Reply to Referee Report 1

Title: Observations of traveling ionospheric disturbances driven by gravity waves from sources in the upper and lower atmosphere.

Overview of Manuscript

This work investigates the sources of ionospheric disturbances due to atmospheric gravity waves due to high latitude space weather and low latitude tropospheric dynamics. They used multiple observational techniques to detect traveling ionospheric disturbances (TIDs) with large and medium scale characteristics, and atmospheric gravity waves (AGWs). Using observations and reanalysis data, they investigated the upper atmospheric dynamics that possibly excited the large and medium scale TIDs originating from the troposphere. The manuscript has the potential to contribute significantly to literature; however, these minor issues need to be addressed.

The authors have responded well to comments and implemented satisfactorily my comments and suggestions. However, there are some minor issues that needs to be solved, especially in the abstract and data sources and methods sections. In the case of the abstract, I will recommend that the authors consider rewritting it entirely with concise but direct and needed details.

The manuscript in the current needs minor revision after which it can be accepted for publication.

Abstract:

General Comment

The abstract is quite confusing. This, I consider to come from the presentation of instruments used and their respective methodologies. Please, carefully but in simple terms consider writting the instrumentation and methodology aspects. Also, capture in clear terms the major contribution of the work.

Reply. *We have rewritten the abstract in simple terms to capture the major contributions of this work.*

Minor Comment(s):

1. **Lines 22 and 24:** Kindly consider rephrasing the sentence: " .... generate gravity waves driving equatorward propagating medium- to large-scale traveling ionospheric disturbances (TIDs) ... and ..... extratropical cyclones are sources of gravity waves driving medium-scale TIDs. The phrase "generate gravity waves driving" .... is a bit confusing.
Reply. *The sentence has been now rephrased.*

Data sources and methods

General Comment(s):
The authors have implemented satisfactorily in relation to this section. However, I would like to suggest to them to iclude the map of the GNSS reciever stations in the supplementary materials to the Fig.1 here (in the main manuscript). Thus, making Fig.1 to comprise of panels (a) – for the current fig. 1, (b) – for the first local domain, and (c) – for the second local domain. The legends are not explained in the text. Infact no legend were defined in the figures for the maps (both the one in the main manuscipt and in the supplementary material). Kindly update them and explain them in the text according to the paragraph in which each instrument was described.

Reply: *We have revised Figure 1 by including the legends and merging it with Figure S1 from the supplementary materials. It is now referenced and explained in the text where each instrument is described.*

Minor Comment:
1. Line 24: The GNSS data for this ???? . .... The sentence seems incomplete, kindly revise.

Reply: *This incomplete sentence is now revised. Thank you.*

Reply to Referee Report 2

Title: Observations of traveling ionospheric disturbances driven by gravity waves from sources in the upper and lower atmosphere.

Overview of Manuscript

This work presents Observations of traveling ionospheric disturbances driven by gravity waves from sources in the upper and lower atmosphere. They use a multi-instrument approach with the aim of attributing observed TIDs to atmospheric gravity waves generated in the lower thermosphere at midlatitudes. The work has the potential to contribute to existing literature if revised and some issues fixed.

I therefore recommend the manuscript be accepted after the implementation of the comment.

Comments

1. The authors should please further simplify the abstract capturing only the important aspects. Although they have worked on it considering the previous version, they should be encouraged to go straight to the point.

Reply: *The abstract has been now simplified to capture the important aspects.*

We would like to thank both reviewers for helping us to improve this manuscript.