

General Comments.

I think this paper is close to ready for publication. I have made a few corrections to the language. My only concern, as I noted before, are the limits on the PWV values. 0 mm values of PWV at a coastal near-sea-level station are not physically possible. If other groups employing these data have similar results, this does not imply the correct calculation of GNSS PWV. For example, Yuan et al. (2023) note that erroneous values in water content are found in high elevations zones, the Arctic/Antarctica, etc... These geographic locations are extremely different from the Chinese coast. I doubt the coldest northern site could even drop below 3mm in this region where sea-surface temperatures do not fall below freezing. Your Figure 11b shows these erroneous minimum values, but Figure 13 demonstrates that it is very improbable that your lower latitude sites approach 0mm or even 5mm. Likewise, the northern data at 40N latitude with maximums greater than 75mm are highly unlikely even with remnants of a typhoon. Remember, clouds and heavy rain can effect the wet delay (Solheim et al. 2019 among others) among other errors that may be associated with the reanalysis data. You should employ more rigid limits, let's say, 3 mm to 80 mm and then separate these extreme values to understand if they result from errors entering into the PWV calculation. This error analysis is interesting in itself. But I will let the Editor assess the importance of this issue and whether you should carry out an additional analysis.

Response: Thank you for your constructive and encouraging comments on our manuscript. We have enclosed a carefully revised version that incorporates the provided comments and suggestions. Additionally, we have included an item-by-item response to all comments in the accompanying rebuttal document.

In response to your feedback, we have re-evaluated the extreme values for PWV to establish more rigorous data quality thresholds. Regarding the lower threshold, we observed PWV values below 3 mm primarily at GNSS stations in temperate monsoon climates. This phenomenon is linked to periods when local sea-surface temperatures (SST) approach or fall below 0°C. To illustrate this, we present the relationship between monthly PWV and temperature for two GNSS stations (BLHT and BTGU) in Figure 1, and between PWV and SST for two nearby radiosonde stations (54662 and 54857) in Figure 2. The radiosonde data confirm that PWV can indeed fall below 3 mm when SST is near zero. In contrast, PWV from subtropical and tropical monsoon areas consistently remained above 3 mm. Based on this evidence, we have set the minimum PWV threshold to 0 mm for temperate monsoon climates and 3 mm for subtropical and tropical monsoon climates.

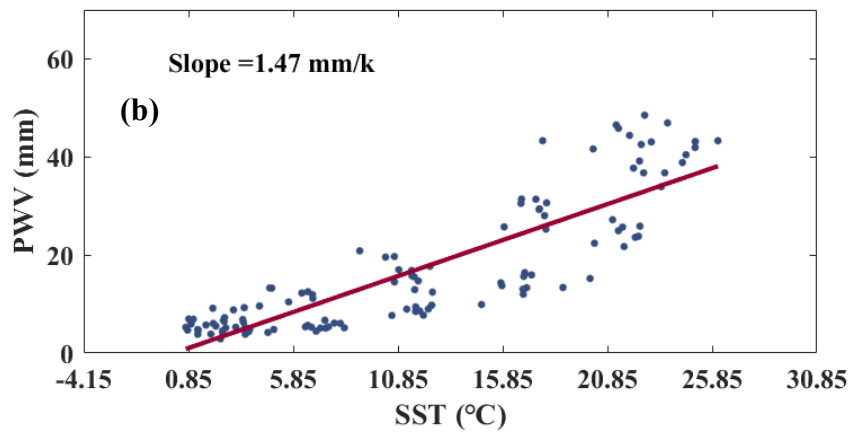
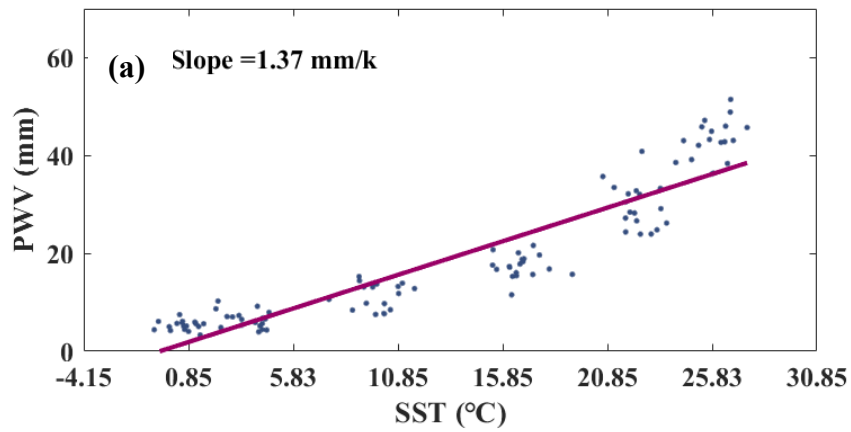
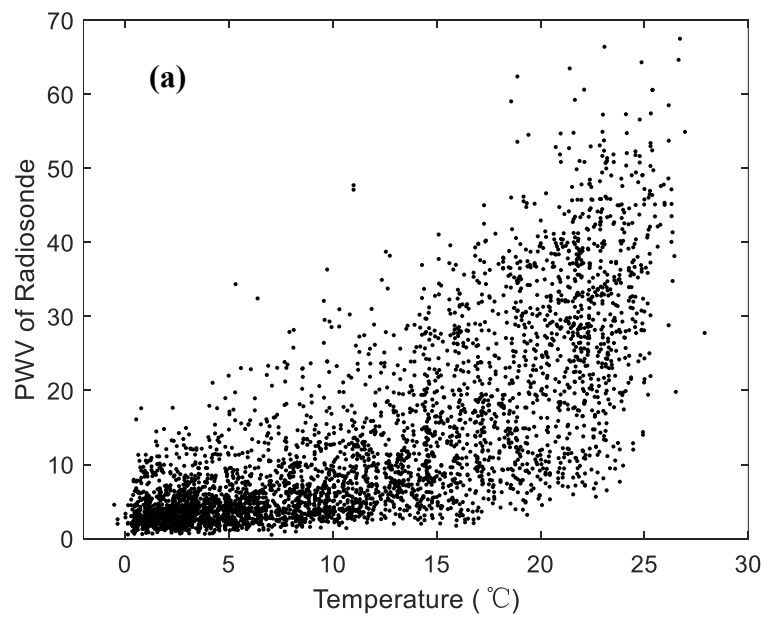


Figure 1 Scatter plot between GNSS PWV (mm) and SST (°C) for Station BLHT (a) and Station BTGU (a).



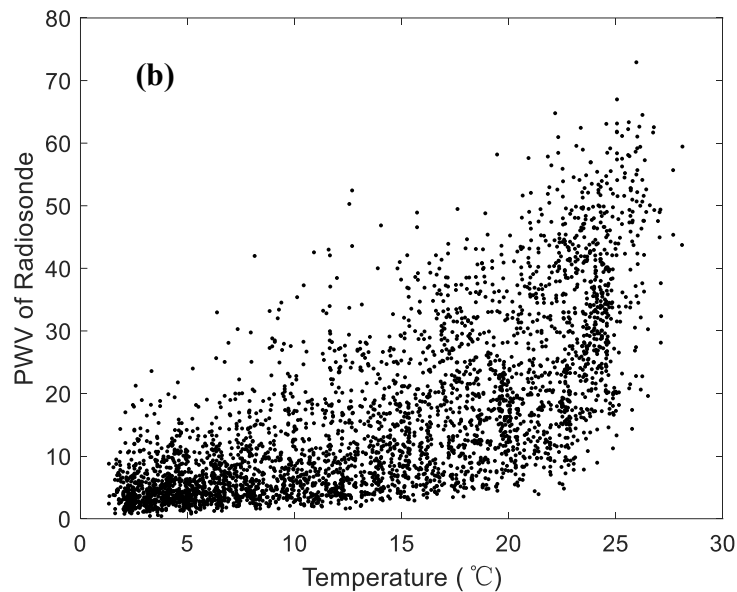


Figure 2 The relationship between PWV and SST for radiosonde station 54662 (a) and 54857 (b)

Regarding the upper threshold, our investigation of PWV values over 80 mm revealed they are not always linked to typhoons. Furthermore, corresponding radiosonde measurements do not exceed 80 mm. Given that wet tropospheric delay calculations are very sensitive to clouds and heavy rain (intensities >40 mm/h) (Solheim et al., 1999; Bonafoni and Biondi, 2016), we have set a conservative maximum value of 80 mm to minimize these potential errors.

In summary, the accepted PWV range for our dataset is now 0–80 mm for the temperate monsoon climate area and 3–80 mm for the subtropical and tropical monsoon climate areas. The manuscript has been revised to include these updated thresholds, figures, and supporting discussions.

References

- Bonafoni S, Biondi R. *The usefulness of the Global Navigation Satellite Systems (GNSS) in the analysis of precipitation events[J]. Atmospheric Research*, 2016, 167: 15-23.
- Solheim F S, Vivekanandan J, Ware R H, et al. *Propagation delays induced in GPS signals by dry air, water vapor, hydrometeors, and other particulates[J]. Journal of Geophysical Research: Atmospheres*, 1999, 104(D8): 9663-9670.

Specific Comments.

Line 33. I assume you want to write "...numerical weather prediction assimilation (Gendt et al., 2004) and extreme weather forecasting (Tsushima and Ohta, 2014)."

Response: Thank you so much for your suggestion. Amended.

Line 43. Remove the word "Therefore", it is unnecessary in this context.

Response: Thank you so much for your suggestion. Amended.

Line 46. Write "...and the ground-based observation network operated by China Meteorological Administration (CMA) (Bai et al., 2021)."

Response: Thank you so much for your suggestion. Amended.

Line 49. Write "dataset from 12,552 ground-based GNSS stations..."

Response: Thank you so much for your suggestion. Amended.

Line 116 Write " A batch least-squares estimation method was used to...."

Response: Thank you so much for your suggestion. Amended.

Line 165 Which stations and when do your near coastal, sea-level station values approach 0.72 mm? These relatively warm waters along the Chinese coast cannot result in PWV near 0.72mm. Your lowest values PWV should always be above 3mm, you need to check this more carefully or better justify that including values below 3mm is correct.

Response: Thank you so much for your suggestion. Accordingly, we have adopted more stringent data thresholds. The accepted PWV range for our dataset is now 0–80 mm for temperate monsoon climates and 3–80 mm for subtropical and tropical monsoon climates.

Line 249 Write "...most of its match-ups occur in Spring."

Response: Thank you so much for your suggestion. Amended.

Line 354 Remove "Besides" it is not correct in this context. Perhaps you mean, " In addition, ..."

Response: Thank you so much for your suggestion. Amended.