Biogeosciences
Discussions

Interactive comment on "Net sea-air CO_2 flux uncertainties in the Bay of Biscay based on the choice of wind speed products and gas transfer parameterizations" *by* P. Otero et al.

Anonymous Referee #2

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The manuscript "Net sea-air CO2 flux uncertainties in the Bay of Biscay based on the choice of wind speed products and gas transfer parameterizations" by Otero et al. analyzes the variation of air-sea CO2 flux in the Bay of Biscay using different wind speed products and gas transfer velocity expressed as a power function of wind speed. Although this work is potentially interesting, the present manuscript is not suitable for publication in Biogeosciences. The work merely examined the difference in wind speed between observations at an ocean buoy and wind products in a limited area, namely the Bay of Biscay (p. 9996, Lns 22–23 and Fig. 2). Then, the authors compare the sea-air CO2 fluxes, which are computed with different wind products and different gas transfer coefficients. From the viewpoint of a study of the carbon cycle, I don't see what

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the conclusion is of such a comparison. For example, one can refer to the discussion on the sea-air gas transfer coefficients and wind products in Section 6.1 of Tkahahashi et al. (2009): "the scaling factor GAMMA depends on the 14C inventory and wind speed field used, and that it must be evaluated for the same wind speed data used for the CO2 flux calculations." I agree with this comment. In this context, we should use the (1954–2000) NCEP Reanalysis-1 wind speed when attempting to calculate the air-sea CO2 flux by using the equation given by Sweeny et al. (2007). Therefore, it is not clear to me what the scientific message of this work is concerning the carbon cycle study.

Specific comments

Pg 9995. Ln 5. "Various studies assume a linear (Liss and Merlivat, 1986)..." is misleading. The linear relationship between gas transfer velocity (k) and wind speed changed at wind speeds of 3.6 and 13 ms-1 [Eqs. (2a), (2b), and (2c) in Etcheto and Merlivat, 1988].

Pg 9997. For the benefit of the reader, the equations of gas transfer velocity used in this work can be summarized in the Table.

One paragraph before Pg10005, Ln 14. What are the new findings with regard to the air-sea CO2 flux in the Bay of Biscay as compared with the paper of Padin et al. (2008)? I would prefer an analysis on temporal and spatial variations in pCO2 and a conclusion focusing on the large/low variability in different regions and periods.

Pg 10005. Lns 11–13. You can summarize the controlling factor for temporal and spatial variations in delpCO2 from the standpoint of the carbon cycle study.

Pg 10006. Ln 6. How did Padin et al. (2008) estimate the value "57%"? I could not find this number in the text.

Fig. 1 Top and right panel. "NCEP" is "NCEP-1."

Fig. 4. Usually, we use the definition delpCO2 = pCO2sea − pCO2air. Why did you

use the opposite definition?

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