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Interactive comment on "Assessing the Performance of Troposphere Tomographic Modeling Using Multi-Source Water Vapor Data During Hong Kong's Rainy Season from May to October 2013" *by* Biyan Chen and Zhizhao Liu

Anonymous Referee #2

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Review of the paper: "Assessing the Performance of Troposphere Tomographic Modeling Using Multi-Source Water Vapor Data during Hong Kong's Rainy Season from May to October 2013"

Authors: Biyan Chen, Zhizhao Liu

The paper deals with an another water vapour observation system (tomography) based on GNSS data. The original aspect of the paper is the assimilation of different kind of water vapour measurements (radio-sounding, photometers, radiometers). Such an assimilation of water vapour measurement is a classical approach (even if it should

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Discussion paper

be taken into account the lack of vertical resolution of the GNSS data). The main interesting impact of the paper that should be reinforced is to clearly state the added value of GNSS data.

The paper is well written and scientifically sounded. The structure of the paper could be enhanced (some repetition in p.8 for example; the description of the inversion is quite long and do not detail if a temporal link is included between the inversions; it is not clear what kind of measurements are assimilated in the NWP models used).

To enhance the impact of the paper, 2 points should be added. (1) To clearly establish the added value of the GNSS data, some others comparison could be done as some comparison between the a priori model (maybe only the best one: V1) and the radiosounding or GNSS SWD as in Champollion et al., 2002. (2) From the water vapour observation system (tomography) based on GNSS data, it is not clear to see the impact of data versus NWP models. Could the authors test the tomography without the NWP models assimilation? It is also not clear if the authors also test the assimilation of the surface humidity data.

The case study during severe precipitations event is a nice illustration of the potential of the GNSS tomography. Is the difference between the NWP model and tomography increasing during such a high precipitation event? Even if this is out of the scope of the paper, the study should extended with additional data such as wind to focus on atmospheric processes.

Reference: Champollion, C., Flamant, C., Bock, O., Masson, F., Turner, D. D., & Weckwerth, T. (2009). Mesoscale GPS tomography applied to the 12 June 2002 convective initiation event of IHOP_2002. Quarterly Journal of the Royal Meteorological Society, 135(640), 645-662.

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