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Supplement of

Nonlinear forcing mechanisms of the migrating terdiurnal solar tide and their impact on the zonal mean circulation

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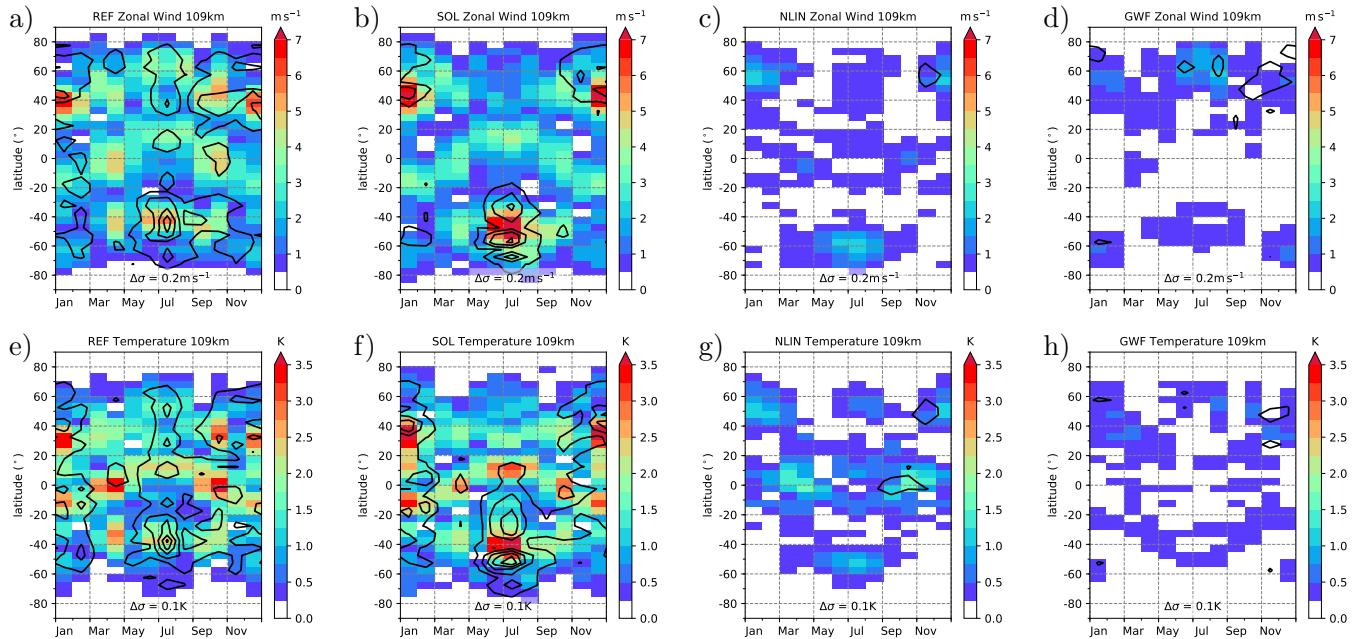


Figure S1. Seasonal cycle of TDT amplitudes at 109 km owing to different forcing mechanisms for the simulations REF (a,e), SOL (b,f), NLIN (c,g) and GWF (d,h) for zonal wind (a-d) and temperature (e-h). Contour lines indicate standard deviations σ starting at $\sigma_0 = \Delta\sigma$ in steps of $\Delta\sigma$.

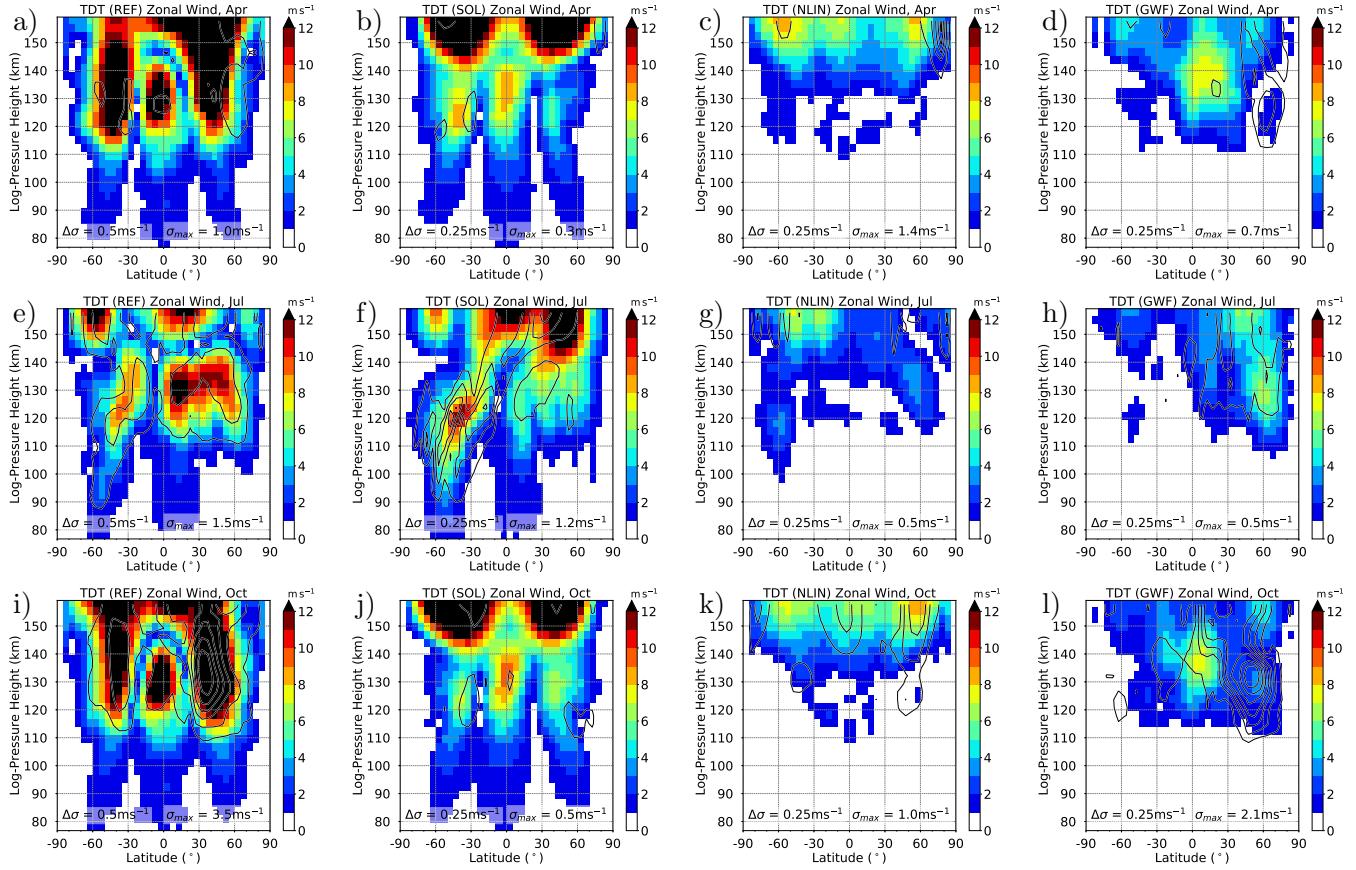


Figure S2. Latitude-altitude distribution of TDT amplitudes owing to different forcing mechanisms for April (a-d), July (e-h) and October (i-l) in the simulations REF (a,e,i), SOL (b,f,j), NLIN (c,g,k), GWF (d,h,l). Contour lines denote standard deviations σ starting at $\sigma_0 = \Delta\sigma$ in steps of $\Delta\sigma$ and with a maximum of σ_{max} as indicated in each panel.

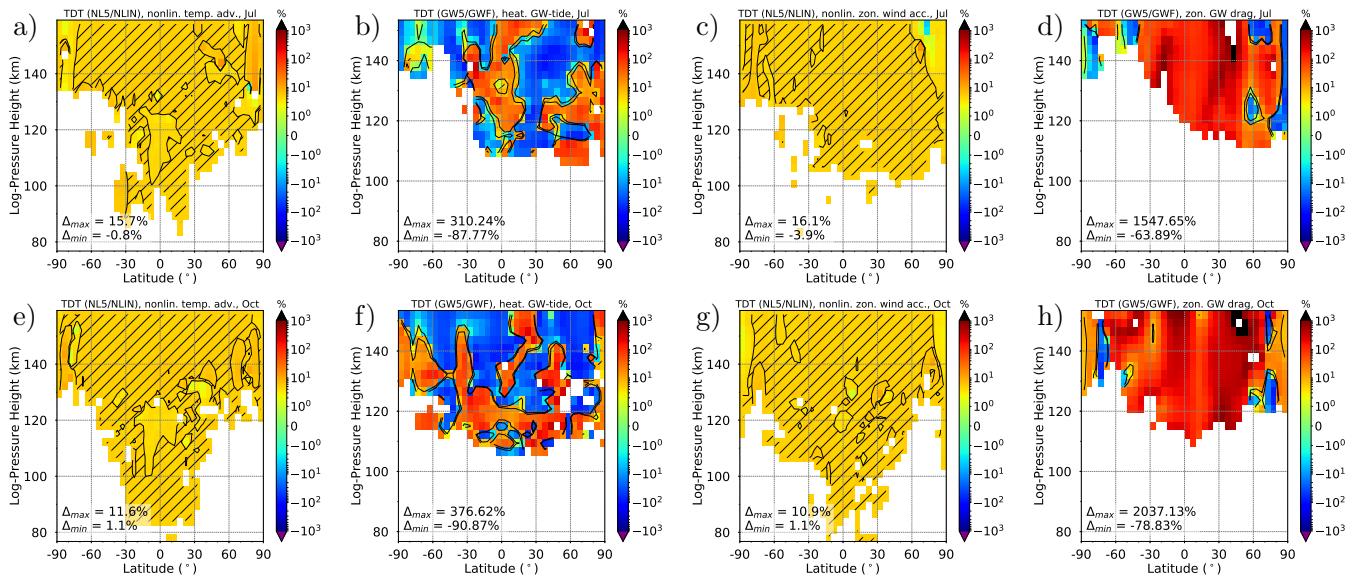


Figure S3. Relative change of terdiurnal forcing terms for an implemented increase of 5% for July (a-d) and October (e-h). From left to right: nonlinear temperature advection (a,e), heating due to GW-tide interactions (b,f), nonlinear zonal wind acceleration (c,g) and zonal drag due to GW-tide interactions (d,h). Red (blue) colors refer to a larger forcing in NLS and GW5 (NLIN and GWF). Hatched areas highlight the values $4.5\% \leq (\text{NLS}/\text{NLIN} - 1) \cdot 100 \leq 5.5\%$ and $0\% \leq (\text{GW5}/\text{GWF} - 1) \cdot 100 \leq 10\%$, respectively. Blank areas denote that the respective forcing in NLIN is smaller than 1 K (2 m s^{-1}), and the respective forcing in GWF is smaller than 1 K (10 m s^{-1}).

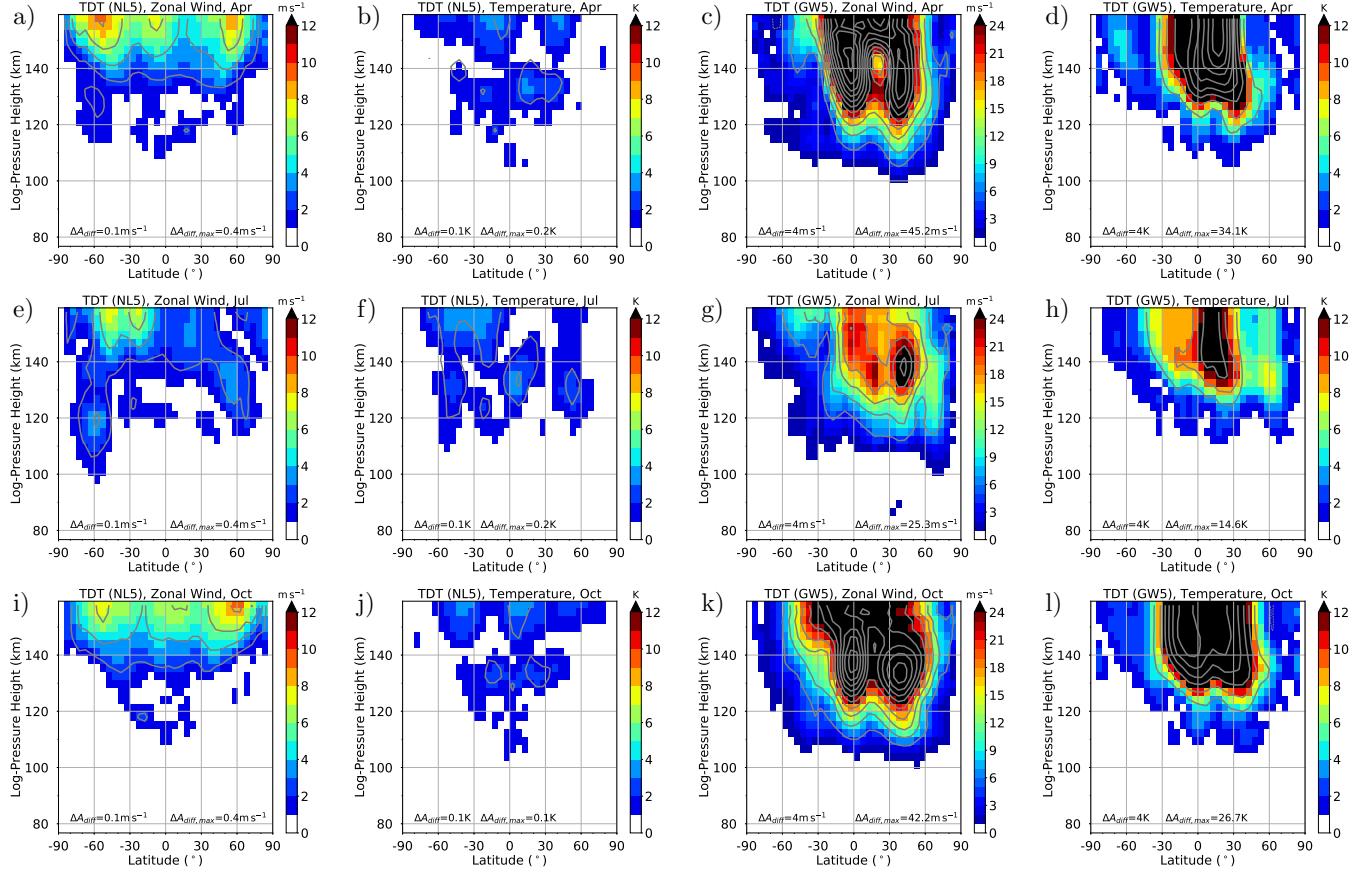


Figure S4. Color plots: Latitude-altitude distribution of TDT zonal wind (a,e,i and c,g,k) and TDT temperature amplitudes (b,f,j and d,h,l) in the ensemble simulations NL5 (a,e,i and b,f,j) and GW5 (c,g,k and d,h,l) for April (a-d), July (e-h) and October (i-l) conditions. Contour lines denote differences to the ensemble simulations NL1IN and GWF, respectively.

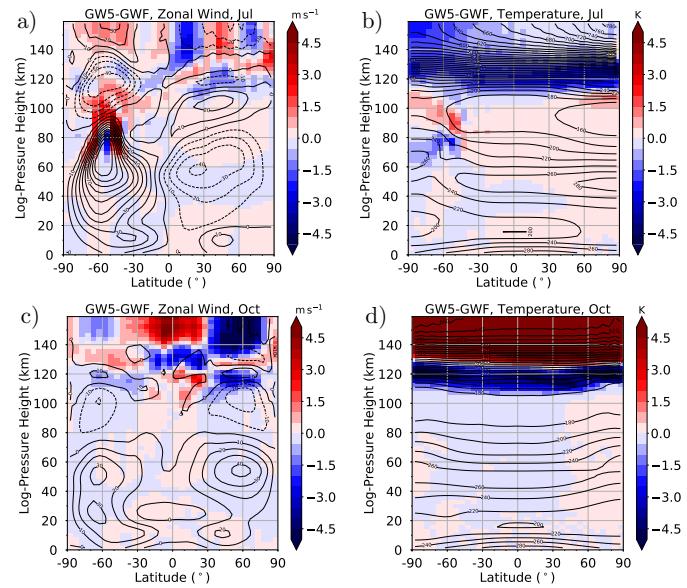


Figure S5. Contour lines: Latitude-altitude distribution of zonal mean zonal wind (a,c) and zonal mean temperature (b,d) in the ensemble simulation GW5 for July (a,b) and October (c,d). Color shading denotes differences to GWF.