

Ann. Geophys. Discuss., referee comment RC2
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Comment on angeo-2021-52

Anonymous Referee #2

Referee comment on "Responses of intermediate layers to geomagnetic activity during the 2009 deep solar minimum over the Brazilian low-latitude sector" by Ângela M. Santos et al., Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2021-52-RC2>, 2021

Referee Report for the AnGeo-2021-52,

Summary:

This article interestingly describes a case report for the intermediate layers to the geomagnetic activity over the Brazilian sector during the deep solar minimum of SCs 23/24 (2009). While the authors show unique data and discussions, their descriptions look slightly excessive and require additional justifications and modifications.

Major Comments:

1. The authors described their target interval (2009) as "the deepest solar minimum of the last 500 years" (e.g., P1L13-14). This is not true. Recent studies have proven that the solar activity was much more quiet during the Maunder Minimum than during 2009, on the basis of the cosmogenic isotopes (DOI: 10.1051/0004-6361/201526652; DOI: 10.1051/0004-6361/202140711), the sunspot records (DOI: 10.1093/mnras/stab1155; DOI: 10.3847/1538-4357/abd949), and the visual coronal structures (DOI: 10.1051/swsc/2020035). The authors should explicitly compare this deep minimum with the Maunder Minimum, to better contextualize their result in the longer-term space climate studies.
2. In this context, the authors should also address why the solar minimum in 2008/2009 was that significant. The authors have cited F10.7, whereas this lasted only after 1947 according to Ken Tapping's works (DOI: 10.1002/swe.20064; DOI: 10.1007/s11207-017-1111-6), which is missing in their reference list. This minimum was somewhat comparable with the deep minima of SCs 24/25 and SCs 13/14 (DOI:

10.1007/s11207-016-1014-y; DOI: 10.1093/mnras/stab1155). The authors should explicitly address such a long-term context.

3. The authors have used 3 paragraphs of their introduction to (mainly) describe their own studies. The readership would wish to know if this topic is only researched in their laboratory. Therefore, I have to strongly recommend the authors to address other teams' achievements. Otherwise, the authors have to explicitly clarify why other teams have not researched this topic.

4. The authors should describe more about the digisond dataset. From when to when these data are available? Which instruments were used here? How these data have been calibrated? It would be better to let the readership to understand the data within this manuscript.

5. Why do the authors use the Kp index here? The authors should redo their analyses, replacing the Kp index with the Dst index (or at least some more quantitative indices). Here, they have to explain why the authors chose the specific geomagnetic index.

6. Their grammar should be thoroughly improved. They have to send their manuscript to professional grammatical corrections before further review processes.