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## ***Interactive comment on “Measurements of ambient HONO concentrations and vertical HONO flux above a northern Michigan forest canopy” by N. Zhang et al.***

### **Anonymous Referee #3**

Received and published: 8 May 2012

The paper “Measurements of ambient HONO concentrations and vertical HONO flux above a northern Michigan forest canopy” by N. Zhang, X. Xhou, S. Bertman, D. Tang, M. Alaghmand, P.B. Shepson and M.A. Carroll introduces interesting technical developments for measurement of concentrations and fluxes of nitrous acid (HONO). The paper is mostly well written and organized and the results and conclusions are sound. Thus I have only a few minor comments to make:

How long is the HONO lifetime in the atmospheric conditions at the site? If the HONO lifetime comparable to the turbulent transport time the flux can be significantly lower than the actual surface exchange (Rinne et al., 2007). This issue should be discussed

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in the paper.

It would be better to write in active, not passive form. For example, on page 7274, lines 2-3: “Systems have been developed and deployed...” would be of better style as “We have developed and deployed systems...”

Section 2.3: How was the beta-coefficient determined for each half hourly period. As was correctly mentioned in the text the beta decreases with increasing dead-band, relative to the  $\sigma_w$ . Thus for a system not utilizing dynamic dead-band it is important to determine the beta separately for each flux measurement e.g. by using temperature as proxy (Bowling et al., 1998).

Figure 4: You could also add concentrations for dead-band to the middle panel to be sure that they fall between up-draft and down-draft concentrations.

Page 7285, line 14 onwards:  $s_w$  should be  $\sigma_w$ .

Page 7288, line 19: “...was very calm with vertical wind speed  $w$  lower than the threshold  $w_t$ ...” Do you mean that the  $w$  was below the threshold the whole period?

## References

Bowling, D.R., A.A. Turnipseed, A.C. Delany, D.D. Baldocchi, J.P. Greenberg and R.K. Monson, 1998: The use of relaxed eddy accumulation to measure biosphere–atmosphere exchange of isoprene and other biological trace gases. *Oecologia*, 116, 306–315 .

Rinne, J., R. Taipale, T. Markkanen, T.M. Ruuskanen, H. Hellen, M.K. Kajos, T. Vesala and M. Kulmala, 2007: Hydrocarbon fluxes above a Scots pine forest canopy: measurements and modeling. *Atmospheric Chemistry and Physics*, 7, 3361-3372.

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 7273, 2012.

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