**Atmospheric
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Discussions**

Interactive
Comment

Interactive comment on "Signature of the 27-day solar rotation cycle in mesospheric OH and H_2O observed by the Aura Microwave Limb Sounder" *by* A. V. Shapiro et al.

Anonymous Referee #2

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Overall: this is an interesting paper communicating valuable scientific results. The analysis is sounding and the dataset used is pertinent. However, the text is confusing and should be re-organized. The reading of the text is difficult as the message does not follow a clear logical flow. Another point is that measurements undertainties are not provided for us to sense if the signal is not just within the uncertainty range.

1 - Introduction: focus on the main objectives of the paper: the first and the second paragraph are ok and convey the idea for mechanistic studies. Following there is a forest of arguments that not necessarily leads to the objectives of the paper. The third paragraph mix model problems with observations problems and neither one of another

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is the focus of the paper or would be solved by the results of this paper. I would suggest from the second paragraph on to focus on the objectives of the paper: an analyses of measurements looking for short term (27 days) signatures at the mesosphere, an altitude where signals are amplified and therefore easier to be detected.

2 - One important point: there are ground based lidar measurements of mesospheric OH in a couple of sites. Those data actually cover from late 1990's and therefore may contain valuable information. Should at least be mentioned in the text. Please look at: Brinksma, E. J., et al. (1998), First lidar observations of mesospheric hydroxyl, Geophys. Res. Lett., 25, 51–54, (Erratum, Geophys. Res. Lett., 25, 521, 1998.).

3 – Data description: Explain the altitude range covered. Maybe here the authors could put a climatological altitude profile with the 1 sigma variability. This would illustrate the variability in the measurements and the altitude range. There is no discussion on measurement uncertainties, precision, accuracy. Would the measurements error bars support the analysis performed here? Include also that by looking at the tropics you avoid effects of energetic particle precipitation. When introducing Figure 2: clearly describe what we learn from this figure and drive us on how it builds the idea the authors want to convey at the paper. The discussion on the Lyman alpha is really confusing. Suggestions: include a section on OH/H2O chemistry at mesosphere. This will provide a clear picture without many words.

4 – The OH and H2O responses. . .. Section: This is really confusing and it mix too many aspects. Here I would suggest to introduce the methodology and explain why it was chosen, what are the limits and how it is applied. The paragraph with the discussion 'To analyze the OH and H2O variability during the periods od high and low solar activity. . ...' could go to Data Description section as it selects what dataset will be used in the paper. Here the focus should be on the statistical analysis proposed.

5 – Sensitivity Analysis section: I do not really see how it is a sensitivity analysis. I would call this section Analyses (remove sensitivity).

6 – Conclusions: there is a problem with the analysis as coefficients as found here are not convincing (order of 0.74 or 0.76). Further analyses could be added here. In anyhow the word 'strong' does not apply here given the correlation coefficients found.

Another point in the conclusion is they mention the results could be used for the CCM model validations: elaborate on how.

Figures:

1 - show uncertainty in the data. Here it may be really interesting to show a climatology profile with 1 sigma variability.

2 - This figure is confusing and it is not clear what we see from it. Maybe a better description in the text may help here.

3 - 7 - OK.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 28477, 2011.

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