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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Can simple models predict large scale surface ocean isoprene concentrations?" *by* Dennis Booge et al.

Anonymous Referee #1

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General Comments: This article describes an evaluation of surface ocean isoprene predictions from a steady-state model using an extensive dataset of cruise data, remotely sensed satellite data, and box modeling. Although the topic of marine isoprene production isn't new, this work describes the most comprehensive evaluation to date using data from cruises spanning multiple years and oceanic regions. The methods are clearly described in the study, and figures effectively summarize the results. Beside some minor technical edits, the manuscript is very well written. My main critique of the article is the unevenness of the results; the oceanic concentrations are thoroughly evaluated while the discussion of the box modeling results are brief and overly suggestive. I'd suggest that the article be published after addressing the comments below.

Specific Comments: 1) After an comprehensive evaluation of the seawater isoprene

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Discussion paper

concentrations from the various cruises which clearly indicates the model improvement from the inclusion of phytoplankton functional types and reduction in bacterial degradation, I found the box modeling section of the results lacking. The article describes the existence of measured isoprene concentrations in the atmosphere from at least two cruises, yet these measurements are simply averaged and put into three curves of a figure. From this simplified analysis, an important conclusion is drawn (there are missing oceanic sources of isoprene) that appears in the abstract and conclusion of the article. I'd suggest either this analysis be removed or preferably expanded to include an evaluation of the atmospheric isoprene concentrations along the ship tracks. Specifically, I think the study could be informed by a box modeling study that moves with the ship location in order to identify the temporal and spatial extent of any missing oceanic isoprene sources.

2) The study clearly shows that phytoplankton function types can affect seawater isoprene concentrations, yet a comparison of measured and satellite-derived phytoplankton function type is not well described. I'd suggest describing in more detail the meaning of "discrepancy less than 25%" (Page 8, Line 35) in terms of the different phytoplankton functional types and oceanic regions and how any of these discrepancies may affect the uncertainty in the global marine isoprene emission estimate.

Minor Comments: 1) Page 1, Line 39: the yr-1 needs a superscript 2) Page 4, Line 19: should be "Table 2 of Taylor..."

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