

We would like to thank the reviewer for valuable comments. They have been perused carefully and responses to all of them are shown below. Our feedback for each comment are in the corresponding "Response" in red italics.

In this study the authors aim at presenting a detailed study of the correlation between PC5 ULF waves and enhancements of MeV electrons at GEO orbit. They follow the first study from Lam et al. (2017), and provide evidences of annual and semi-annual variability over two consecutive solar cycles. Moreover, they present insights to identify the major origins of these variabilities. The study is well detailed and numerous aspects are discussed. However, even if the authors rely on the previous study from Lam et al. (2017), the new findings are not enough highlighted, and conclusions do not provide fully new assets. I would recommend this work for publication after a few major revisions. I detail in the following these points.

Response: *Thanks for pointing out this. The main results can be summarized in four items as:*

- 1. Relativistic electron Fluences present a clear Semiannual Variation. Logarithmic Fluences reach ~ 7.5 near equinoxes and ~ 6.5 near solstices, equivalent to a difference of approximately one order of magnitude. This means that there is a higher probability of internal charging on satellites near equinoxes then being more plausible for them to suffer operational anomalies.*
- 2. Pc5 ULF wave powers also have a Semiannual pattern being ~ 0.5 orders of magnitude higher near equinoxes than near solstices.*
- 3. Due to all correlations in Sections 4.1, 4.1.1 and 4.2, it can be inferred that the Equinoctial mechanism may be the dominant effect in the Semiannual Variation of Fluence and both Equinoctial and RM mechanisms would play equally relevant roles in the Semiannual Variation of Pc5 ULF wave powers.*
- 4. The autocorrelation analyses served to track periods in both parameters along two 11-year solar cycles (SCs). The 27-day period can be observed in every phase of the SC being most prominent during the declining phase when high correlations at multiples and subharmonics of 27 were also observed. On the contrary, the 27-day period is less recognizable in the ascending and maximum phase.*

These four points are put in context in Sections 3.1.2 and 5 where they are compared and discussed with results obtained in previous works.

We will modify the text so that the main results are clear for the reader.

Major remarks:

1- In Lam et al. (2017) the correlation is computed between electron fluxes and PC5 pulsations. Even if it is not the point in this study, I am thinking if the authors could discuss more these correlations, in particular in section 4.1. Figure 9 could benefit from more detailed cross-correlation between fluence and PC5 waves. As mentioned in the title of the manuscript, the reader is waiting for more details on such correlation in my mind.

Response: The title refers to the comparison of the Semiannual Variation in both parameters (Pc5 ULF waves and relativistic electron Fluences) with the three main theories (Axial, Equinoctial and RM) which reflects the objective of the study.

One has to be cautious in saying that the cause of Semiannual Variations in relativistic electrons is the Semiannual Variation in Pc5 ULF waves because there are many physical processes that can produce electrons at MeV energies in the magnetosphere. So we decided to limit the comparison between FI_{SAV} and $Pc5_{SAV}$ and focus on the comparison with the main theories.

However, a brief discussion of the results in (Lam, 2017) will be added since it could be valuable to highlight the main results of the manuscript.

2- Moreover, it is compared here with only $> 2\text{MeV}$ electrons fluences. Do the authors tried to use the lower energy channel ($>650\text{keV}$ electrons)? This may also add some discussion on the energization induced by these waves as well as radial diffusion, as a function of energy, as it has been discussed in some previous studies (see for example Lejosne et al., 2013).

3- One last major remark is (maybe naïve), why do the authors only discuss the power of the PC5 waves? Wouldn't it be interesting to discuss the correlation with fluence and solar cycle according to their modes (toroidal or poloidal as they tend to induce different effects on electrons trapped at GEO orbit, and as their sources may differ)?

Response: The suggestion of studying low energy electrons as well as poloidal and toroidal modes would certainly improve the knowledge of the influence of Pc5 ULF waves on magnetospheric electrons. We are considering to pursue such topics in our future studies.

However, we think the study of periods and Semiannual Variation in both sets of observations used in this manuscript is long enough and self sufficient to present it in a paper as it is.

Minor remarks:

1- Page 3, line 9 : I think yGSEq should be changed into zGSEq, isn't it?

Response: Thank you for this comment. It should be written zGSEq to be consistent with the angle θ used in Section 4.1. However, the use of yGSEq instead of zGSEq means just a 90° shift and the yearly variation with respect of zGSM maintains.

2- In section 4.1, there is only a sub-paragraph 4.1.1, but no 4.1.2. Please clarify.

Response: Thanks. 4.1.1 could be just 4.2 and then change the numeration of the following sections.