

## ***Interactive comment on “Intercontinental trans-boundary contributions to ozone-induced crop yield losses in the Northern Hemisphere” by M. J. Hollaway et al.***

**Anonymous Referee #2**

Received and published: 28 October 2011

The paper by Holloway et al. entitled “Intercontinental trans-boundary contributions to ozone-induced crop yield losses in the Northern Hemisphere” attempts to characterize the transport dynamic and formation of ozone and its precursors in the northern continents, with the ambitious goal to define how a reduction in NO<sub>x</sub> emission in North America, South East Asia and Europe can modify ozone concentrations and effects on crop yields for each of the northern continent. Different metrics for concentration-based ozone-risk assessment are applied, and a global atmospheric chemistry model is used to predict transport dynamics over continents. Data show that the model makes a good work in predicting ozone concentrations at regional level, although I am not familiar with the model used and its parameterization. My main concern is somehow shared with

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the other reviewer, since it is quite limiting to consider the same growing season for crops in the Northern Hemisphere. This is an approximation which turns in wrong estimates of the real yield loss, even assuming that the model has a perfect predictive capacity of the local ozone concentrations. However, the paper reads well and the overall message is clear. Future improvements will have to be a better calculation of crop growing seasons, as well as the implementation of metrics based on accumulated ozone flux, not just concentrations. I recommend publication in Biogeosciences, with some minor comments below:

Pag. 8647 linen 18: Surface concentrations or background concentration: please clarify what it means and be consistent with the definition in the text.

Pag. 8654 lines 22-27: It is time to parameterize flux-response relationship for global application, isn't it? First you say that concentration-based metrics may not be appropriate for location where they have not been developed, then you sat that an aim of the paper is to determine how use of these metrics impacts yield loss contributions. Perhaps I did not understand what the author meant, but it seems a little contradictory. I think it is a fair assessment just to state that large uncertainties on yield loss could derive from the application of concentration-based metrics and that future effort should be dedicated at implementing flux-based metrics because they are a better predictor of ozone damage==yield loss.

Pag 8655line 24-25 + pag 8656 lines 1-10: This part should be included in the M&M section as it describes the data sources.

Pag 8657 line 18: put “concentration” after ozone.

Table 5. Please add the units (%) in the table.

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Interactive comment on Biogeosciences Discuss., 8, 8645, 2011.

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