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Atmospheric Chemistry and Physics Discussions

Interactive comment on "NO_x lifetimes and emissions of hotspots in polluted background estimated by satellite observations" *by* F. Liu et al.

Anonymous Referee #4

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* Overall an interesting and relevant paper. The data are well presented, the measuring and analysis methods seems to me sound although the many fitting, scaling and filtering functions used under different situations with different areal extend makes me confused from time to time.

* The authors state that the mean lifetime is derived from the change of the observed NO2 patterns under windy vs. calm conditions. But if I understand the text well enough, N is derived from C and C is the line density under calm wind only as states into the text (near Eq 4). So this would be the blue lines in Figure 2 since these are the line densities for calm winds? In the figure caption on the contrary, N is fitted to the windy conditions for the different wind sectors (grey line on red crosses). Please clarify, since I am confused.

* It is also not clear to me why you subtract wind speeds between windy and calm conditions for use in deriving the life time. If it is not of a big effect as stated in the footnote 1 why bother?

* The NO2 amount A on top of the background is determined by fitting the functions gi (x) simultaneously for all available wind directions. What do the authors mean with "simultaneously"? Do they mean that they fit it for the 8 different wind sectors at the same time and still only retrieve one A? Please rephrase and clarify.

* The possible linear gradient in the back ground of Equation 5: how can this be explained? Is it also possible that it results from interannual trends in the emissions over the area for the NO2 period under investigation?

* The fit interval h is not well introduced in the main text. Suddenly it pops up. Please clarify.

L26, P24189: replace "division" by "dividing". L9, P24192: should be "visually inspection". Figure 5: Why not using the same color bar range for both panels to stress the difference in total NO2 columns between China and US?

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 24179, 2015.