General comments: This paper presents the proposal of troposphere modelling using tomography technique and multi-source water vapor data. The integration method of different observation is the novel approach and gives the possibility to improve the stability of equation system inversion. The results are significant and verified independently.
The answers to the main question for the reviewer:
1. Does the paper address relevant scientific questions within the scope of AMT? Yes 2. Does the paper present novel concepts, ideas, tools, or data? Yes, the propose of data integration in one solution. 3. Are substantial conclusions reached? Yes 4. Are the scientific methods and assumptions valid and clearly outlined? Yes/No details comments below 5. Are the results sufficient to support the interpretations and conclusions? Yes 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes 8. Does the title clearly reflect the contents of the paper? Yes 9. Does the abstract provide a concise and complete summary? Yes 10. Is the overall presentation well structured and clear? Yes 11. Is the language fluent and precise? Yes 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes 13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? No 14. Are the number and quality of references appropriate? Yes 15. Is the amount and quality of supplementary material appropriate? Yes

R: Thank you very much for your kind comments toward our manuscript.

Questions and comments:
p.9 l. 5 What observations were processed GPS or GNSS? It is not clearly explained.

R: Thank you very much for this comment. The GPS observations were used to estimate the slant wet delays. We revised it accordingly.

p.9 l.20 The procedure for determining the weights for observations require stronger justification. The process of balancing equations observation weights should be the result of the analysis of the accuracy of observations. In paper for three types of observations unit weights are used and why they are equivalent?

R: Thank you very much for your constructive comments. Yes, the weighting matrix should be determined by the variance-covariance matrix which describes not only the error of each single observation but also the correlation of these errors. In this study, the weighting matrix of radiosonde is from the statistical variance-covariance matrix. For GPS and NWP, their variance-covariance matrices are hardly to be obtained and thus their weighting matrices are defined as diagonal with elements calculated by $\sin(\theta)$ (θ refers to the elevation angle of the SWD of each individual satellite). For WVR, AERONET and synoptic observations, only zenith direction observations are available. Their observations are assigned as unit weights since their variance-covariance matrices are not available either. In the zenith direction, the GPS

PWV weight is one (sin(90 degrees)=1.0), same as that of the WVR, AERONET and synoptic observations in the zenith direction. Therefore the PWV data from GPS, WVR, AERONET and synoptic observations are categorized into one group. In addition to this group, the NWP and horizontal constraints are categorized as two other groups. The Helmert variance component estimation method is adopted to adjust the weight coefficients among each category of PWV data.

As you suggested, we added some descriptions in the revised manuscript to provide more justifications for determining the weights for observations. In line 22 of page 9, we added "In general, the weight matrix should be determined from the variance-covariance matrix that is derived from the analysis of the accuracy of observations. For most of the observations, however, this information is currently not available. Therefore, the observation weights are determined as follows." In line 27 of page 9, "For the weight matrices P_W, P_A, Ps and P_H, they are defined as unit matrices" is revised to "For the weight matrices P_W, P_A, Ps and P_H, they are defined as unit matrices since variance-covariance matrices of these data are currently not available and also hard to be obtained". In line 5 of page 10, "water vapor measurements from these techniques are at a similar level" is revised to "water vapor measurements from these techniques are at a similar level. In our previous comparisons with radiosonde over a half-year period from May to October of 2013, GPS, WVR and AERONET achieve accuracies of 18.06 mm, 18.15 mm and 17.95 mm, respectively. Their accuracies are very similar".

There are a few justifications to answer the question "In paper for three types of observations unit weights are used and why they are equivalent?". First, accuracies of water vapor measurements from these techniques are at a similar level. In our previous comparisons with radiosonde over a half-year period from May to October of 2013, the WVR and AERONET achieve accuracies of 18.15 mm and 17.95 mm, respectively. Second, the variance-covariance matrix of each data is currently not available and hard to be obtained. Therefore, equivalent unit weights are used for these observations.

Thank you very much again.