

Supplement of Atmos. Chem. Phys., 15, 5827–5833, 2015
<http://www.atmos-chem-phys.net/15/5827/2015/>
doi:10.5194/acp-15-5827-2015-supplement
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Supplement of

Ocean mediation of tropospheric response to reflecting and absorbing aerosols

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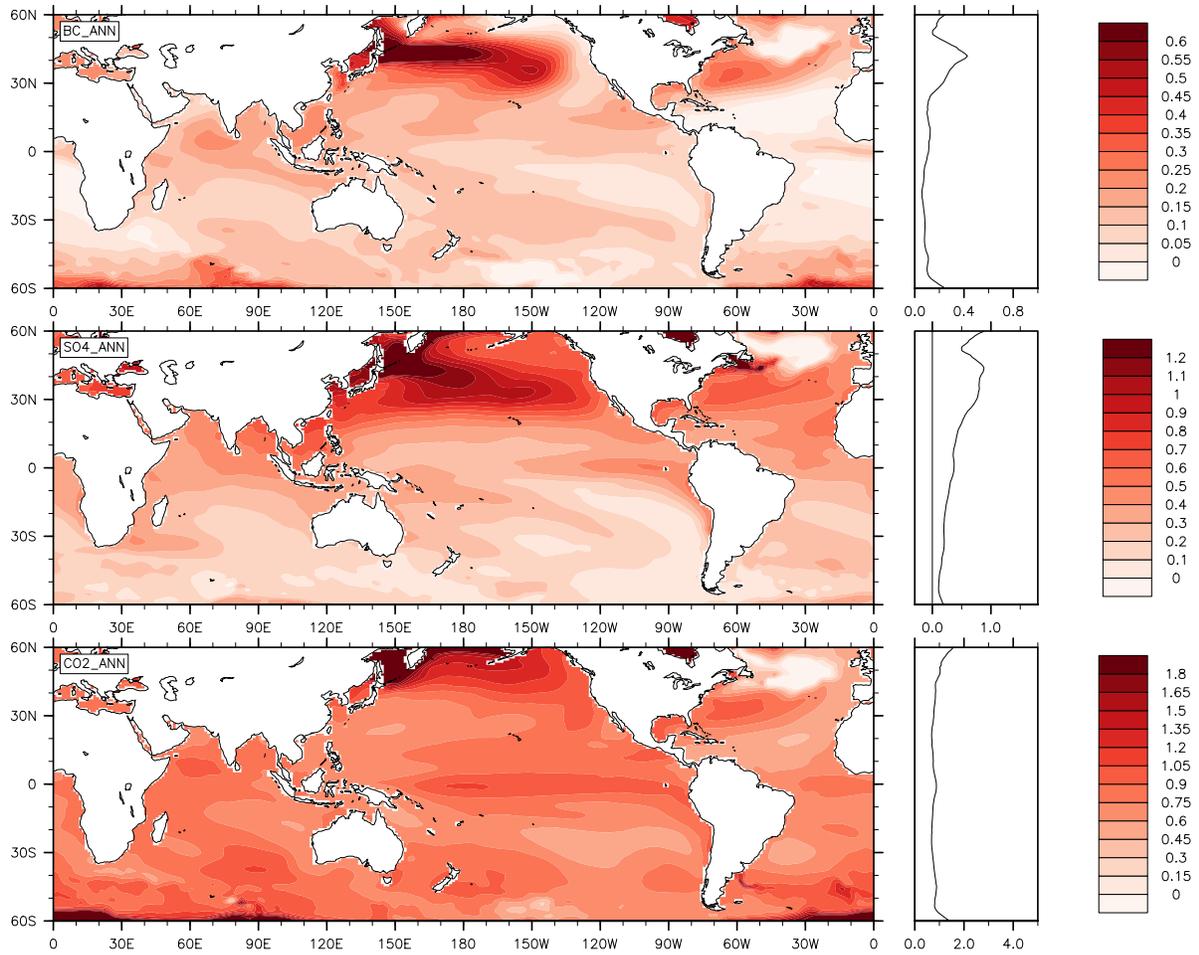
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10 Table S1. (a) TOA forcing (W/m^2 , shortwave and longwave) due to BC (direct radiative forcing
 11 from pre-industrial to present-day; not including snow albedo effect), SO4 (direct and indirect
 12 forcing from pre-industrial to present-day, so called “adjusted forcing”) and CO2 (from pre-
 13 industrial to present-day at 400 ppm). The radiative forcing is diagnosed by contrasting two sets
 14 of five-year atmospheric-only simulations with pre-industrial and present-day
 15 emissions/concentrations, respectively. (b) Surface temperature change ($^{\circ}C$) in response to
 16 different forcings in (a). These are calculated from the 60-year average of coupled model
 17 simulation. (c) Cumulative precipitation (cm) change in response to different forcings in (a). The
 18 relative changes in percentage are shown in parenthesis next to the absolute changes.
 19

	BC	SO4	CO2
(a) TOA net forcing (W/m^2)	0.5	-0.9	1.7
(b) Surface temperature change ($^{\circ}C$)	0.21	-0.49	1.15
(c) Cumulative precipitation (cm)	-0.01 (0%)	-2.09 (-2%)	1.73 (2%)

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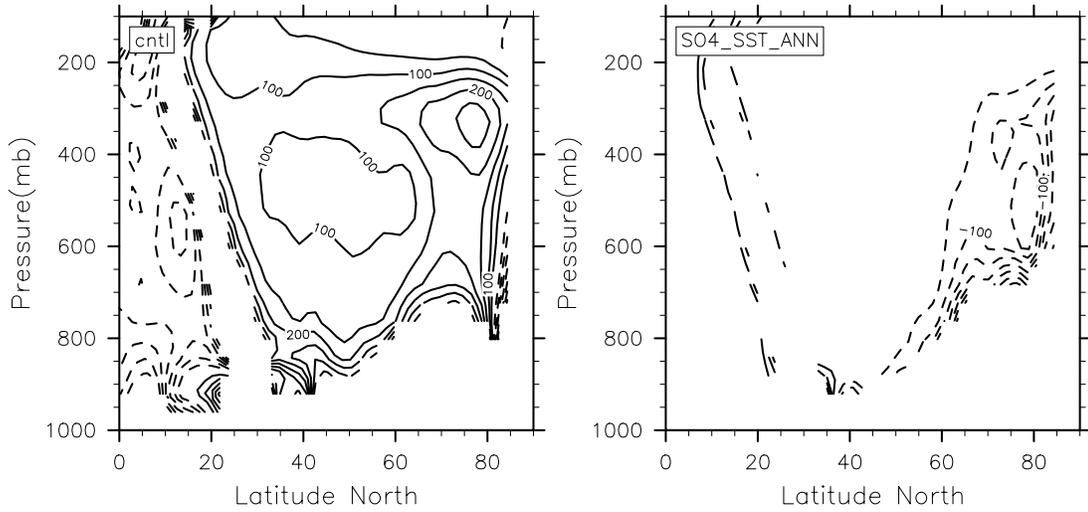
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22 Fig. S1: Sea Surface temperature change (°C) change in response to BC, SO4 and CO2 forcings.

23 These are calculated from the 60-year average of coupled model simulation. Color scale for SO4
 24 is reversed.

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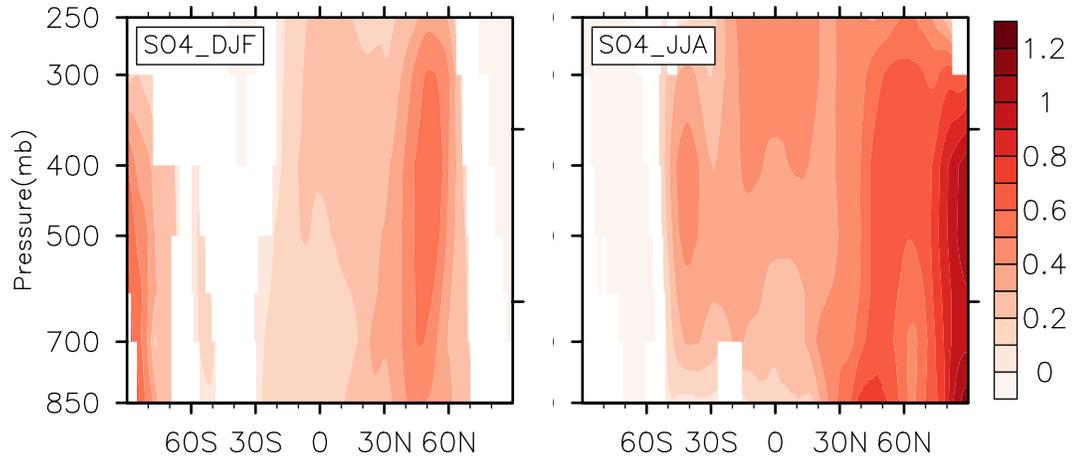
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29 Fig. S2: Refractive index in the climatology (left panel) and its change due to SO₄-induced SST
 30 perturbation (right panel). The contour plot is limited to 0–400, following Figure 8 of
 31 Limpasuvan and Hartmann (2000), to highlight the contours in the mid-latitude regions where
 32 the wave activities are strongest.

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38 Fig. S3: Similar to the 2nd row of Figure 1, but showing the trend of temperature changes
39 ($^{\circ}\text{C}/\text{decade}$) during 1940-1970 in the 20th century transient climate simulation using the same
40 model (CESM1) with time-evolving aerosol-only forcing. During this period, SO_2 emissions
41 rapidly increased. Color scale is reversed to be consistent with Fig. 1. GHG forcing is fixed in
42 this simulation. An ensemble of three simulations was conducted.

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