

## ***Interactive comment on “Observational constraints on the global atmospheric budget of ethanol” by V. Naik et al.***

### **Anonymous Referee #1**

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This manuscript describes the development of a model budget of global atmospheric ethanol and subsequent comparison of the model simulation with observations. The authors apply the most recent updates to source and sink estimates and yet still find a significant underestimate of free tropospheric ethanol that cannot be reconciled with an oxidation source from known VOCs. The paper is concisely written and motivates further investigation of the sources of ethanol. I have only minor suggestions to improve the clarity of the text.

1. Page 930, line 3: Why are the biogenic emissions calculated offline? What kind of daily variability in emissions would be expected and how might not accounting for this impact comparisons with field observations?
2. Page 930, line 4: What LAI product was used for these calculations?

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3. Page 930, line 13: Is there significant uncertainty in the biomass burning emission factors for ethanol used here? Perhaps a sentence on how extensively measured these EFs are for different ecosystems?
4. Page 931, line 25: A global annual mean BL concentration of ethanol is not particularly useful given its short lifetime and strong gradients – perhaps the authors could separate into continental and oceanic BL?
5. Page 932: when first introducing the field observations, please list the campaigns/sites in the text.
6. Figure 3: Having performed tagged simulations, perhaps the authors could shade the BASE bars by tagged source to illustrate the role of different sources in different regions as discussed in the text.
7. Figures 3 & 4: The colours between these figures should be coordinated (i.e. BASE blue in both plots).
8. Page 936, line 1: Please elaborate a bit on what aqueous-phase chemistry might be important for ethanol.
9. Given that both the supplementary information and the main article are fairly short and that the information given in the supplement is of general interest for the construction of the ethanol budget, I would recommend that the authors integrate the text.

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Interactive comment on Atmos. Chem. Phys. Discuss., 10, 925, 2010.

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