Answers to reviewer n°2

The paper studies the impact of GNSS data assimilation over Italy with a focus on a 6-hour forecast based on precipitable water vapor and precipitation. It is evident from the study that GNSS DA improves the underestimation of water vapor by WRF.

We acknowledge the reviewer for reviewing the paper and for the useful comments.

I mostly agree with the points mentioned by **Referee #1**, however, I think that reframing the aim of the paper and adding some additional analysis that could bring some novelty to the paper. From the reply comments of the author to the reviewer, I see the author has already started to prepare results in the direction of data thinning experiments which is good.

We will discuss the results of the data thinning experiment and we will reframe the sentence about the novelty of the paper.

My major concern to add is that the data assimilation experiments need some more elaboration:

- regarding the observations assimilated in the BCKG experiment.

The BCKG experiment uses only initial and boundary conditions from ECMWF. No other data are assimilated to focus on the added value of GNSS-ZTD data assimilation alone. We will mention this explicitly into the paper. Thanks.

- regarding the GNSS data used for assimilation and if bias correction was performed before the assimilation of GNSS data.

Thank you for this comment, which gives the opportunity to clarify the point. We applied the bias corrections before data assimilation using the following procedure. First the raw GNSS data are assimilated in the 3DVAR to calculate the corrections that come from the background. The difference between the observation and the background is saved for each receiver and for each time giving the quantity $(O\text{-}B)_{i,t}$,where i is the receiver index and t is the time. The quantity $(O\text{-}B)_{i,t}$ takes into account for the difference between the model orography and receiver height that, in our case, is never larger than 300 m. For each receiver we compute the background bias by averaging $(O\text{-}B)_{i,t}$ over all times:

$$\overline{(O-B)}_i = \sum_{t=1}^{N} \frac{(O-B)_{i,t}}{N}$$

Where N is the total number of times (i.e. observations) available for each GNSS receiver. Then we use the corrected observation $O'_{i,t}$ in the 3D-Var:

$$O'_{i,t} = O_{i,t} - \overline{(O-B)}_i$$

A paragraph will be added to the paper describing the procedure above. Similar methods were used in the bibliography.

My minor concern to add is about the tense usage in the text throughout the journal should be uniform. Also, the paragraph construction should be more refined regarding the main point to express in a context.

We will review the tense usage.