

## ***Interactive comment on “Seasonal variation in diurnal atmospheric grass pollen concentration profiles” by R. G. Peel et al.***

**R. G. Peel et al.**

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We would like to thank Professor Bergmann for his thoughtful and constructive comments. Please find below a response to his specific suggestions, including details of the revisions we propose implementing in the manuscript in order to address the issues raised.

1. The authors should define the "pollen season". On which dates the grass pollen count was measured? The season may vary from April till October.

The following text will be added to the beginning of Section 2.2.1 (line 17, page 14632), satisfying this suggestion (this point was also made by the anonymous referee):

C7354

The Aarhus grass pollen season ran from 20 May - 29 July in 2009, from 6 June - 8 August in 2010, and from 21 May - 27 July in 2011. Here we define the start of the season as the first day and the end of the season as the last day that a daily average of  $\geq 10$  grains  $\text{m}^{-3}$  was recorded at one of the three monitoring stations.

2. The authors should notify the differences in pollen counts measured at street level and in the high of about 15 metres referring to their own publication of R.G. Peel: "Do urban canyons influence street level grass pollen concentrations?" In the discussion the authors may discuss the lower exposition with pollen at the street level in comparison with the high level on the roof.

We will add the following paragraph at the end of Section 3.4, satisfying the reviewers request:

It is worth noting that grass pollen concentrations measured at urban background monitoring stations do not necessarily equate to those encountered by the local population - indeed Peel et al. (2013) found a tendency for concentrations measured at roof level monitoring stations to be greater than those recorded simultaneously at street level within the key exposure environment of the urban street canyon, implying that monitoring station data may overestimate within-canyon exposure. Monitoring station and within canyon data were however also found to be fairly strongly and significantly correlated (Spearman's correlations coefficients of 0.84 and 0.65 for canyons in Aarhus and London respectively), suggesting that the variation in the diurnal pattern detected in the monitoring station data analysed in this study will be replicated at street level.

This will result in the following additional reference:

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Peel, R. G., Kennedy, R., Smith, M., and Hertel, O.: The influence of urban canyons on street level grass pollen concentrations, *Int. J. Biometeorol.*, in press, 2013.

3. In the discussion on the clinical importance of the last period of grass pollen season the authors should mention that in this period many hay-fever sufferer adapted already

We will add the following text to the end of the third paragraph of Section 3.4 (line 28, page 14642), satisfying the examiners request:

The clinical impact of increased exposure risk at the end of the pollen season is unclear - according to the priming effect theory, symptom intensity increases following repeated exposure (Connell, 1969) which could lead to increasing sensitivity amongst allergy sufferers as the season progresses, however in the Netherlands similar pollen concentrations have been found to provoke more intense symptoms during the early than the late grass pollen season (de Weger et al., 2011).

This will result in the following additional reference:

de Weger, L. A., Beerthuizen, T., Gast-Strookman, J. M., van der Plas, D. T., Terreehorst, I., Hiemstra, P. S., and Sont, J. K.: Difference in symptom severity between early and late grass pollen season in patients with seasonal allergic rhinitis, *Clinical and Translational Allergy*, 1, 63–72, 2011.

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Interactive comment on Biogeosciences Discuss., 10, 14627, 2013.

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