

Figure S1. Global maps of aerosol optical depth (AOD). (a) MISR-observed AOD for 2001–2009, (b) the difference between CAM5-simulated AOD and MISR for the unadjusted emissions scenario and (c) the difference between CAM5 AOD and MISR for the adjusted emissions scenario. Note the improvement in fire regions of Africa, South America and equatorial Asia.

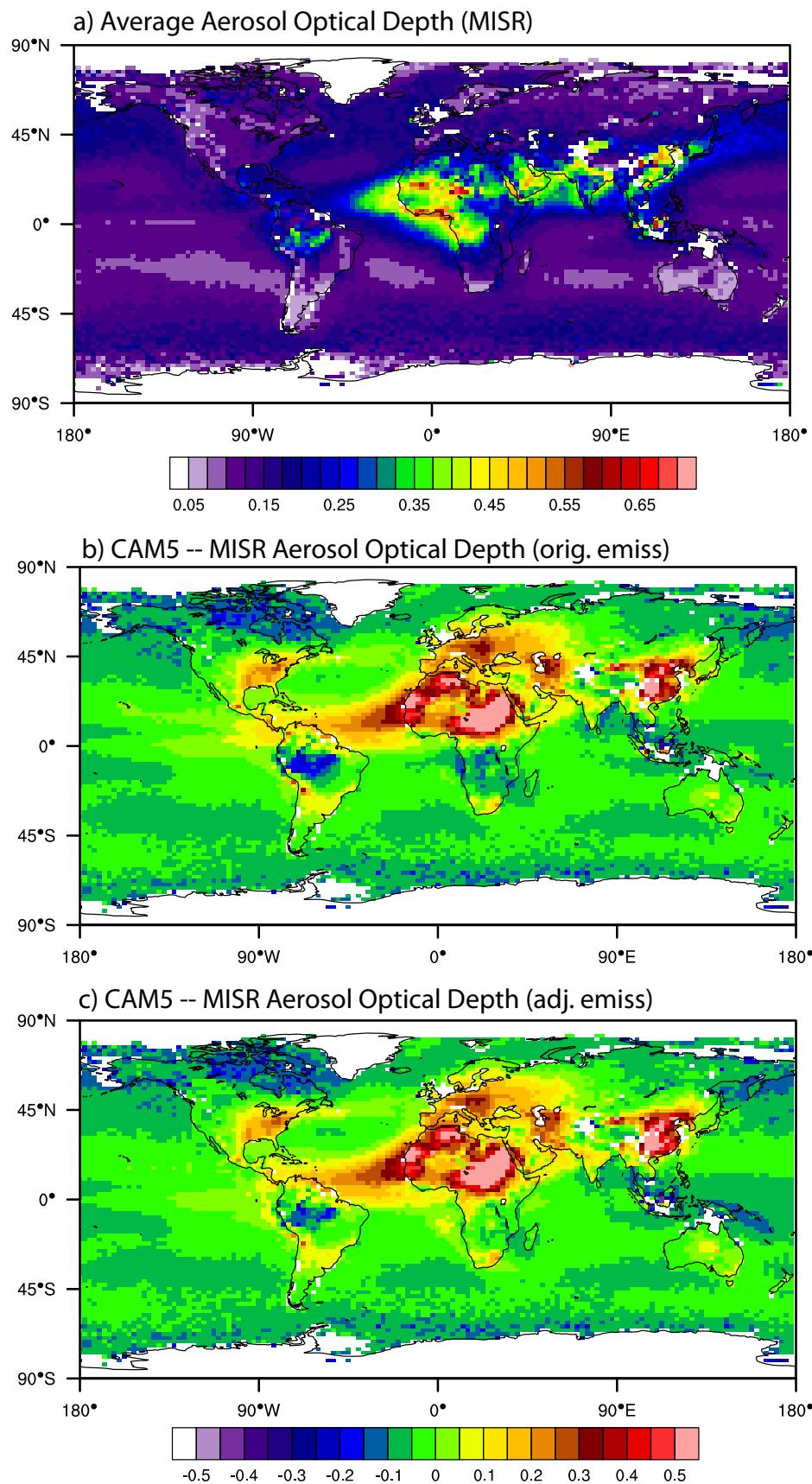
Figure S2. Time series of modeled (CAM5) AODs for simulations with adjusted fire emissions for the three main burning regions of (a) South America, (b) southern Africa, (c) equatorial Asia and (d) boreal North America (for lat-lon boxes, see Fig. 1 in the main text). The thick line represents the total AOD and the thin line is the fire-only AOD (the difference in AOD between the FIRE and NOFIRE simulations).

Figure S3. Time series of modeled (CAM5) and observed (MISR & MODIS, combined) AODs for the same regions as Figure S2. The dashed lines are observations, the thin lines are from simulations with unadjusted emissions and the thick lines from simulations with adjusted fire emissions.

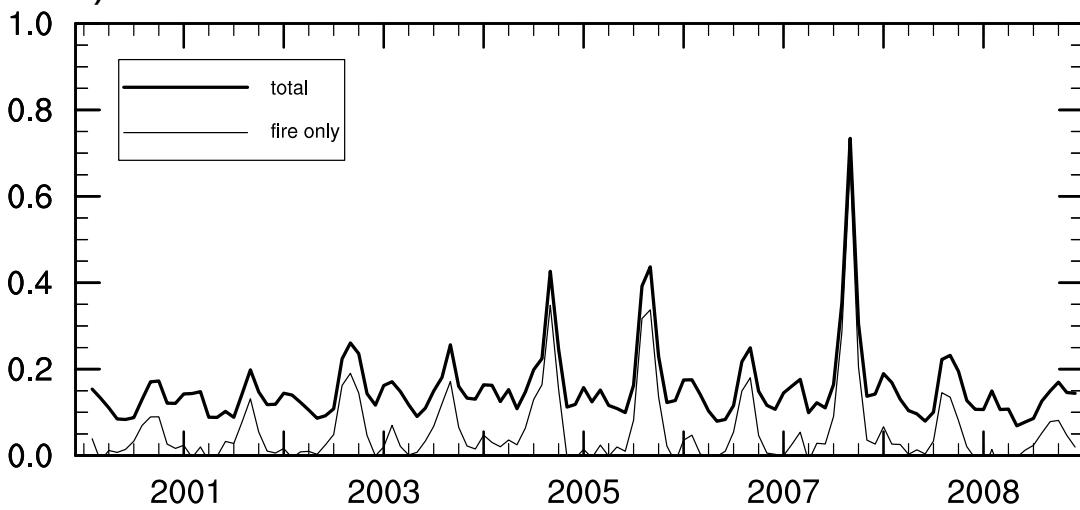
Figure S4. (a) Global map of anomalies (FIRE – NOFIRE) of the difference in temperature between the surface and 700 mb. (b) Global map of vertical velocity anomalies (FIRE – NOFIRE) at 850 mb (10^{-3} Pa s $^{-1}$)

Figure S5. A cross-section of May–October vertical profiles of zonally averaged anomalies (FIRE – NOFIRE) over central Africa (40°S–40°N) for (a) atmospheric heating rates (10^6 K s $^{-1}$), (b) temperature (°C), and (c) vertical velocities (10^{-5} Pa s $^{-1}$). Zonally averaged AOD anomalies are shown in (d) for the same region and period.

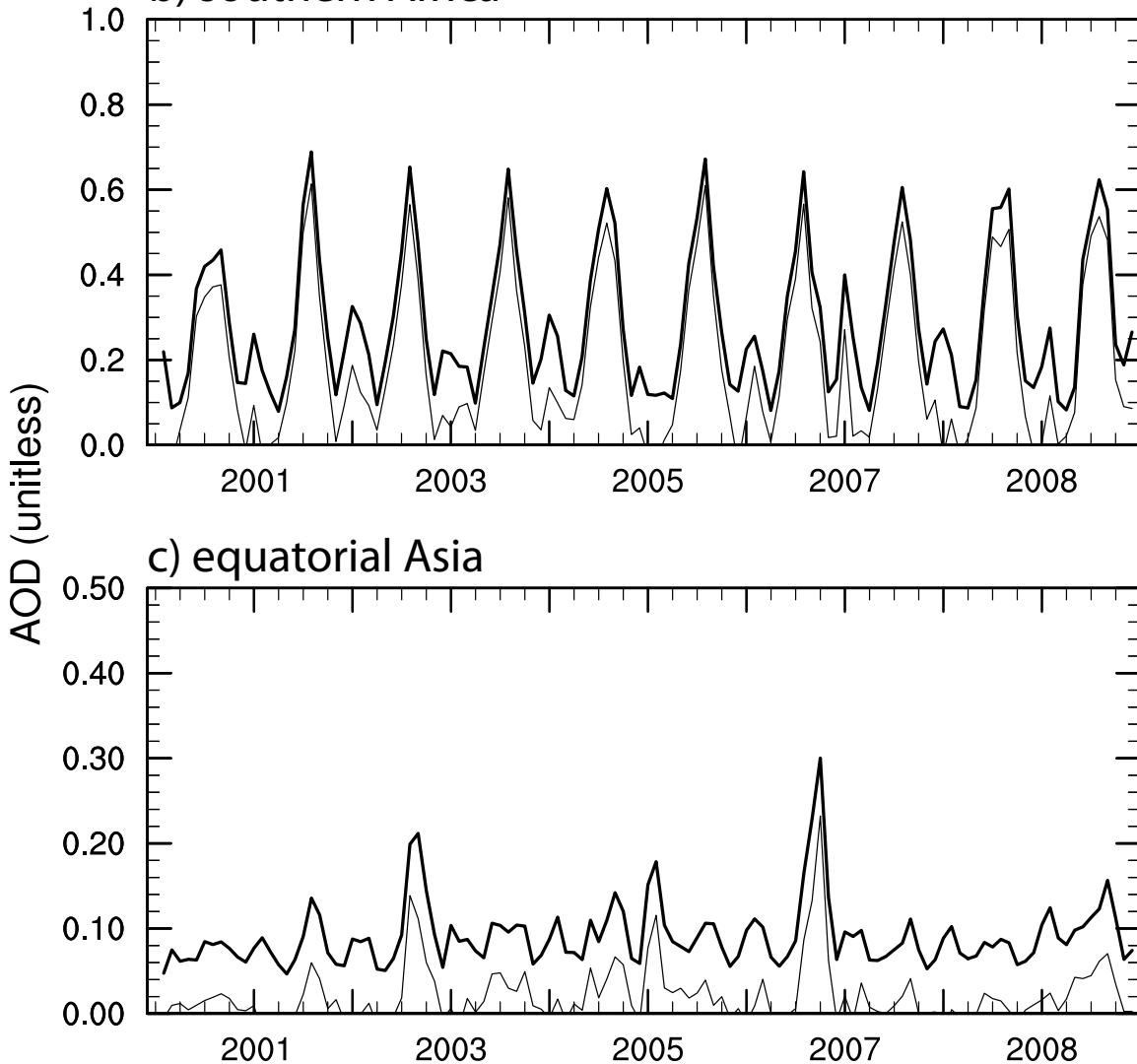
Figure S6. A cross-section of annually averaged vertical profiles of zonally averaged anomalies (FIRE – NOFIRE) over the central Pacific for (a) atmospheric heating rates ($\times 10^{-7}$ K s $^{-1}$), and (b) vertical velocities (10^{-5} Pa s $^{-1}$). Zonally averaged sea surface temperature (SST) anomalies are shown in (d) for the same region and period.



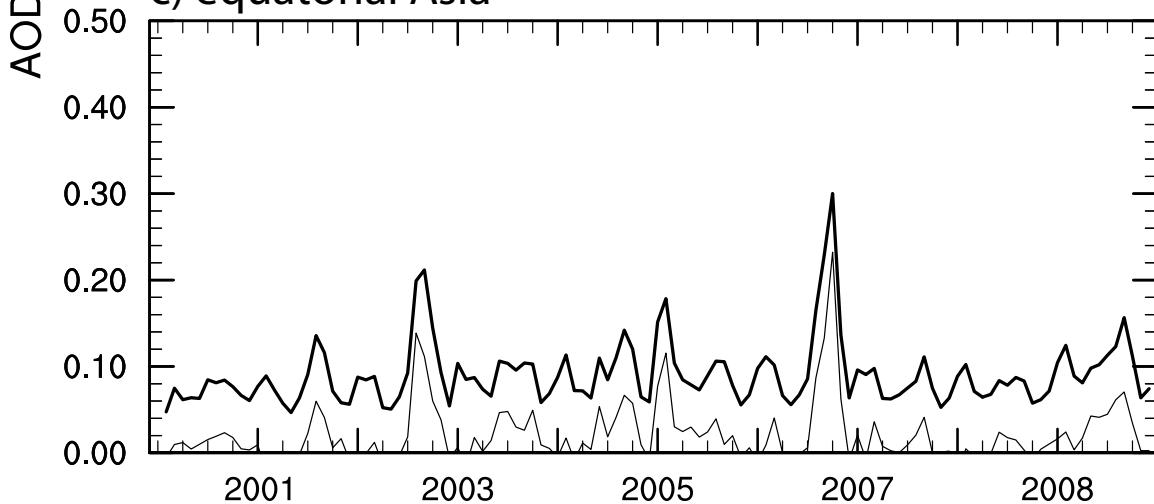
a) South America



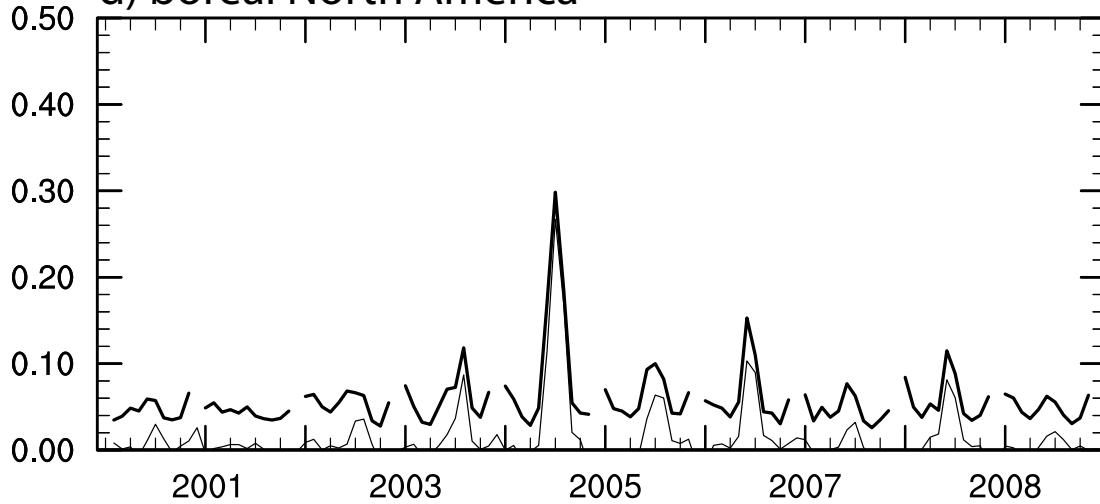
b) southern Africa



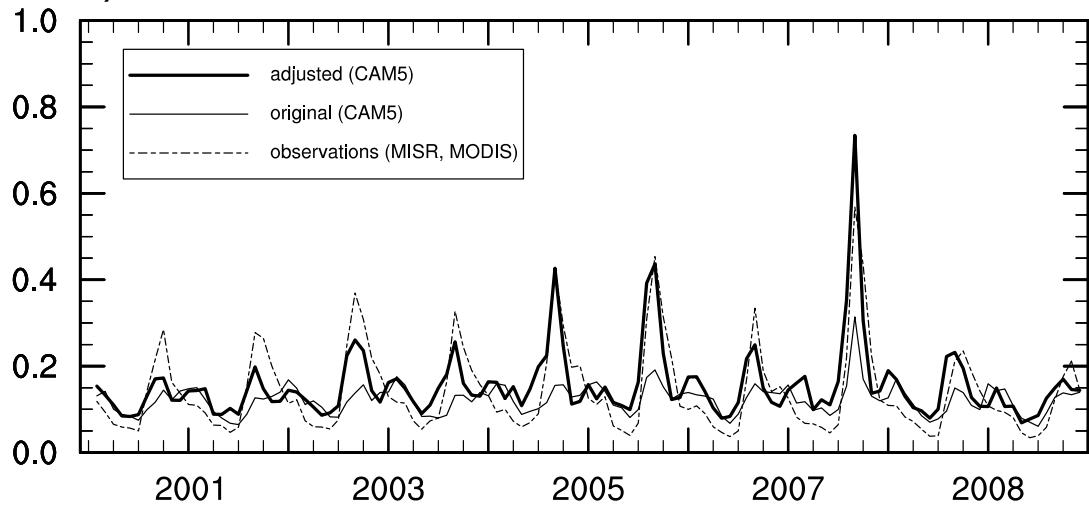
c) equatorial Asia



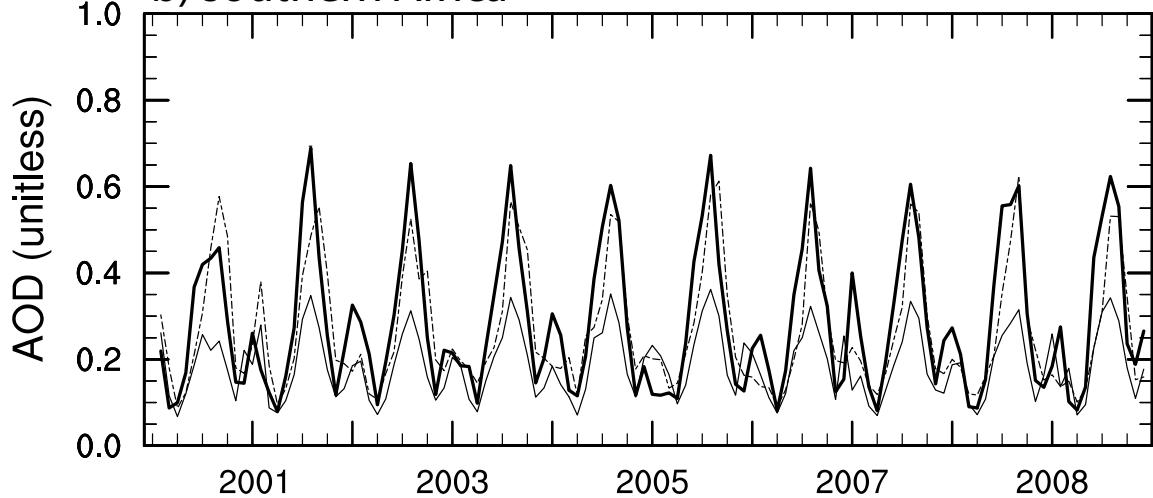
d) boreal North America



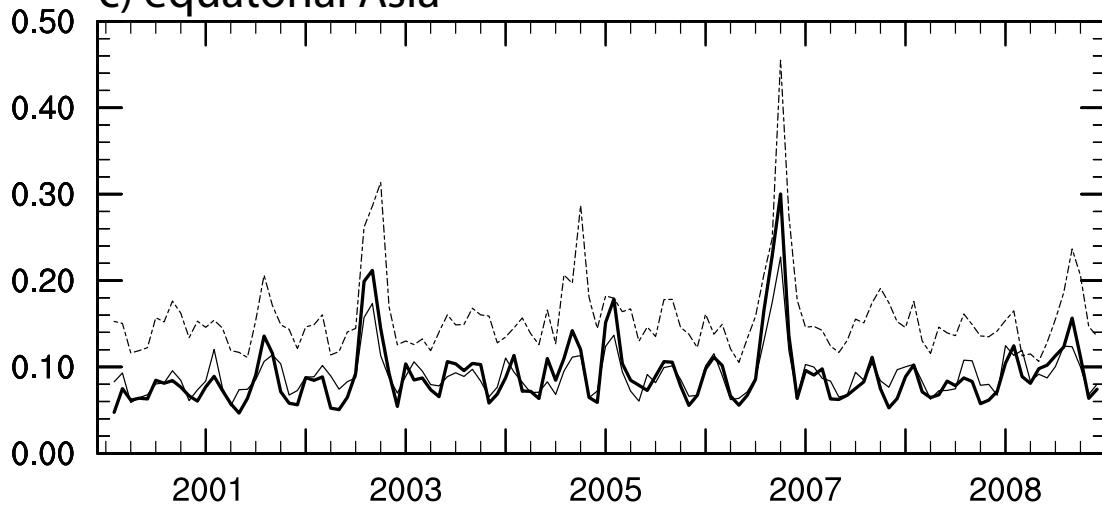
a) South America



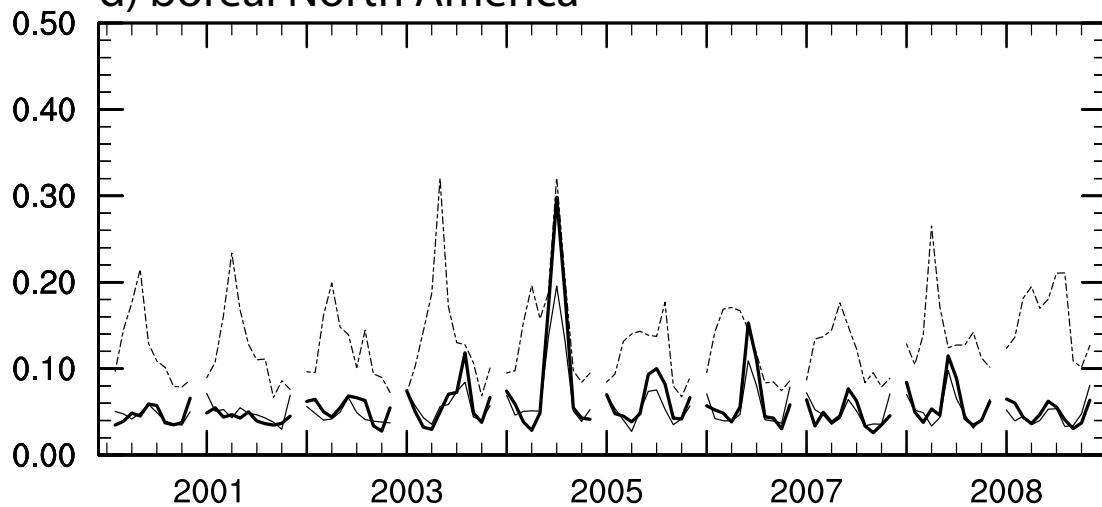
b) southern Africa



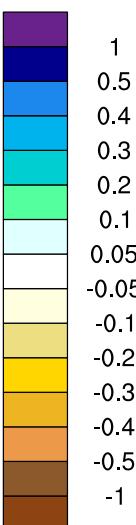
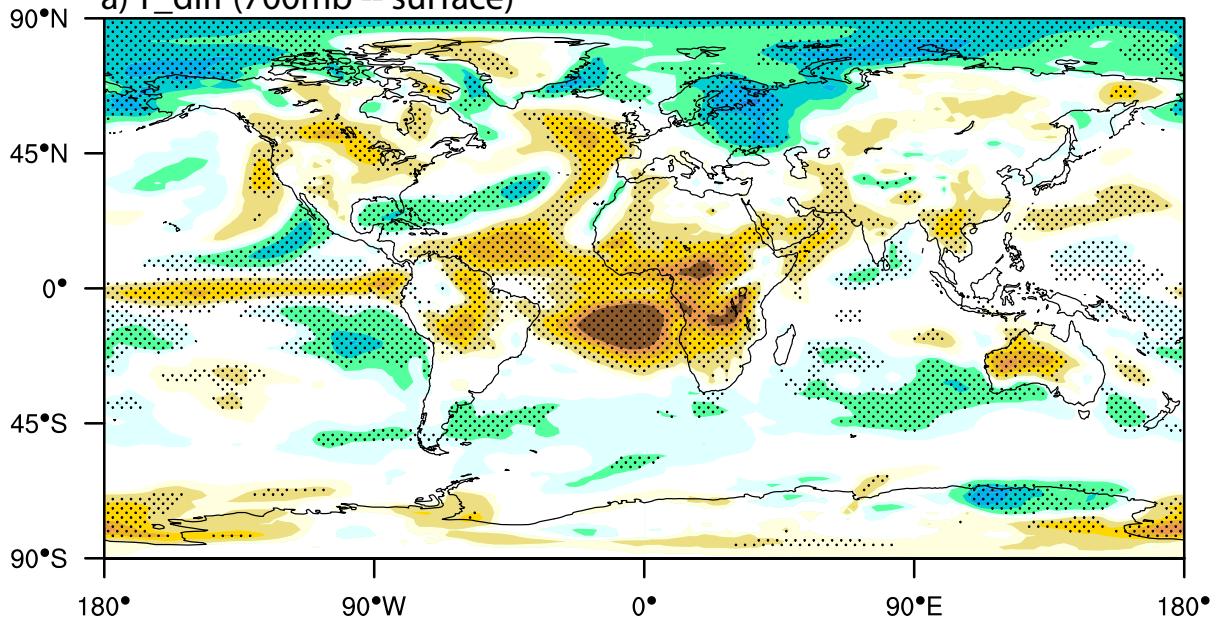
c) equatorial Asia



d) boreal North America



a) T_diff (700mb -- surface)



b) 500 mb vertical velocity (omega)

