# Number of Model Layers below 400 m: SO2-at-height (absolute difference) surface flux of SO2 - global surface flux of BC - global 1.2e-19 2e-13 6.1e-20 $\Delta$ emiso2 (kg m $^{-2}$ s $^{-1}$ ) 0.0e+000e+00 -6.1e-20 -2e-13 -1.2e-19 2 6 2 6 Number of Layers < 400 m Number of Layers < 400 m surface concentration of BC - global surface concentration of SO4 - global 2e-10 $\Delta$ mmrso4 (kg kg – 1) 1e-10 0e+00 -1e-10 -2e-10 2 2 6 Number of Layers < 400 m Number of Layers < 400 m surface concentration of SO2 - global surface concentration of DMS - global 1e-12 $\Delta$ dms (kg kg – 1) 5e-13 0e+00 -5e-13 -1e-12 2 6 2 6

GISS modelE

NorESM2

MIROC-SPRINTARS

Number of Layers < 400 m

OsloCTM3

UKESM1

 $\Delta$  emibc (kg  $\mathrm{m}^{-2}~\mathrm{s}^{-1})$ 

2e-12

1e-12

0e+00

-1e-12

-2e-12

5e-10

0e+00

-5e-10

Number of Layers < 400 m

E3SM

**GEOS** 

GFDL-ESM4

CAM-ATRAS

CESM

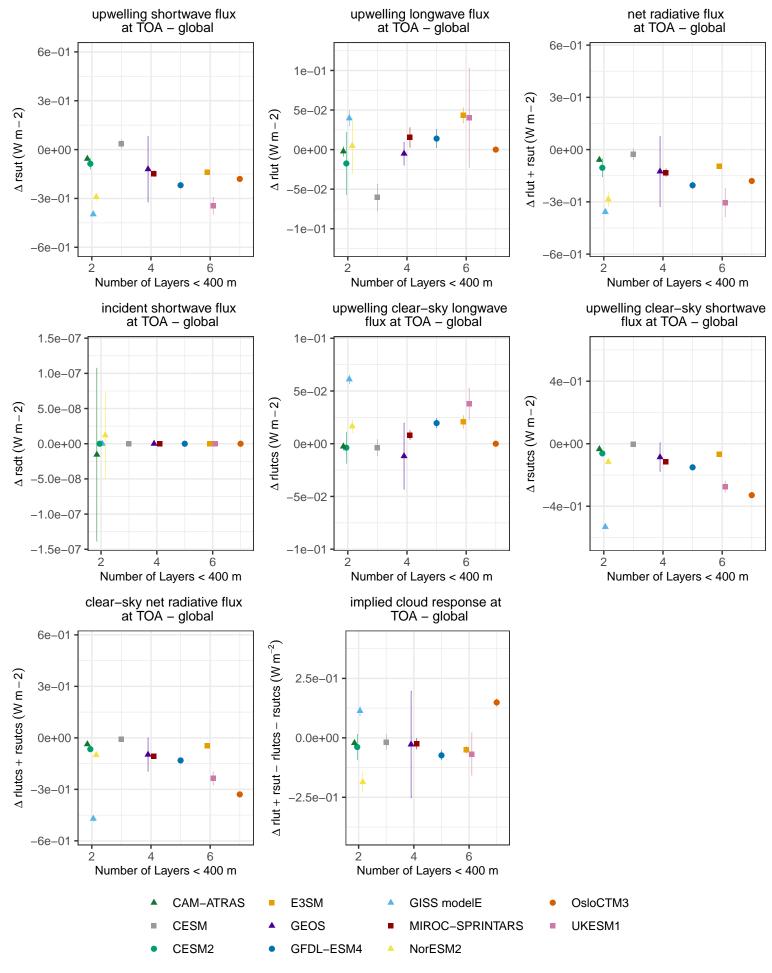
CESM2

 $\Delta \cos (kg kg - 1)$ 

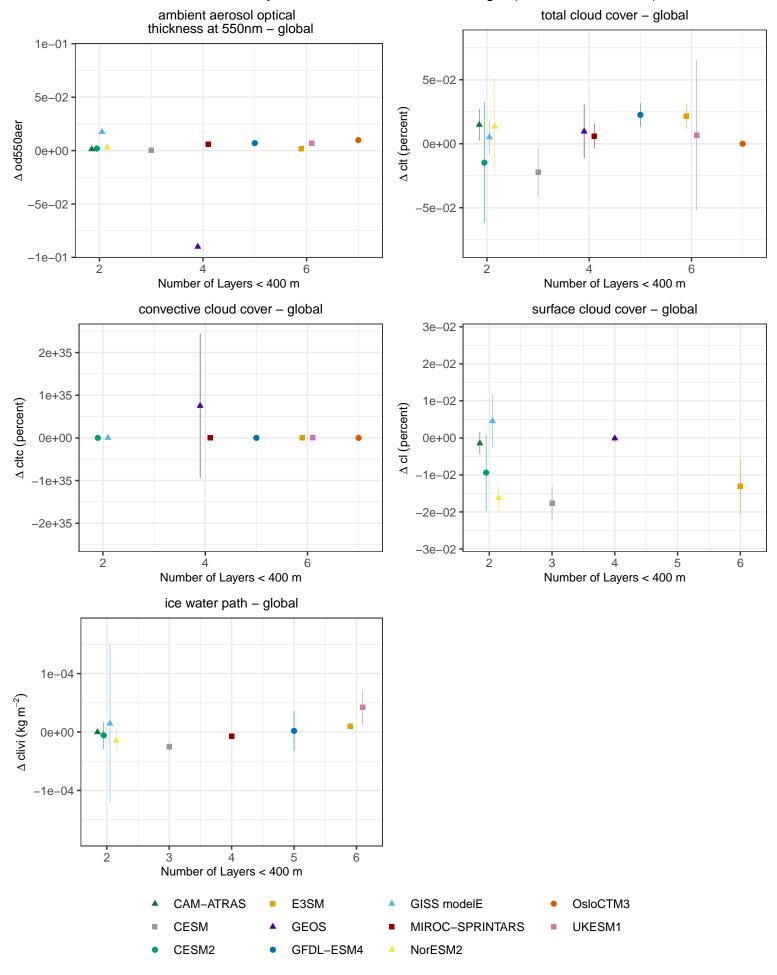
 $\Delta$  mmrbc (kg kg-1)

### Number of Model Layers below 400 m: SO2-at-height (absolute difference) column mass burden of SO4 - global column mass burden of SO2 - global 4e-07 2e-07 $\Delta$ loadso4 (kg $\mathrm{m}^{-2})$ $\Delta$ loadso2 (kg $\mathrm{m}^{-2})$ 0e+00 0e+00 -2e-07 -4e-07 2 2 Number of Layers < 400 m Number of Layers < 400 m SO4 lifetime - global column mass burden of BC - global $\Delta$ loadso4/(dryso4 + wetso4) (days) 1e-09 1e+01 $\Delta \log dbc \, (\mathrm{kg} \; \mathrm{m}^{-2})$ 0e+00 0e+00 -1e-09 -1e+01 2 2 Number of Layers < 400 m Number of Layers < 400 m SO2 timescale - global 1.5e+10 1.0e+10 ∆ loadso2/emiso2 (days) 5.0e+09 0.0e+00-5.0e+09 -1.0e+10 -1.5e+10 6 Number of Layers < 400 m CAM-ATRAS E3SM GISS modelE OsloCTM3 CESM **GEOS** MIROC-SPRINTARS UKESM1 CESM2 GFDL-ESM4 NorESM2

### Number of Model Layers below 400 m: SO2-at-height (absolute difference)



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