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Atmospheric Chemistry and Physics Discussions

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

Anonymous Referee #2

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The paper describes a modeling experiment with a global chemical transport model which goal is to better constrain the global budget of ethanol by comparing model results with currently available observations. The paper is well written and provides useful and original information regarding the possible sources and sinks of ethanol. I only have minor comments.

1. Section "Model and experiments": Why do the Author need to update the POET emissions inventory? Is there no geographical distribution provided? How do they estimate the fraction of ethanol which is emitted from ethanol production (10%)? How are their results sensitive to this fraction? What are the uncertainties associated with these anthropogenic emissions?

2. Section "Results and discussion": I find the statement "The model underestimate of

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aircraft measurements over NA is not necessarily inconsistent with the overestimate of ship observations along the tracks. . . " a bit weak. The Authors base (to some extent) this statement on the relative contributions of different tagged tracers while the overall agreement between model and observations is rather low. This makes it difficult to actually trust these tagged contributions. Could they rephrase and possibly extend this discussion?

3. Section "Results and discussion", Figure 4: The additional diffuse source used in the SYNEOH simulation enhances ethanol mixing ratios by about 0.1 ppbv throughout the column over the TRACE-P region for example. In contrast, mixing ratios over continental regions seem to be only marginally affected by this additional source (at least not to the same extent). Could the Authors explain this a bit better?

4. Section “Results and discussion”: Could the Authors elaborate a bit on the potential role of aqueous chemistry and if possible, provide an estimate of this potential source?

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