

## ***Interactive comment on “Integration of remote sensing data and surface observations to estimate the impact of the russian wildfires over Europe and Asia during August 2010” by L. Mei et al.***

**L. Mei et al.**

yx9@hotmail.com

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The authors are grateful to all reviewers for their constructive comments. Below are detailed answers to the comments.

Anonymous Referee #2 – C3127 This paper integrates different satellite and ground measurement data to analyze the effect of a critical fire event in Russian in year 2010. The most indicative atmospheric parameters such as aerosol optical depth, particulate matter (PM<sub>2.5</sub>), concentration of CO<sub>2</sub>, NO<sub>2</sub> and SO<sub>2</sub> are chosen for analysis. The transportation of these atmospheric parameters is linked by the HYSPLIT model and the synoptic condition, which shows a powerful method for characterizing predicting

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plume transport. In addition, the paper attempt to get more reliable atmospheric parameters using optimal smoothing scheme and GEOS-Chem model. The paper gives a believable result of effect area of Russian fire in both local and other countries, which is useful to assess the effect of health crisis. I like to see the paper to be published in BG after some minor corrections. Following are my suggestions. 1> Are there any relationships between aerosol (e.g., ice particles) and other gas concentrations particularly Ozone? 2> Figure 11b shows the vertical profile of aerosol. It is better to give more explanations. 3> some pictures could be black/white such as Figures 7, 9 and 10. 4> Figure 2 is not really useful.

Response: (1) Aerosol impact on trace-gas budgets through photolysis. Taking Ozone as an example, some researches found that the impact of aerosols on photolysis alone is to increase troposphere Ozone by 0.63 DU. (Varotsos and Zellner, Atmos. Chem. Phys., 10, 3099–3105, 2010). (2) Figure 11 shows the aerosol extinction coefficient over Kyrgyzstan in August, 2010. We can see the vertical profile of aerosol in different levels. The aerosol extinction coefficient is much larger above 5km than near the surface, which means that the pollutants of the Russian wildfires have transported in vertical level, which agree with the properties of biomass burning aerosol (fine particles) as well as the meteorological condition. So the effect of biomass burning is serious at high altitudes. (3) We will provide Figures 7, 9 and 10 as black/white pictures. (4) We have deleted Figure 2 from the revised version.

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