

REVISION LIST (Topical Editor)

Title: Extending the Coverage Area of Regional Ionosphere Maps Using a Support Vector Machine Algorithm
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Date: January 09, 2019

Dear topical editor

Thanks for your comments on this manuscript. The authors have incorporated all the comments in revised manuscript. The revised or new sentences are colored in red in the revised manuscript. The manuscript has been revised from the minor revision posted on December 21 (Response to Editor).

< **Topical Editor** >

1) Page 1, Paragraph 15:

What indices do you mean in the last sentence of the paragraph "...hourly/daily indices...". It should be clarified.

It two variables; observation hour and day number. The sentence has been revised.

<Sec.1, p.1>

2) Page 2, paragraph 25:

Please, give some references to the results published by you or to other scientific papers for the statement "*The ionospheric variation is correlated with the diurnal and seasonal time variation, and the ionospheric delay above the locations involved in the study reaches its maximum around 14 hours local time (LT) and its minimum around 2 LT. Also, the daily mean ionospheric delay is higher in spring and autumn, and lower in summer and winter.*"

We have added two references. (Wu et al. 2012, Mansoori et al. 2015).

<Sec. 2, p.2>, <Ref., p.17>

3) Page 2, paragraph 40:

The sentence "However, Dst response performance depends on ionosphere storm types" is not correct. It depends of the ionospheric storm driver.

Thanks for your tip. "Types" has been changed to "driver".

<Sec.2, p.3>

4) Page 3, the second sentence from the top:

"After performing some numerical experiments with Dst, Kp has been selected for the parameter."

and pages 9-10, paragraph 40:

"Series of experiments had been performed by using Dst instead of Kp. In certain instances Dst reflects ionospheric variation better than Kp does. A correlation analysis between Dst or Kp with TEC showed that Dst yields a slightly higher correlation values than Kp. Therefore, we had performed another estimation process after replacing Kp with Dst. Our preliminary results showed that Dst is not better than Kp for our estimation algorithm. The results may be different for another data period when CME-driven ionosphere storm occurs. One month of data period tested in this research may not be sufficient for determining optimal parameter. Comprehensive analysis with a longer data period, e.g. multiple years, will be helpful."

When reading what was said in both page 3 and pages 9-10, there is not clear, what index you are finally using in your computation. Please, give clear information for readers. The statement that "...Dst reflects ionospheric variations better than Kp does" is also not correct. In this case wording "...storm-time variations.." is more clear. In general, the Kp index is usually more suitable, as it reflects both CME- and CIR/CH HSS-related ionospheric disturbances (or combination of both Kp and Dst). On the other hand, as you have mentioned, one-month data analysis is really not enough to get a clear indication of a reliability of the indices. Also geomagnetic activity during October 2014 was minor-to-moderate, what is not an excellent choice when evaluating correlation.

Kp was used for the final computation. The two paragraphs in page 3 and 9/10 have been fully revised to clarify the parameter selection. The shortcoming of Dst has been stated and the test results between Kp and Dst have been briefly included in the paragraph.

<Sec.2, p.3> <Sec. 4, pp. 9-10>

5) Page 3, paragraph 40:

What do you mean using the term "*inner ionosphere*"? The term should be clarified when it was used first.

The inner ionosphere represents a geographical area where ionospheric delay information or observations are available. We have added the definition of the inner and outer areas and replaced "inner ionosphere map data" with "ionosphere input data" for clarification.

<Sec.2, p.2, p.3, p.7, p.8, p.12>