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Supplement of

The impact of recent changes in Asian anthropogenic emissions of SO₂ on sulfate loading in the upper troposphere and lower stratosphere and the associated radiative changes

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Supplementary figures

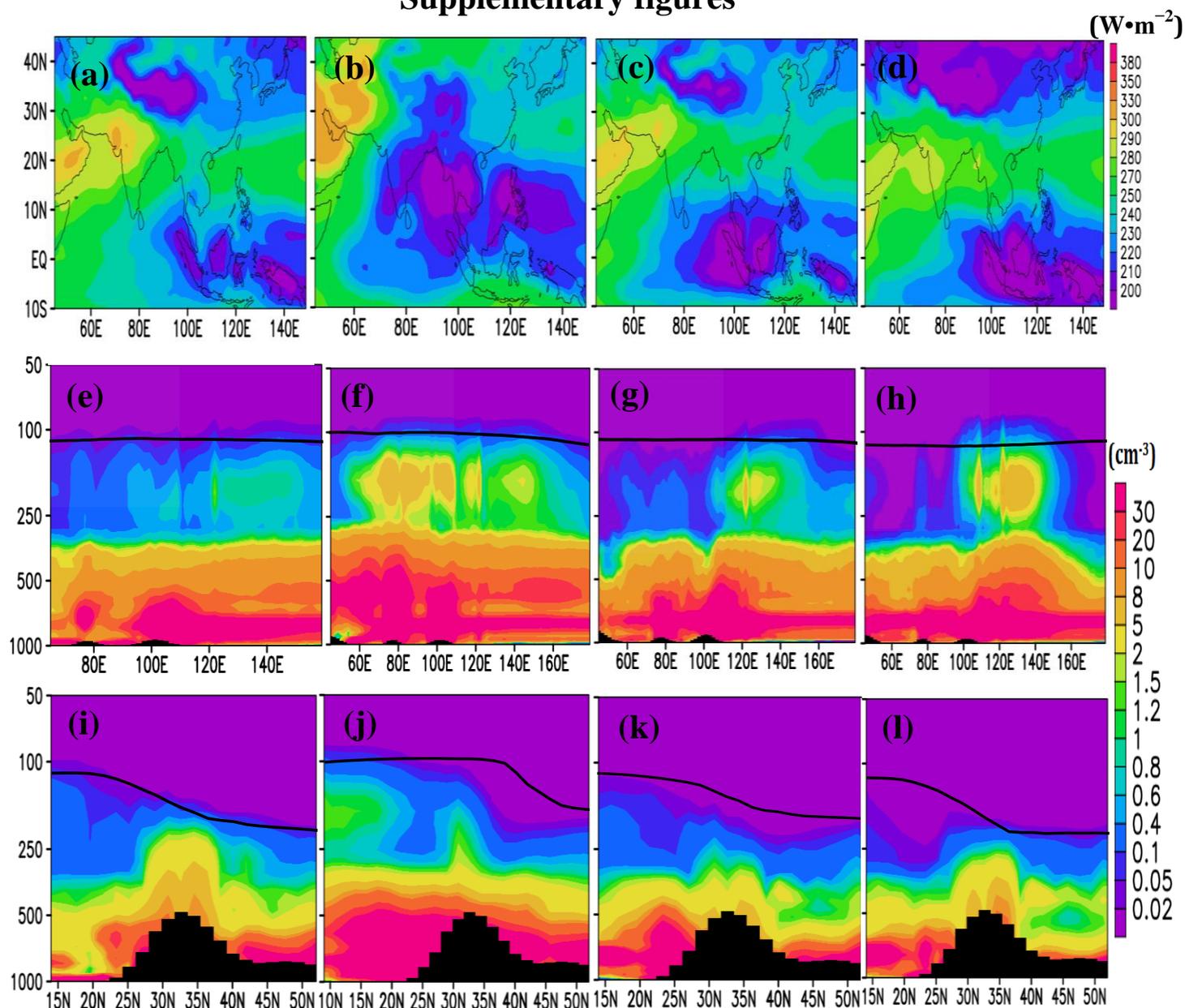


Figure S1: Seasonal mean distribution of outgoing longwave radiation (OLR) for the (a) pre-monsoon, (b) summer-monsoon, (c) post-monsoon and (d) winter season. Seasonal mean distribution of cloud droplet number concentration (CDNC) and ice crystal number concentration (ICNC) (cm^{-3}) from CTRL simulations, averaged over latitude 12 – 20 °N, for the (e) pre-monsoon, (f) summer-monsoon, (g) post-monsoon and (h) winter season, (e-h) same as (e-h) but averaged over longitude 80 – 95 °E. The black vertical bars indicate topography and black line in (e) to (l) indicates the tropopause.

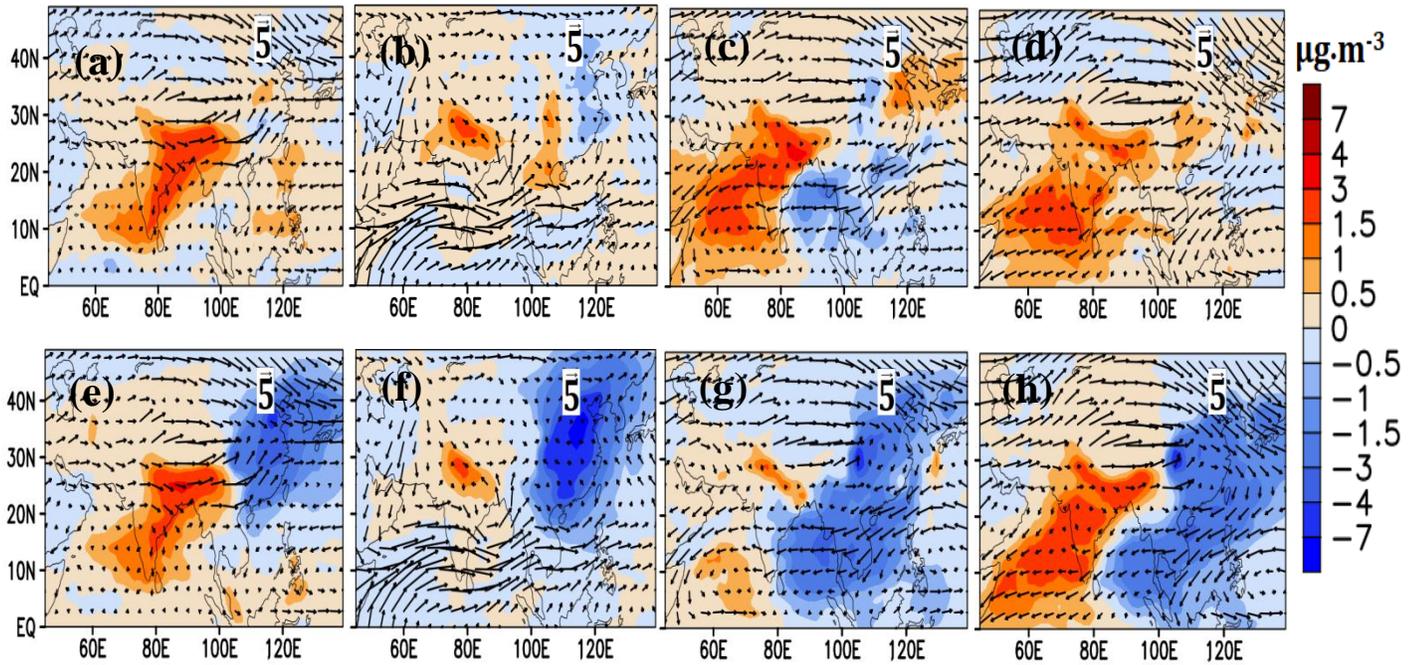


Figure S2: Seasonal mean distribution of anomalies in sulfate aerosols ($\mu\text{g}\cdot\text{m}^{-3}$) from Ind48-CTRL simulations at 850 hPa for the (a) pre-monsoon, (b) summer-monsoon, (c) post-monsoon and (d) winter season, (e)-(f) same as (a)-(d) but from Ind48Chin70-CTRL simulations.

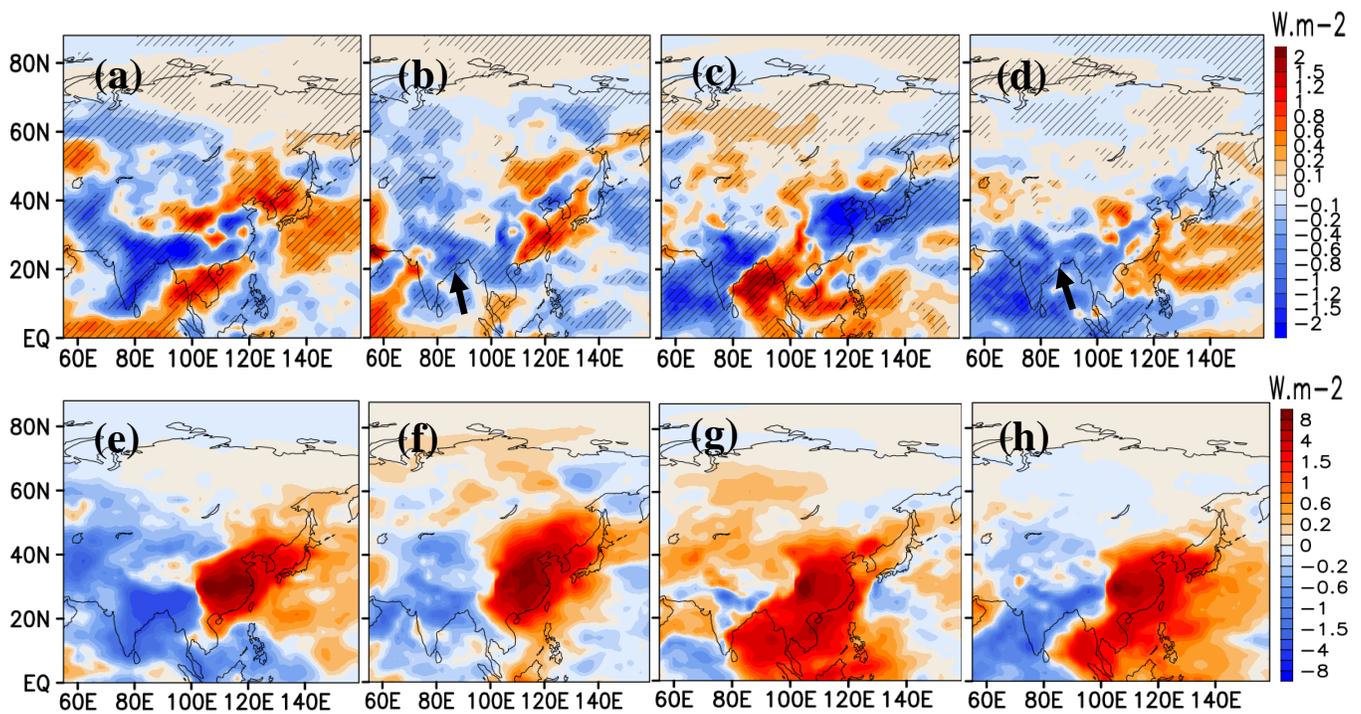


Figure S3: Seasonal distribution of anomalies in clear sky direct net radiative forcing ($\text{W}\cdot\text{m}^{-2}$) at the surface, from Ind48-CTRL simulations for the (a) pre-monsoon (b) summer-monsoon, (c) post-monsoon, and (d) winter season, (e)-(h) same as (a)-(d) but for the Ind48Chin70-CTRL simulations.

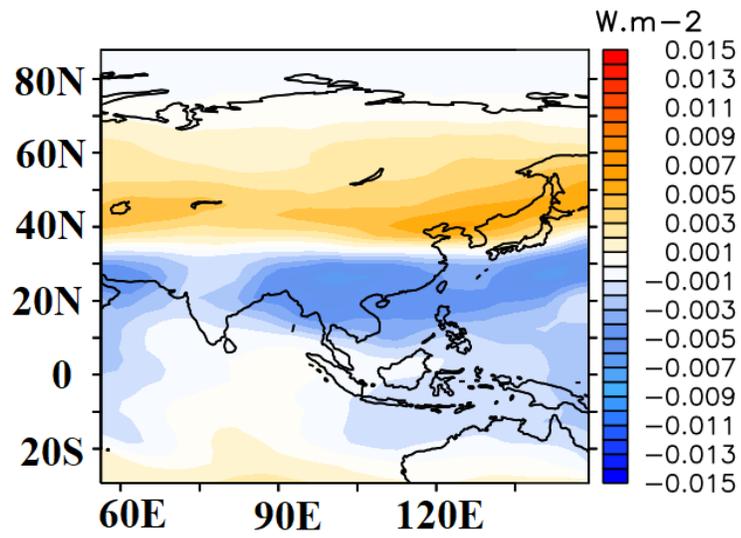


Figure S4: Clear sky TOA direct net radiative forcing ($\text{W}\cdot\text{m}^{-2}$) anomalies simulated by offline simulations due to sulfate aerosols in the UTLS-only for the post-monsoon season.