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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Modelling marine emissions and atmospheric distributions of halocarbons and DMS: the influence of prescribed water concentration vs. prescribed emissions" *by* S. T. Lennartz et al.

Anonymous Referee #1

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In this study, the authors implemented the online calculated emission module of very short-lived trace gases into one atmospheric chemistry model (EMAC) with prescribed seawater concentration (referred as the PWC method). The objective is to evaluate this method by comparing with the one prescribing sea-to-air emission fluxes (referred as the PE method) and observations. They concluded that the PWC method is more accurate in computing atmospheric mixing ratio of relevant trace gases than the PE method. They also investigated the uncertainties of online calculated emission associated with different air-sea transfer velocity parameterization. Generally speaking, this is

a nice modeling study appropriate for the scope of ACP. I have a few minor comments listed below. A minor revision is recommended.

Specific comments: 1. Since authors mentioned one of the biggest benefits of the PWC method is to determine both direction and magnitude of air-sea exchange fluxes given the concentration gradient, It would be very interesting for authors to show a spatial map where the negative or positive fluxes reflecting either deposition or emission are in the PWC method. I think this is of great importance to be distinct from the method prescribing non-negative emission fluxes. 2. Page 17566, line 17-24, the authors mainly compared modeled DMS with ship and air craft measurements and stated that "no data from ground based time series stations is available". I disagree. To the best of my knowledge, Ayers et al. (1995) provided a long time series data of DMS in Cape Grim from 1988 to 1993. Sciare et al. (2000) discussed a time-series data of DMS observed in the Amsterdam Island in the Indian Ocean. These data might be useful for the authors to validate their model in terms of the seasonal variation of DMS predicted from either PWC or PE method similar to Figure 7/8/9.

References: Ayers, G. P., S. T. Bentley, J. P. Ivey, and B. W. Forgan (1995), Dimethylsulfide in marine air at Cape Grim, 41°S, J. Geophys. Res., 100(D10), 21013–21021, doi:10.1029/95JD02144. Sciare, J., Kanakidou, M., and Mihalopoulos, N.: Diurnal and seasonal variation of atmospheric dimethylsulfoxide at Amsterdam Island in the southern Indian Ocean, J. Geophys. Res., 105, 17 257–17 265, 2000.

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