

***Interactive comment on* “Response of middle atmospheric temperature to the solar 27-day cycle: an analysis of 13 years of MLS data” by Piao Rong et al.**

Anonymous Referee #1

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General Comments:

Review of ‘Response of middle atmospheric temperature to the solar 27-day cycle: an analysis of 13 years of MLS data’ by Rong et al., submitted to Atmospheric Chemistry and Physics. The paper is well written and presents interesting results. Minor comments are detailed below.

Specific Comments:

1. Abstract, Line 9: If the sensitivity is larger at high latitudes the why show low latitudes results? Is there a rationale behind choosing 5N for the figures and discussion of results in for e.g. section 4.1.1?

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2. Page 2, Line 15-20: Please specify results from Hood et al. (1991) and Brasseur (1993)
3. Page 3; Line 8: Yes, the processes leading to the observed 27-day signatures are not well understood. This manuscript also only speculates about the influence of dynamics but as in other publications doesn't provide any analysis to understand these processes.
4. Page 6; Line 1: Is the 0-day, 7-day, 13-day smooth also applied to the temperature anomalies (page 8; line 1) or is it used only to identify maxima and minima? Figure 7 shows that 3-day smooth is applied to temperature, is the same 3-day data smooth applied to MgII anomaly?
5. Page 12; Line 25: Another reason could be the vertical resolution between MLS (>10 km) and SOFIE (~2 km). Also, SOFIE measures a range of latitudes (~65-85).
6. Page 13; Line 13-14: If the 27-day signatures in solar minimum conditions are not statistically significant at most altitudes and latitudes, is the comparison of sensitivity values between strong and weak activity years valid? Can the authors specify what are the altitudes and latitudes that have significant sensitivities?

Technical Corrections:

7. Abstract, line 8: Is there a typo in this sentence "A tendency to higher temperature sensitivity to solar forcing in the winter hemisphere is found" (quantify tendency?)
8. Page 3, Lines 3-4: I think there is a typo, grammar issues and/or or missing words in "Besides, an influence of 27-day variability on tropospheric parameters is also debated". Maybe the authors are saying that the 27-day variability on tropospheric parameters has been studied previously?
9. Page 3; line 27: typo "...radio flux 'or' can be..."
10. Page 9, line 17: typo – "...the 27-day signature 'is' more significant..."

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