

Spread F occurrence features at different longitude regions during low and moderate solar activity

Abimbola O Afolayan et al.,

The present paper deals with a good comparative study of Range spread F (RSF) development from different longitude sectors of equatorial ionospheric region during low and moderated solar activity periods and worth to publish. Though the research contents of this paper are of excellent qualities some modifications are needed especially in the structuring the manuscript and clarifying the result before publication.

Some of the modifications are discussed as below:

1. First about the title “Spread F occurrence features at different longitudinal regions during low and moderate solar activity”. I think as the present manuscript describes only RSF so title should be more specific.
2. In the line 17-18, “at different.....2013” the meaning is not clear here.
3. In lines 24-26, “The observed featuresof occurrence”, please rephrase the sentence.
4. Please put a space between the word “widespread” in line number 38.
5. Line 47-48: “The pre-reversal enhancement (PRE).....in conjunction” the vertical drift velocity of what and how it is related with PRE?
6. Line 50-52: please put some references in favor of the statement “The PRE.....instability mechanism”.
7. Line 54: replace “of the” with “in”.
8. Line 57: use “conditions” instead of “condition”
9. Line 58: whenever you are using the phrase “past studies” please include some suitable references.
10. Lines 59-61: “The complex.....low latitude region.” Please include the references Haldoupis et al., (2003) and Miller (1997)

- a. *Haldoupis C, Kelley MC, Hussey GC, Shalimov S. Role of unstable sporadic-E layers in the generation of midlatitude spread F. Journal of Geophysical Research: Space Physics. 2003 Dec;108(A12)*
- b. *Miller, C. A, Electrodynamics of midlatitude spread F 2.A new theory of gravity wave electric fields, J. Geophys.Res., 102(A6), 11533-11538, 1997.*

11. Line 103-104: “the different.....solar activity”, please mention which seasons you are using for your manuscript, yearly mean of SSN or F(10.7) and the longitudinal range using for this study.
12. Line 127: Please specify the longitude range.
13. In Table 1, please refer the short forms for all ionosonde stations that you used throughout the manuscript.
14. Line 135: please delete “echo” from the statement “the recorded.....SSF”
15. In the same sentence please some references of “Bowman” e.g.,
 - a. *Bowman, G. G., (1960), A relationship between “spread-F” and the height of the F₂ ionospheric layer, Aust. J. Phys., 13, 69-72.*
 - b. *Bowman, G. G., (1998), Short-term delays (hours) of ionospheric spread F occurrence at a range of latitudes, following geomagnetic activity, J. Geophys.Res., 103(A6), 11627-11634*
16. Line 139: please replace the word “height” by “altitude” and delete the words “echo” and “axis”.
17. Line 141: “Hereafter, we.....RSF”, if you consider both RSF and SSF as RSF then why are you mentioning SSF separately?
18. Line 151-153: “the data taken.....MSA period. Since solar flux unit is similar,” Not clear, are you consider both 2009 and 2010 data for LSA and 2011, 2013 data for MSA? Because mixing of 2009 with 2010 data, also 2011 with 2013 data is not a scientific approach to analyze equatorial ionosphere.
19. Line 162-164: “The seasonal variation of RSF.....MSA period”. Please mention the Figure numbers where you have shown the histogram patterns.
20. Line 165-167: “while.....months” please replace “start” by “starting”.
21. In the same sentence please mention that the statement you have made is that true for all longitude sectors?

22. Line 172-175: “Li et al., (2011).....LSA year.” Where is the highlighted result you have mentioned? The irregularity development at the equatorial region normally initiated around the post-sunset period over the magnetic equator and thereby transported along the magnetic field lines to East ward directions. The post-midnight irregularities are not always the trail of post-sunset irregularities but some fresh irregularity bubbles may develop during late evening hours depending on the nighttime ionospheric effects. So please discuss the statement properly.
23. Line 176-178: “Furthermore, the.....sunset time.” Where is the supporting information against this statement? It can’t be concluded just from the histogram plots.
24. Figure 4: Please mention in the x axis that the time is taken in Local Time (LT). Also mention the years of observations in the caption.
25. Line 185-186: “ILR station....recorded” 100% of what?
26. Line 195-196: “irregularity onset.....onset time,” where is the supporting information regarding this statement?
27. Line 198-200: “The largest STBA.....period”, where is the supporting information against this statement?
28. Figure 5: Please mention in the x axis that the time is taken in Local Time (LT). Also mention the years of observations in the caption.
29. Line 210-215: “The observed pattern D-solstice period.” How can you conclude that ESF occurrence is independent of solar activity whereas solar activity is one of the major controlling agents of equatorial ionosphere?
30. Line 215: what do you mean by non-occurrence of RSF?
31. Line 218: Please rephrase “anti-solar activity” with “inverse solar activity” throughout the overall manuscript.
32. Line 219: Please mention the location from where Su et al., (2007) have been described the inverse solar activity effects of RSF events during the solstice seasons.
33. Line 226: occurrence percentage of what?
34. Line 227-229: “The typicalESF events.” Please provide some references in support of your statement.
35. Figure 6: Please mention in the x axis that the time is taken in Local Time (LT).

36. Line 243: PRE in the equatorial ionosphere normally occurs during sunset or before but not at evening. So please correct the statement in line 243.
37. Line 246-247: "In case of MSA period." Please mention the proper Figure number in the statement.
38. Line 252-255: "Such zonal.....sectors", Please put some references.
39. Figure 7 (a and b): Please mention in the x axis that the time is taken in Local Time (LT).
40. Line 285-288: This section is I think not necessary for the manuscript.
41. Line 314-316: "The equinox entirely." Please provide some reference.
42. Line 327-329: "They associated On the defined $h'F_C$." Please rephrase the sentence.
43. Line 348-351: "We assume during both epoch." The meaning of the statement is not clear.
44. Line 359: Please replace "longitudes" by "Ionosonde stations".
45. Figure 8: Please put it in result section instead of discussion.
46. Line 380-401: In my opinion this paragraph is more suitable to demonstrate Figure 8 in result than discussion section.
47. Line 405-412: "The relationshipas expressed as V " This portion is also not necessary in the discussion section of the present manuscript.
48. Line 413-415: Please make sure the letter front size should be same throughout the whole body of manuscript.
49. Line 417: What is the significance of the dust particles with this study? If you want to keep the statement described in line 417-418, please provide some reference and relate your study with the dust particles.