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Interactive comment on "Impact of climate variability and land use changes on global biogenic volatile organic compound emissions" *by* J. Lathière et al.

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The paper describes a very interesting analysis on how climate and human induced changes will affect future emission patterns of biogenic VOCs in a global context. A lot of emphasis is on isoprene emissions which are probably the best understood. Given the focus on climate and landuse change, the authors might not be aware of recent findings on biogenic emissions. For example, Rosenstiel et al. (2003) observed decreased isoprene emission under elevated CO2 due to biochemical changes. It is clear that at this point it might be difficult to include these observations in global vegetation models. Nevertheless these findings are important enough to at least be considered in the discussion as they could have ramifications on modeling future isoprene emissions. Oxygenated VOCs: Emissions of these compounds are probably the least understood. A lot has been learned in the past 5 years. Example 1: It is not clear why the authors estimate that methanol emissions from crops should be much greater than in other ecosystems. The authors cite one experimental publication obtained above a ponderosa pine plantation (Schade et al., JGR 2000). Methanol fluxes reported in this publication are on average 1-1.5 mgC/m2/h. The same authors (Schade et al., 2004) report methanol fluxes from agricultural landscapes of 0.1-0.2 mgC/m2/h, which would be much lower. On the other hand harvesting and natural drying of grass and crops resulted in increased methanol and other oVOC emissions (Karl et al., 2001, Warneke et al., 2002), while recent laboratory screening of various crops showed considerable variability of oVOC emissions (Karl et al., 2005). It is not clear how changes of oVOC emissions are calculated based on the citations given in the present manuscript. For example Guenther et al., 2000 gives generic biogenic oVOC emissions which are not speciated according to land cover. The cited publication by Fall et al. (1993) is exclusively based on laboratory leaf process studies. Direct up- scaling from these leaf level emissions is not possible. Example 2: Villanueva-Fierro et al. (2004) report ambient concentration of many oVOCs. Diurnal concentration measurements observed by these authors however do not necessarily have to be driven primarily by biogenic emissions. For example Rottenberger et al. observed diurnal acetaldehyde concentrations in the Amazon associated with uptake due to a compensation point driven exchange. Similarly carboxylic acids follow a compensation point driven uptake. Condensation in the branch enclosure system which is particularly problematic when sampling polar compounds might have masked the real nature of oVOC exchange reported by Villanueva-Fierro (2004). Kreuzwieser et al. (2004), have observed significant increase of acetaldehyde emissions above flooded ecosystems due to ethanol transport from roots which is converted to acetaldehyde in the leaves through ADH.

There are many more experimental field measurements published in the last 5 years that iterate on biogenic oxygenated VOC emissions (see reference list). A better idea on landscape and leaf age variability of oVOC emissions might be gained from a more detailed literature review of recent field and laboratory flux studies. In particular comparison of flux measurements above different ecosystems and during different seasons might be valuable and show the variability of oVOC emissions under realistic scenarios. They could also provide guidance on how to improve parameterization and incorporation of oVOC emissions in large scale models in the future. Without attempting to give a complete summary of recent literature on biogenic VOC emissions the following list might give a starting point and be of particular interest:

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