

***Interactive comment on* “Observing three dimensional water vapour using a surface network of GPS receivers” by S. de Haan and H. van der Marel**

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We thank the anonymous referee for his/her carefully reading the manuscript and thorough comments. We have considered all comments as valid and useful to improve the manuscript.

General comments:

We added a simulation to show that the current network is incapable of observing 3D WV at resolutions higher than approximately 30 km. A figure of the root mean square of the (slant) observation departure (mapped to the zenith) for a number of different grid sizes and vertical grids is added in the revised manuscript. The simulations were all initialised with a constant background which had an exponential decay in water

vapour density. For a period of six hours real slant water vapour data was assimilated with an hourly update (using a persistence background); the RMS for the observation departure was determined the last assimilation. This figure shows that 30 km is an optimal resolution in terms of accuracy and computation time.

We tried a higher resolution for the 2003/05/03 case but observed no improvements. This is in line with the findings shown in the new figure in the revised manuscript.

Specific comments:

p17200 line 12: The conversion factor from IWV is simply applied to SWV. We think that the conversion factor will not change dramatically for elevation higher than 10 degrees.

p17219 line 13: We observe biases due to differences in orography. These biases are removed from the observations before assimilation.

All other comments were used.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 17193, 2008.

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