

Interactive comment on “Forcing Mechanisms of the Terdiurnal Tide” by Friederike Lilienthal et al.

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Dear anonymous reviewer #1,

on behalf of all co-authors I would like to thank you for your comments and ideas to improve the manuscript. Hereby, I would like to give a short statement on your main comment; a more detailed and comprehensive answer to your review will follow soon.

You raise the question whether removing one forcing will influence the background circulation and therefore also wave propagation conditions and the remaining terdiurnal forcings. As an example, Fig. 1 shows the differences of the zonal mean (background) zonal wind between the NO_SOL and the REF simulation (red and blue colors) where areas of significance are hatched for a 90% confidence interval. For orientation, the REF background zonal wind is added as gray contour lines. It can be seen that significant changes only appear at some spots above 100km altitude. They reach a maximum

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of about 1m/s. For comparison, the year-to-year variability of the model (see Fig. 1b in the manuscript) reaches magnitudes of more than 10m/s for the background zonal wind. The variability due to the removed solar forcing is therefore much smaller and we can neglect this effect.

Fig. 2 shows changes in the scaled nonlinear zonal forcing between the NO_SOL and REF simulation (red and blue colors). The REF nonlinear zonal forcing is added as green contour lines for orientation. Differences amount to less than 10^{-3} m/s/d. In the manuscript, we show the year-to-year variability of this forcing in Fig. 3a which reaches more than 10^{-2} m/s/d. This also shows, that the internal variability of the model is larger than the effect of removing a terdiurnal forcing term.

Of course, these two figure are only examples. However, note that differences in the background circulation and in nonlinear forcings are even smaller in the NO_GW simulation.

In the next version of the manuscript we will include a paragraph discussing this topic but we do not think that it is necessary to include the figures. These are only for illustration for the reviewer.

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2018-154>, 2018.

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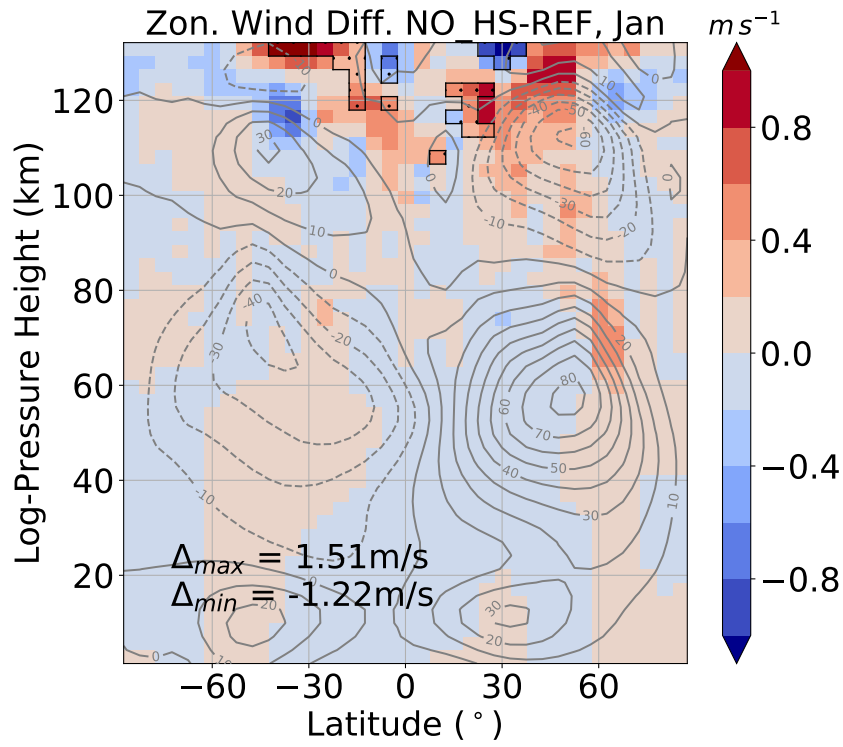


Fig. 1. Differences of January mean background zonal wind (NO_SOL-REF) in colors. Areas of significance are hatched (90% confidence interval). REF background zonal wind as gray contour lines.

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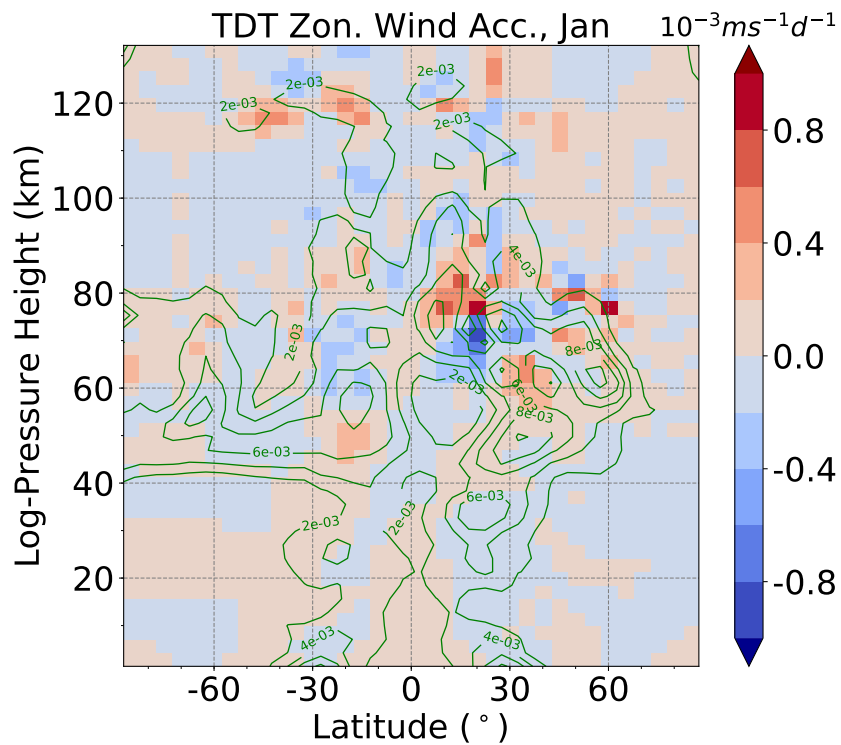


Fig. 2. Differences of January mean nonlinear zonal forcing (NO_SOL-REF) in colors. REF nonlinear zonal forcing as green contour lines.

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