Response to Editor

Thank you for a detailed response to the comments by the two reviewers. Although commenting was extensive, I believed most of the issues raised were minor and I find almost all answers satisfactory. After reviewing your answers and revisions (in the "tracked changes" version of your submitted, revised article), I am happy to recommend your manuscript for publication in Annales Geophysicae, following few technical and minor corrections.:

Figure 4: Please generate a higher resolution plot. Parts of the plot (axes, legend, data points) are too fuzzy or blurred. Please also change the title to L: 3.7-3.8 (instead of L3.7_3.8). The meaning of first line of the legend (in red) is also not clear.*

Figure 16: The vertical axis looks cropped, please fix.

General on Figures: in most cases, superscript fonts are used to denote the cm-2 s-1 units (for the power value), except in some cases (Figures 4 and 15-17). Please use superscript also in these cases.

➔ I think I have corrected all little imperfections in figures as you mentioned.

General on units: In some cases the flux is given per steradian, in others integrated over the solid angle. Please verify that in all cases units are consistent – it is not uncommon to have spectra differing by factors of "pi" because an angular/pitch angle integration was forgotten, so I just want to make sure there is such issue. Also, do values given "per steradian" correspond to specific pitch angles or to pitch angle averages of fluxes (taking into account the PAD shape at each energy/L)?*

➔ I have checked all the figures and the units are ok. In most of the cases "sr^{-1}" just comes from omnidirectional data divided by 4π.

Regarding your answer to reviewer 2 on "Figure 16: Since NOAA satellite is at low altitude, it will only measure the particles with really small pitch angles at large L shells. But GREEN provides an average flux of all pitch angles. Most of the times, the pitch angle distribution peaks at 90 degree, so I would expect NOAA lines generally lie below the GREEN lines. But this is not the case especially for the >30 keV electrons. Could you please comment on this?":

Your clarification, that GREEN provides a flux at each pitch angle, is useful. However, I suspect that what reviewer was maybe inquiring is how do you quantify in GREEN the flux at large pitch angles and L-shells, given that at large L-shells NOAA cannot monitor large equatorial pitch angles. Do you assume a certain PAD shape which you constrain with NOAA observations at low pitch angles?

➔ Yes we assume a PAD shape. I have specified it in the text: "An equatorial pitch angle distribution shape in sinus is assumed and constrained by data all along the magnetic field lines between L*=2.5 and L*=5 (Figure 5)."

On the issue of discontinuities (p. 13, lines 15-19 in the revised article): You suggest that improving each model at each boundaries may be a solution, but wouldn't that be unnecessary complex (ie. to improve 6 models in parallel?). Why can there be no consistent way develop a unified model across many L and energies, combining in parallel all different measurements that each of the 6 "submodels" of GREEN. I believe you partly address this is the introduction, but maybe you can be more explicit why this has not worked (or cannot work).*

➔ I have added a sentence in the introduction to be more clear: “Obviously, the ideal would be to develop a unified global model across many L* and energies rather than combining “submodels”. However, radiation belts are made of several regions with different dynamics and several populations (low energies and high energies) with different behavior. So it is easier to develop local models for each region and each energy range.

Non-public comments to the author:

Dear Dr. Sicard,

thank you for submitting your manuscript to Annales Geophysicae. After reviewing the article myself and your discussion with the referees, I am glad to proceed with its acceptance for publication, after some technical and minor issues are clarified, as you can see in my public comments.

Kind regards,

Elias Roussos

➔ Thank you Elias for taking the time to read and reread this paper.

Kind regards,

Angélica