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Biogeosciences Discussions

Interactive comment on "European emissions of isoprene and monoterpenes from the Last Glacial Maximum to present" *by* G. Schurgers et al.

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We thank the reviewer for commenting to our manuscript. The changes we will make to the manuscript are listed below:

Section 2.2: The accuracy (and composition) of the CRU data is not mentioned. How good is this data set?
A sentence will be added to describe the CRU data: "... with data from the Climatic Research Unit of the University of East Anglia (CRU TS 2.1, hereafter referred to as CRU data) for 1901-2000 (New et al., 2000; Mitchell and Jones, 2005). The data set is based on weather station data, which are assembled onto a regular grid."

The authors should briefly describe the inhibition model of Arneth et al. (2007b) (i.e.

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include model parameterization) which is used for simulation (1).
The inhibition model by Arneth et al. will be briefly described: "This inhibition was incorporated in the isoprene model by relating production to the inverse of atmospheric CO_2 concentration (Arneth et al., 2007b). The model was parametrized to have no effect on production at an atmospheric CO_2 concentration of 370 ppm."

Section 3.1: Are isoprene emissions from shrubs found within warmer Mediterranean regions significant?
The mediterranean shrubs are responsible for 6 % of the total isoprene emissions in our present-potential simulation. The isoprene emission capacity of mediterranean shrubs reflects the presence of a few emitting shrub species such as *Myrtus communis* and *Erica arborea* (Table B1).

Section 3.2: Why are the estimates of Steinbrecher et al. (2009) significantly lower? Please comment.
The comparison with Steinbrecher et al. (2009) for July contained an error in our values caused by unit conversions, hence our high values. The corrected values are considerably lower than those in Steinbrecher et al. (2009). A sentence on the reasons of this difference will be added: "Our averages for July are considerably lower: 0.057 g C m^{-2} $month^{-1}$ for isoprene and 0.066 g C m^{-2} $month^{-1}$ for monoterpenes (averaged for 1981-2000). This difference is likely caused by the difference in the algorithm, by a smaller reduction due to land use in the study by Steinbrecher et al. (2009), as well as by the focus on July 2003, which is particularly warm compared to our 1981-2000 average."

Figures 4 and 5 are particularly interesting. It would be beneficial if they could aligned side by side in the finished manuscript.
We thank the reviewer for this suggestion, as it indeed provides a good insight to have the figures side by side. A new figure combining the old figures 4 and 6 was prepared for the revised manuscript.

BGD

6, C3097–C3099, 2009

Page 8821, Line 13: Please state the likely timescales these changes are likely to occur on?
The processes that were mentioned play a role on centennial to millennial timescales; this will be added to the sentence.

Page 8821, Line 24 to Page 8822, Line 2: I found this section of text slightly disjointed and difficult to understand. Please rephrase to make it clearer.
This sentence will be rephrased: “In addition to these differences in tree species composition, it becomes apparent that the emission capacities for isoprene that were found in the literature survey for European species (Table B1) are generally lower than the isoprene emission capacities assigned to PFTs in global models (8–45 μg C g^{-1} DW h^{-1} for temperate or boreal broadleaf deciduous or evergreen trees, Levis et al. (2003), Naik et al. (2004), Lathière et al. (2006)). For monoterpenes the opposite can be observed: monoterpene emission capacities found for many European trees exceed the emission capacities used in global models (0.8–2.4 μg C g^{-1} DW h^{-1} for temperate or boreal broadleaf deciduous or evergreen trees, Levis et al. (2003), Naik et al. (2004), Lathière et al. (2006)) considerably."

Page 8823, Line 25: The short lifetimes of oxidation products would also contribute to the uncertainty in ice-core samples.
The high reactivity of the oxidation products will be added to the list of uncertainties.

Typos will be corrected in the revised manuscript.

Interactive comment on Biogeosciences Discuss., 6, 8805, 2009.