

## ***Interactive comment on “Combined effects of boundary layer dynamics and atmospheric chemistry on aerosol composition during new particle formation periods” by Liqing Hao et al.***

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This is an interesting study, which aims at linking aerosol chemical composition during particle formation events to local meteorology and chemical factors. In section 3.3, the authors discuss how dilution due to PBL growth, mixing in of aerosol from the residual layer and aerosol formation by partitioning of organic vapors can affect the diurnal cycle of organic aerosol. These issues have been addressed quantitatively in a previous study on PBL effects on SOA concentrations at the same site by me and my co-authors (Janssen et al., 2012). Using a boundary layer-chemistry model in combination with observations, our study reached some conclusions which may be

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relevant for the discussion in this study as well.

We found for instance that the local formation of SOA can play a role in the observed diurnal evolution of organic aerosol, but that for typical emissions at the SMEAR II station, its role is minor compared to that of PBL dilution and entrainment (figs. 8 and 9). Further, we tested the sensitivity of the simulated OA diurnal cycle to OA concentrations in the residual layer (Fig. 6). These different concentrations could be helpful in explaining the difference in dilution between the SV-OOA and the LV-OOA factors. For the LV-OOA, it seems likely that concentrations in the residual layer are relatively high, since it could have been formed elsewhere and have been advected over large distances. I hope these findings are useful for a more detailed discussion on the diurnal cycle of OA.

Best regards,

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Reference

Janssen, R. H. H., Vilà-Guerau de Arellano, J., Ganzeveld, L. N., Kabat, P., Jimenez, J. L., Farmer, D. K., van Heerwaarden, C. C. and Mammarella, I.: Combined effects of surface conditions, boundary layer dynamics and chemistry on diurnal SOA evolution, *Atmos Chem Phys*, 12(15), 6827–6843, doi:10.5194/acp-12-6827-2012, 2012.

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