

As expressed in the title, the manuscript developed a dataset which contains high quality integrated water vapour dataset from 12,552 ground-based GPS stations in 2020. Such dataset provides better accuracy in IWV than the current operational GPS IWV dataset also provide by Nevada Geodetic Laboratory. The enhanced IWV have been validated by comparing with the ones given by the operational GPS IWV and with nearby Radiosonde-derived IWV. The error budget of enhanced IWV has been briefly discussed and the quality of the ERA5, which provides the weighted mean temperature and pressure for the conversion of ZWD to IWV, has also been validated by comparing with the RS data. Such dense network of enhanced IWV product is import to study both the temporal and spatial variations of the water vapour and is useful for a validation with IWVs given by other techniques. The manuscript is well written with a good structure. I would suggest that the manuscript should be published after a minor revision.

Some minor comments:

Line 44: remove "precise". radiosonde-derived IWV suffers from errors caused by the sensor characteristics that vary in time and space. It is better here just saying Radiosondes can provide vertical distribution of water vapour.

Line 69: "valule" → "value"

Line 88: Are those constraints recommended by GipsyX? Are those values suitable for all stations since you are processing data globally? Can you comment on such issue.

Line 98: "three-dimensional station coordinates every 24 hours" → "daily three-dimensional station coordinates"

Figure 1: In capital, "cyan" → "blue"

Line 108: "distances" → "differences"

Line 135: "IWV" → "ZTD"

Line 154: ", " → "."

Line 196: remove "-"

Figure 5: Use kgm^{-2} as the unit of IWV in the figure to be consistent to the rest parts of the manuscript.

Line 305: "weak" → "small"

Line 309: "weak" → "small"

Line 317: "have" → "has"

Line 318: Change to "1 mm ZHD bias can result in a IWV bias ranging from 0.12 to 0.17 kgm^{-2} "