

Interactive comment on “Interannual variability in soil nitric oxide emissions over the United States as viewed from space” by R. C. Hudman et al.

Anonymous Referee #1

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In this paper the authors examine the interannual variability in NO₂ observed from OMI over the US and show that some of the variability is due to pulsing of soil NO_x emissions over agricultural regions in the central US. They further use a CTM to infer the impact of soil NO_x emissions on surface ozone. This is a very interesting paper presenting a new way to examine and attribute interannual variability in satellite observations of NO₂. The paper clearly outlines its methods and assumptions, and is a pleasure to read.

I have two main concerns:

1.) The authors do a very good job at comparing the interannual variability of OMI NO₂ columns with that of soil NO_x emissions, lightning, precipitation, temperature. However, I am surprised that they do not show the predicted NO₂ column interannual variability

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as calculated by the GEOS-Chem model – driven by their soil NO_x emissions. I realize that the model has a lower resolution than the observations, however it seems that by not showing or even discussing this in the paper, the authors miss an important part of the picture. This is particularly important as they go on to examine the impact of the modeled soil NO_x on ozone using the GEOS-Chem model. I thus suggest that the authors include another panel in Figure 3 showing the mean anomalies in column NO₂ calculated with the model. Similarly they could add a line indicating the model NO₂ column timeseries on figure 5 – or at least discuss how the model compares to the observed column.

2.) Page 13038 lines 10-13. The authors found that satellite retrievals are affected by the subtraction of the stratospheric component in the vicinity of a storm. This is somewhat worrisome as it seems that some of the observed variability could thus be an artifact. Do they have reason to believe that the DOMINO product is better or worse than the standard product? I suggest that they elaborate on this point in the text.

Minor comment

+ What is the time period shown in Figure 2?

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 13029, 2010.