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Biogeosciences Discussions

Interactive comment on "A simple method for air/sea gas exchange measurement in mesocosms and its application in carbon budgeting" *by* J. Czerny et al.

Anonymous Referee #1

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The submitted manuscript deals with a novel and elegant method to determine air-sea gas exchange in mesocosm experiments. The work deals with the issue of gas exchange under very low wind conditions, for which the standard oceanographic parameterisation is inappropriate. The authors use N2O to determine transfer velocity, and then translate this to a CO2 transfer velocity. In addition, chemical enhancement of CO2 air-sea exchange is quantified. The paper is important and provides a key contribution to carbon related processes in mesocosms. It deserves publication. The paper is however not very clearly written. It will need one or two more iterations by the team of authors to make it a flowing manuscript. I have made a number of comments on the writing style below.

Specific comments: Abstract: line 9: cumulative extrapolations of bioassays.....explain term bioassay here. There is a switch from mesocosm to bioassay, unclear why that is.

P 11991 'For this purpose, in situ measurements using the whole enclosure as experimental vessel have to be elaborated, in order to avoid problems occurring when extrapolating from bottle incubations to the mesocosm'. It is unclear here what how the bottle incubations are linked to the mesocosms? What type of bottle incubations?

P 11991: Air-sea gas exchange rates are needed to calculate the rate of exchange between the ocean and the atmosphere. The rates are not needed for comparing gas concentrations between mesocosm experiments or ocean regions. P 11991: line 20-21: sentence lacks meaning. P 11991: line 26: what is CT? P 11993, Line 5: what was the source and purity of N2O. P 11993, line 6: 'Additions were calculated. . ..'. Unclear what his means P 11993, line 20: units in equation 1 do not square up. P 11994, line 22: headspace was added to what? P 11994, line 24: mixing rates of what? Equation 2: what is the variable d? Fig. 2: Please relate the different trends to the pCO2 perturbations Fig. 6 and 3 are referred to before Fig 2. Potential errors section (3.3) is not clearly reasoned. Various errors are listed in a seemingly random manner. P 12000, line 4: N2O analytics should read N2O measurements. P 12000, line 17: should read: too low

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