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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Nitrous oxide emissions from the Arabian Sea: A synthesis" *by* "H. W. Bange et al."

H. W. Bange et al.

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Reply to Anonymous Referee #1, Atmos. Chem. Phys. Discuss, 1, S8-S9, 2001.

Abstract: We modified the abstract as suggested. We added a sentence stating why the results from our study differ and also state the errors associated with our calculations.

Details of calculations: We added further information about the used algorithms for the wind speed and the used smoothing/interpolation method: We added a new Appendix A and new Table 5.

Main concern: The change of atmospheric N2O with the time. To account for this effect we have estimated for the error propagation a rather large mean error of the atmospheric N2O mole fraction of +/- 2%, equal to a range from 301 ppb to 313 ppb N2O (see Table 5). Of course this does not reflect the precision of the atmospheric measurements themselves which are usually much better than 1%. Another problem arises

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because of the fact, that the used data are not equally distributed over time and space. 27% of the data are from 1976/77 and about 71% are from the period 1994-97 which makes it very difficult to choose an appropriate mean atmospheric value. The best solution for this problem would have been to use N2O saturation ratios instead of N2O concentration. Since the N2O sea water concentration depends on the atmospheric concentration, saturation ratios calculated with actual N2O atmos. values measured on board are much more representative. However, saturation ratios or atmospheric N2O values have not been available for all data sets.

New N2O data by Naqvi et al. 2000: Indeed, Naqvi et al. concluded that the high N2O emissions from the shelf of west India might result from a recent shift in the O2 regime (toward lower O2 conc. associated with higher N2O production). However, the data by Naqvi et al. (2000) have not been available for our study. From our data set we cannot depict any trend of dissolved N2O in any part of the Arabian Sea since the data coverage is not good enough. We might speculate that by including the recently published data from Naqvi et al. we will get a considerable higher N2O flux estimate for the SON season.

New N2O diffusion coefficient: We added further information why we think that the new equation developed by Rhee is more suitable.

Errors: We added a sentence to the Results& Discussion section mentioning the rather large errors associated with our estimate of the annual fluxes. Moreover, we also cross-reference now to details given in the Appendices C and D (Error disscusion).

Interactive comment on Atmos. Chem. Phys. Discuss., 1, 167, 2001.

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