Dear Dr. Sotomayor-Beltran,

We appreciate your response to the referee's comments and corrections you made in the manuscript. We have sent the improved manuscript for the second revision, and now I am coming back to you on the status of your paper. We have already received suggestions and comments on the improved version. For your guidance, the comments are appended below. Two reviewers recommended revising the manuscript again. There are still statements and information given in the manuscript, which need substantiation and clarification. One of the referees is will review the manuscript again.

The paper contains original results potentially useful in ionospheric studies and I will recommend it for publishing in the Annales Geophysicae after you consider the suggestions and the manuscript will undergo additional revision. Please, consider and discuss in the revised version of the manuscript comments of both referees and results of the already published works the referees referred to.

If you are prepared to undertake the work required, please submit a list of changes or a rebuttal against each point, which is being raised when you submit the revised manuscript.

Kindest regards

Yours sincerely

D. Buresova

Referee#1

Referee report on the paper "Emergence of a localized total electron content enhancement during the G4 geomagnetic storm of September 8, " byCarlos Sotomayor-Beltran

The paper is devoted to the study of the ionospheric storm, using total electron content data occurred on 7-9 September 2017. In particular, the author put in evidence what he calls "a localized total electron content enhancements", and increase of TEC respect a background, at Southern mid latitude hemisphere.

General Comments The principal comments have not been clarified.

The reply of the author that the same effect has been found in another paper is not an answer. 1) The storms studied are different 2) In the paper of Edemskiy et al.2018 they analysed TEC but also foF2 data. 3) The background that they used is not calculated considering 8 days

At first the author should change the background, secondly he has to analyze ionosonde data. This spot with increased TEC covers Australia and it is possible to check this increase using Australian ionosonde stations. 02UT was a daytime in the Australian sector and the NmF2 increase due TAD moving equatorward is a standard situation in the beginning of a strong geomagnetic disturbance. This should be seen Checking ionosonde data.

Only after this it is possible to state that that was a localized enhancement.

So an additional analysis may be recommended (major revision) using Australian ionosonde observations.

Referee#2

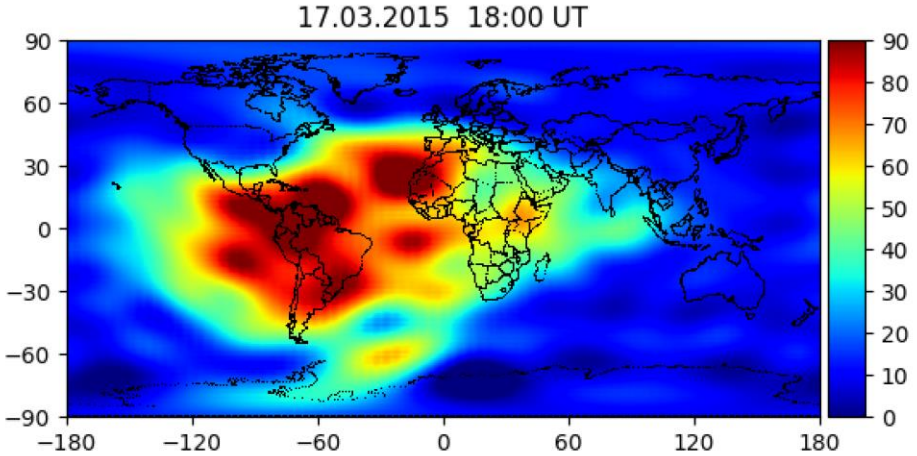
The article is dedicated to investigation of localized TEC enhancement during G4 magnetic storm of Sep 8, 2017.

The topic and the obtained results are quite interesting, however there are several remarks to be considered.

First of all, the presented paper is not the first published results of TEC analysis for 8.09.2017. See the paper of J. Lei et al. (DOI: 10.1029/2017JA025166) and a report of D. Horozovic (DOI: 10.13140/RG.2.2.33749.73442).

The title shows that the article investigate TEC during 8.09.2017 but 2 out of 5 figures and almost a half of the Results section text are dedicated to St. Patrick's storm. Either reflect it in the title or reduce St. Patrick's part adding more information about storm from the title.

How did you check the effectiveness of the presented method in LTE detection? It should be shown that it gives the claimed detection of 95%.
According to the text using the method you detected LTE which is turned out to be the southern crest of EIA. Here is CODE GIM map for 18 UT of Mart 17, 2015 with the clear LTE near Weddell sea. Why did not you mentioned its presence? Is it due to absence of a significant ΔTEC variations?



I also would recommend to show a series of ΔTEC maps to present the LTE dynamics more clearly.

Writing in conclusions about “increment in intensity for this LTE” what level do you use as a background? One can think that you mean that LTE exists all the time and became visible increasing its intensity.

Two out of three paragraph of conclusion are dedicated to St. Patrick's storm LTE and the one detected by other authors at August 15, 2015, with presentation of their suggestion of negative Bz influence on LTE generation. It would be better to describe in more details your statement of LTE generation connection with fountain effect and gives some specific details of the investigated LTE manifestation.

Figures 1 and 4 present data for a whole month whereas author uses only several days to analyze. Moreover such a long series makes impossible to see details of indices variations and to check the timestamps presented in the text. Remove the data you are not using and add hours to timescale. Since you compare Dst and Bz dynamics in the text, it would be better to place Kp panel at the bottom of the figure.

Figure 1 label: Bz is a north-south component of IMF and only negative values correspond to southward direction.

Figures 2 and 5. TEC maps are discussed before ΔTEC ones. To make the reading less confusing it would be better to place TEC to the left and ΔTEC to the right. To make ΔTEC maps more contrast it would be better to use some other color map with white in a middle.

Figure 3. Please use the same style labels. Replace square brackets with round ones and add TEC before “TECU”. Why do you use fractional values for latitude? It will be easier to read integer numbers.

pg 3 ln 12: “5-” instead of “-5”
pg 3 lns 28-30 This is a well-known fact, but here it is formulated as some new or at least unusual result.
pg 4 The top paragraph takes 4/3 of the page and is difficult to read. Split it.
pg 4 lns 10-11 I did not understand why do you duplicate here the information presented above.
pg 4 ln 23., pg 5 ln 20, pg 6 ln 13: According to Space Weather storm of August 15, 2015 was rated as G3 (https://www.spaceweatherlive.com/en/archive/2015/08/15). Where did you get G2?
pg 5 ln 8: “several” not “some”
pg 5 ln 10: replace 4 with 5 in “Fig. 4”
pg 5 lns 11-12: What do you mean by “increment of decrement of VTEC”? If it is not about a temporal variations it would be better to describe them as deviations from medium value.
pg 6 ln 10: “What is was discovered was...” is not a good formulation. Rewrite this part.

That looks like you are citing the paper of Hathaway and Upton only to explain what do you mean by solar cycle 24-25 minimum. I should note, that mentioned authors write more correctly: “from early 2016 to the end of 2019 – near the expected time of Cycle 24/25 minimum”. I recommend to replace “solar cycle 24-25 minimum” by “since 2016”.