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Interactive comment on "Declining risk of ozone impacts on vegetation in Europe 1990–2050 due to reduced precursor emissions in a changed climate" *by* J. Klingberg et al.

Anonymous Referee #2

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This manuscript quantifies vegetative ozone exposure under current climate conditions and in the future under the RCP4.5 emissions scenario. The authors find that ozone exposure over a threshold of 40ppb decreases in the future due to reductions in emissions, despite the favorable climactic conditions for ozone formation. Additionally, conditions favoring plant uptake of ozone through stomata also change in the future. The authors conclude that the impact of emissions reduction under RCP4.5 will ultimately drive a decrease in the impact of ozone on vegetation that is larger than the increases possible due to climate change.

The manuscript is simple and straightforward, with no major methodological problems. I think the authors can emphasize even more strongly the positive impact that policies

limiting ozone precursors can have on vegetation damage, and perhaps the title can be modified to reflect this.

The authors argue that plant ozone damage, which is regulated by stomatal conductance in addition to exposure indices, can change differently than the ozone concentrations. In fact, the authors spend a significant amount of time discussing how changes in environmental variables will alter the ozone uptake, though this argument is significantly weakened by not quantifying those changes. The argument is made that quantifying ozone uptake is beyond the scope of this paper, but it is not clear why. Given that ozone concentrations, exposure duration, and presumably stomatal conductance (based on the fact that the authors calculate changes in conductance) are all known, the uptake calculation should be simple. If the authors are unwilling (or unable) to quantify ozone uptake, they should at least consider mapping the changes in stomatal conductance, and what proportion of the changes are due to VPD, SWC, and temperature.

In the introduction, the authors need to make it very clear the different impacts that climate and emissions have on ozone formation. I realize that the content is already there, but it needs to be reorganized so that these differences are highlighted and easily understandable to the reader. Additionally, the process of ozone uptake – what it is, why it matters, and how it changes – needs to be included. It would fit nicely into an expanded third paragraph.

Two other minor comments: Section 2.1 is confusing as written. I had to read through several times before I understood what you did. Please try to clarify. Second, you say in the introduction and the methods that you use the A1B scenario for climate, but throughout the results, discussion and conclusions sections, you refer to all the scenarios as RCP4.5. Please clarify why you are using A1B climate instead of RCP4.5, and make sure to not leave that information out when referring to your simulations in later sections of the paper.

Detailed comments are included as notes within the attached manuscript.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/11/C220/2014/bgd-11-C220-2014-supplement.pdf

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Interactive comment on Biogeosciences Discuss., 11, 625, 2014.