

## ***Interactive comment on “Forcing mechanisms of the quarterdiurnal tide” by Christoph Geißler et al.***

### **Anonymous Referee #1**

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#### General comments:

Forcing mechanisms of the quarterdiurnal tide (QDT) have been tested by a nonlinear mechanistic global circulation model. For this, the model has been run in different configurations to analyze the importance of different forcing mechanisms (absorption of solar radiation by ozone and water vapor, nonlinear tidal interactions, and gravity wave-tide interactions). There are a few modeling studies that explore the forcing mechanisms of QDT and new insights are presented by the authors which add to our understanding of this tidal mode. The scientific contribution is appropriate for this journal, but there are some issues that need to be addressed and the language should be revised.

#### Specific comments:

Description of the model need to improve, mainly about gravity wave routine.

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Page 3, line 23 - Information about the tidal forcing needs to be supplemented. Was the model run with DT, SDT, TDT and QDT modes on?

Page 5, line 2 - from Fig 1 it possible to see that largest amplitudes in the NH are found in February and October for meridional wind component whilst for zonal wind the largest amplitude appear in October for temperature in February, October and November. For the southern hemisphere, the largest amplitudes appear between April and October, being worthy of discussion.

Page 5, lines 11-12 - Please change this sentence - “The largest QDT amplitudes in the southern midlatitudes derived from the satellite data do not show agreement with the MUAM results in Fig. 1 (a).” - In fact, the model does not reproduce the observed amplitudes.

Page 7 (lines 33 and 34) and page 8 (lines 1-6): it would be interesting to separate the description NO\_LIN from the description NO\_GW.

Page 8, lines 19-21 and 34 - The sentences about Figs 9 and 10 are confused. Please rewrite more clearly. Are the authors dealing with the NLIN or NO\_LIN case?

In Fig 1 QDT amplitudes in HS are higher than in HN (mainly in zonal wind). Could the authors discuss these differences considering the different forcing mechanisms ?

#### Minor/Technical comments:

Page 5, line 22 - change “bySmith et al.” for “by Smith et al.”

Page 5, lines 32-33 - Please provide compound term on first appearance of acronyms.

Page 5, line 22- change “(Fig. 7 g, h the amplitudes” for “(Fig. 7 g, h) the amplitudes”

In some sentences the word “model” is used insted “modeling”. Please, check.