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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Indications for a potential synchronization between the phase evolution of the Madden-Julian oscillation and the solar 27-day cycle" *by* Christoph G. Hoffmann and Christian von Savigny

Anonymous Referee #1

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This is a well-written and rigorous study of interdependence between Madden-Julian Oscillation (MJO) and the 27-day solar cycle. This study confirms that the relation between these phenomena is most pronounced during certain conditions: during easterly phases of Quasi-biennial Oscillation (QBO) and during boreal winter and MJO events with a strength between 0.5 and 2. On the other hand, the authors bring a rigorous and systematic analysis of all possible aspects which may influence the interpretability of the link between MJO and the 27-solar cycle. In particular, the results strongly depend on the used MJO index and indicate a possible relation between the 27-day solar

cycle and outgoing longwave radiation (OLR). Overall the manuscript has appropriate scientific quality and significance and I recommend publication in the ACP.

However, due to the extensity and focus of the study, I would appreciate an adoption of Open Science approaches to allow reproduce extensive analysis in this study (e.g. Laken, 2016). In particular, I would recommend any kind of willingness of the authors to publish the code allowing to reproduce the figures in the paper. There are multiple ways how to proceed, either to allow the access upon request or via portals allowing to assign Digital Object Identifier (DOI) to the research outputs, e.g. ZENODO. I think it could enhance the quality and reliability of this publication. In the end, this publication might be motivating for future solar-terrestrial studies.

Minor comments

In the abstract please provide explanations of the following abbreviations: RMM, OMI.

I would add a citation of the study Sukhodolov et al (2017) to the discussion starting in P3L3 or elsewhere related to the middle atmosphere. Their modeling results of temperature without a rotational component reveal that the atmosphere can produce random internal variations with periods close to 27 days even without solar rotational forcing. Furthermore, they also discuss quite extensively studies of Hood (1986) and Hood (2016).

Fig. 12 misses an explanation what horizontal lines represent.

References

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