Dear reviewers,

Thank you for quickly reviewing this manuscript again. We appreciate your thoughtful feedback which was incorporated into the manuscript. As before, our responses to your feedback in this letter are colored green, and with done for minor suggestions.

Also, for each comment this time we included line number references in the format: L123/456, with the first line number referencing the accepted version, and the second number referencing the tracked changes version.

Sincerely,

Mike Shumko

Reviewer #1 (Comments to Author (shown to authors):  
  
Below are my comments on the revised draft from Shumko et al., 2021. The authors have addressed most of my previous concerns, but I have two remaining significant issues that need to be addressed.  
  
The first major issue is with the paragraph starting on L282, where the authors argue that the microburst duration increase with MLT isn't due to a magnetic latitude effect of chorus propagation. I don't agree that this conclusion is demonstrated.  
  
(Brief comment: I don't understand what you're trying to say in L288-290. Please clarify.)  
  
From L290: "If low and high latitude chorus waves scattered microbursts with different durations, Fig. 4b would show the microburst durations broaden or bifurcate from midnight to noon MLT."  
  
Based on the recent statistics of:  
  
Agapitov, O. V., Mourenas, D., Artemyev, A. V., Mozer, F. S., Hospodarsky, G., Bonnell, J., & Krasnoselskikh, V. (2018). Synthetic empirical chorus wave model from combined Van Allen  
Probes and Cluster statistics. JGR, Space Phys. <https://doi.org/10.1002/2017JA024843>  
  
I don't think we would expect either of these possibilities. Their Figure 9 shows that from MLT=2100-0300 the chorus amplitude distributions are mostly confined to < 7 deg (panel a). However, there is a big shift to higher latitudes by 0400-1200 MLT (panel d), with nearly all the wave power at > 5. This MLT binning is very coarse, and in likelihood the distributions are smoothly varying from 21 UT to 12 UT. At least, I don't recall seeing any previous evidence of any bifurcation that exists at some MLT value. If you know of such a result, then please cite it. (Brief note: I think the Agapitov statistics are more relevant here than the Li et al. 2009 statistics b/c they have better mlat resolution).  
  
  
I don't think we would expect to see significant broadening of microburst duration because I don't see significant broadening of the mlat power distributions of Agapitov et al., 2018. Rather, the chorus just shifts to higher latitudes with increasing MLT. This is just what is observed in your Figure 4b, and so seems a possible explanation for your MLT observations.  
  
Of course, mlat is just a single factor (though possibly a dominant one). Variation over a solar cycle, variation with activity level, etc can all factor in to complicate things. But I don't think it's correct at this stage to rule out changes of chorus with mlat.

Thank you for referencing Agapitov et al. 2018---we found their paper to be very informative. We agree with assertion that high latitude chorus could be responsible for longer-duration microbursts given the wave amplitude distributions shown in their Figs 9b and 9d. We rewrote the paragraph starting on LXYZ/ABC highlighting these results and we mentioned that this is likely not the sole driver of microburst duration.  
  
  
The second major issue is:  
L241: I have a problem with this statement: "This subtle trend is most evident in Fig. 4a". I don't think it is evident at all, and I don't think that most readers could be convinced of this. However, the example plots you provided in the rebuttal showing the overplotted median lines make this result very clear. You state that these make the plots appear "haphazard", but I disagree. I strongly recommend using these versions.  
  
If you choose not to, then I think you should state that the trend isn't clear in the plot but that your analysis indicates that there is a subtle change in duration with L-shell (I personally find this approach way less satisfying than actually presenting the overplotted lines).

We appreciate your nudge to visually show the trend in L-Shell. We added the median duration trend line to Fig. 4; in L-Shell in Fig. 4a and, for consistency, in MLT in Fig 4b.

We made numerous minor edits throughout the text reflecting this change. We also quantified both trends in the text. For example “the median duration, shown by the solid white line, increases from 85 ms at L=4, to 106 ms at L=5.5”, on LXYZ/ABC and “Fig. 4b that clearly shows the microburst duration roughly double from 75 ms near midnight to 140 ms near noon MLT” on LXYZ/ABC.  
  
Other minor issues remaining.  
  
L145: "microburts" misspelled Done   
  
L214: "Microburt" Done  
  
L215: "decrease" is a better alternative to "shrink" Done  
  
L299-301: What prior work? Done. We referenced the Shue et al. 2019, and Teng et al. 2017 results

Also, "duration is 3-4 times longer" Done  
  
Looking forward to hearing the authors' responses to the above. I will do my best to return my comments much more quickly next time.

Reviewer #2 Evaluations:  
Science Category (Required): Science Category 1  
Presentation Category: Presentation Category A  
Key Points (Required): Yes  
  
Reviewer #2 (Comments to Author (shown to authors):  
  
Shumko et al.  
"Duration of individual relativistic electron microbursts: A probe into their scattering mechanism"  
  
The authors revised their manuscript along my comments, and now I recommend that this paper should be published in GRL.