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Interactive comment on "Variability of Relativistic Electron Flux (E > 2 MeV) during Geo-Magnetically Quiet and Disturbed days: A Case Study" *by* Tulsi Thapa et al.

Anonymous Referee #2

Received and published: 13 July 2020

General comments:

The authors studied the relativistic electron flux (E > 2 MeV) in the outer radiation belt during four events, three magnetic storms with different intensities and a quiet period, using wavelet transform and cross-correlation. The solar wind parameters and a magnetic storm index have been related to the radiation belt electron flux. The case studies may be interesting although it should be carefully presented and explained. The manuscript is not clear in many parts and presents many language issues.

Specific comments:

1. Some parts in the manuscript are confusing as for instance the lines 17-18 and

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Discussion paper

300-301 do not agree in the statements.

2. There are strong conclusions during the manuscript mentioning previous papers although the results do not clearly show it.

3. The Introduction may be rewritten since it does not really support your work, mainly in lines 50-59. The Van Allen probes are mentioned in lines 50-51 but only GOES data is used.

4. How does your work focus on loss, acceleration and transport of relativistic electrons as mentioned in lines 61-63?

5. You mention that “magnetic storms are not the primary factor that pumps up the radiation belts”, but you found a good correlation between electron flux and SYM-H. How do you explain that? Do you think your results support your conclusion?

6. What do you mean by “different interplanetary structures” in line 145? You only mention high speed streams.

7. What is the point of using Wavelet transform in your work to support your conclusions?

Technical corrections:

It has been pointed out some corrections, but not everything. You may please check punctuation, space, missing “the”, references, etc.

15: remove and

15: fluctuation or variation?

16: is dependent

15-17: This conclusion is not clear during the manuscript.

17-18: This sentence does not agree with the statement in lines 300-301.

22: electron flux

22-24: The same comment is lines 334-336: You may be clear here that you are relating electron flux with SYM-H.

32-34: . . .(CME), co-rotating interaction region (CIR) and high speed streams (HSS)

34: space before reference

34: add more references related to geomagnetic disturbances during CIR and HSS

36: trapping or loss of high

36: charged

36: particles in the Van Allen radiation belts (remove known as Van Allen belt)

37: space before reference

37-38: This sentence is not clear “There are . . . flux”

38-39: This sentence is not clear “Enhancement. . .atmosphere”, add reference to it.

40-41: The sentence “Magnetic reconnection. . .magnetosphere.” has no connection to the entire paragraph. I suggest removing it.

43: ions, protons? Would it be just ions?

44: The outer. . .

48: Replace drags us

43-59: I suggest to rewrite the second part of the paragraph: “The aftermath. . .. values.”. You may explain some past results which are important to state your present work.

Section 2: Dataset and Methodology

61:loss, acceleration and transport?

65: dataset

67: Omni web link does not work.

95: Table

96-105: Missing space in tittle SYM-H value; SYM-H intervals may be rewritten, starting from the lower value to the higher (-50 to 0), choosing the word to or the inequality symbol, not both.

112-114: This sentence should be in the Methodology Section.

118: It is missing unit: -4 nT

119: which may be

121: Why to 2 to 2.5 nPa? At the plot the PSW reaches lower values.

121: solar wind pressure? Which pressure? Dynamic? Thermal? Magnetic?

124-126- Sentence “As the solar wind. . .” is not clear.

126-128- Sentence “Since. . .” is part of the last sentence. Both may be rewritten.

128: fluxes -> flux

131-132: Sentence “As high speed. . .” is not clear.

134: corresponding to the time of minimum SYM-H value.

145: What do you mean by “different interplanetary structures”? It may be clear in the sentence.

146-147: The sequence of panels is the same as explained in Figure 1.

147-148: which indicates the storm is moderate according to . . .. . .

148: remove [ ]

149 : allows the charged

157: You'd rather rewrite it since accelerate is not a good word here.

158: new paragraph

164: rewrite reference

167: stream

168: storm

168: The higher solar wind speed, the higher

182-183: Sentence "The fluctuation. . ." is not clear.

185: remove [ ]

186-188: Sentence may be rewritten.

190: accelerating is not appropriate here.

191: What is normal?

193: fluxes or flux?

195-205: This discussion should be improved.

215: compression of bow shock?

229-241: This discussion should be improved.

275: Figure 5 should be presented in the same order as the Section, from quiet to super-intense storm.

280: "(refer to . . .)"is not clear.

286: "our work" may not be necessary.

288: for the intense storm

299: greater -> larger

301: The sentence “Hence ..” may be rewritten.

314: events

314: there seems to increase?

320-321: “compressed . . .far” is not clear.

322: and enhancing

326: ‘To be ..” is not clear

328: in all

328: the intense

329: The high Psw values lead

334-336: You may be clear here that you are relating electron flux with SYM-H.

336-339: it is not clear.

-You did not mention anything about the red dashed line in Figures 2, 3 and 4.

-The description of similar figures may follow the same pattern in all the figures and Sections.

-You refer to figures as Figures, figures, fig., etc. This should follow the same pattern along the manuscript.

- Replace solar wind velocity by solar wind speed.

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