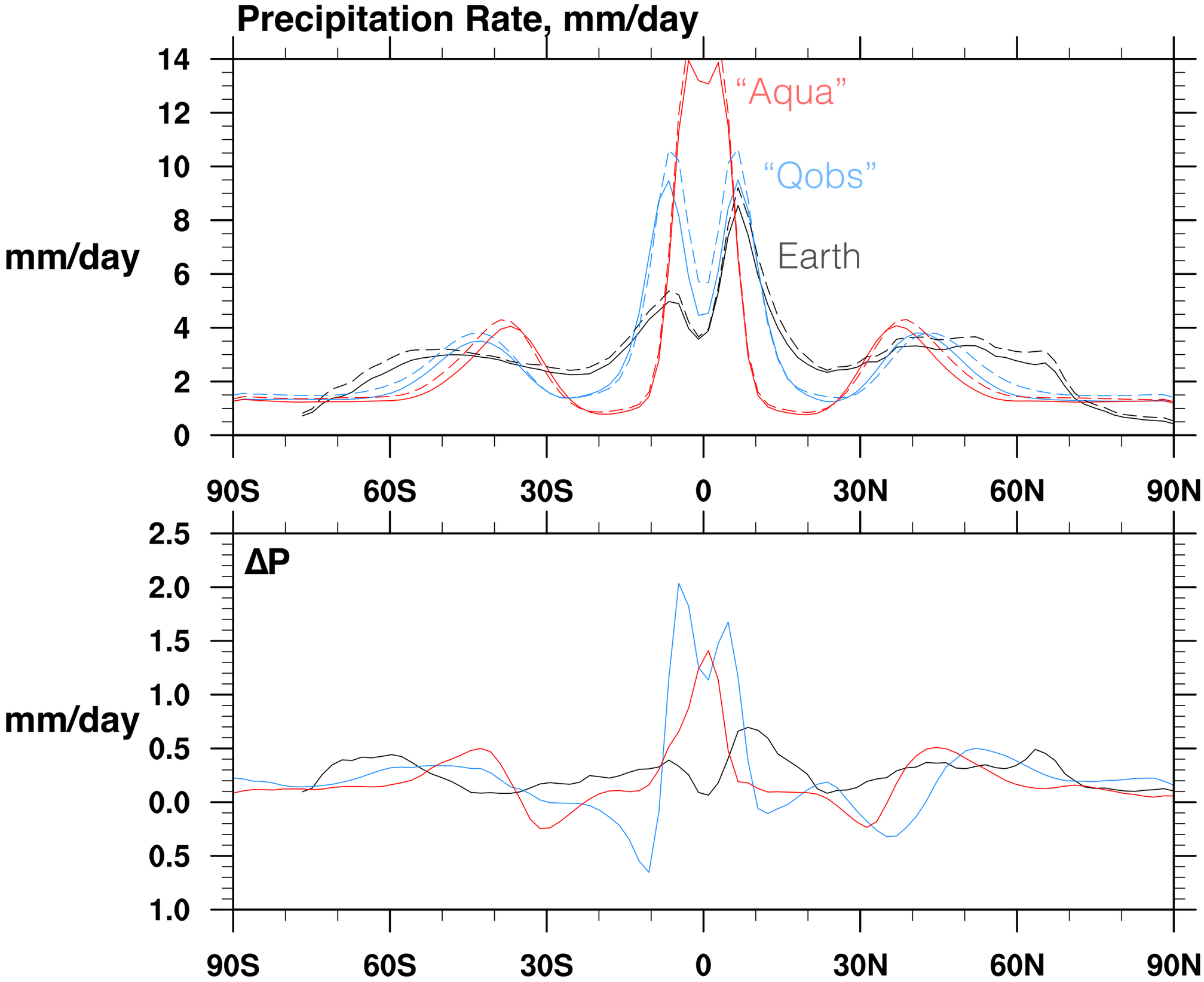


CAM5
"Qobs"

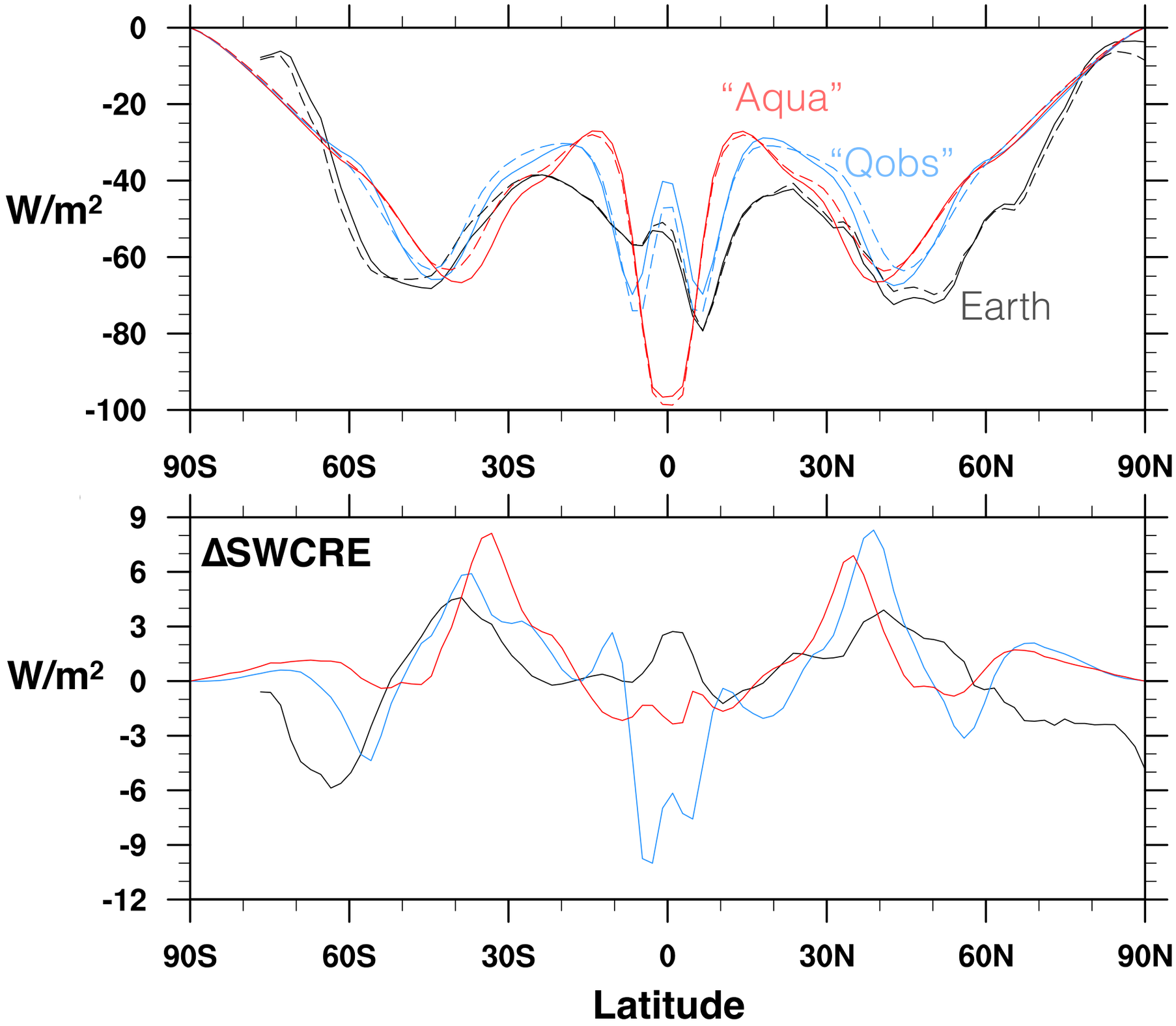


CAM5
"Aqua"


NOMINAL PRESSURE [hPa]
233
379
610
821
913
976
0 5 10 15 20 25 30 35
CLOUD [%]
0.000 0.003 0.006 0.009 0.012 0.015 0.018
LIQUID [g/kg]
0.0 0.2 0.4 0.6 0.8 1.0 1.2
DROPLETS [#*10-7]
Convection
Subsidence,
LTS<12K
Subsidence,
LTS > 12K


Precipitation Rate, mm/day
mm/day
14
12
10
8
6
4
2
0
"Aqua"
"Qobs"
Earth
90S
60S
30S
0
30N
60N
90N
ΔP
mm/day
2.5
2.0
1.5
1.0
0.5
0.0
0.5
1.0
90S
60S
30S
0
30N
60N
90N

Shortwave Cloud Effect



- CAM4 Earth/Aqua fall in line with previous models.
- CAM5 experiments follow pattern of other models.
- CAM5 Earth cloud effect around zero in Cess-style experiment.

- CAM5 Aquaplanets vary in sensitivity and cloud effect.
- Aerosol effects are present, but not leading order issue.
- Possible dependence on structure of tropical circulation.
- Other models?