Biogeosciences Discuss., 8, C3590–C3592, 2011
www.biogeosciences-discuss.net/8/C3590/2011/
© Author(s) 2011. This work is distributed under
the Creative Commons Attribute 3.0 License.

Biogeosciences Discussions

Interactive comment on "Seasonal trends and environmental controls of methane emissions in a rice paddy field in Northern Italy" *by* A. Meijide et al.

Anonymous Referee #2

Received and published: 15 October 2011

The paper is focusing on a comparison of CH4 fluxes from an Italian rice paddy as measured by chamber and EC measurement techniques. Though it is useful to compare both techniques and since this certainly increase our understanding of advantages and disadvantages of different measuring techniques it would be helpful if the authors would be more critical with regard to their own data evaluation (see below) and data interpretation.

The major objective of the paper is to compare flux measurements by chambers with those of EC. However, this requires some more lines explaining the experimental set-up (e.g. position of chambers in relation to the EC-tower), data evaluation (use only of

data when wind direction was appropriate) and foot print analysis. The statement that a foot print analysis revealed that 80% of the fluxes were coming from the respective rice paddy field is surely not sufficient for a chamber-EC comparison study. Moreover, for such an objective one should also consider uncertainties of both measurement techniques (why were chambers closed for 90 min? in view of the magnitude of fluxes a closure time of max. 30 min is sufficient) as well as spatial variation (specifically for chambers) and should consider to measure chamber fluxes not only once per day at 12 (why was this time chosen, there are reports about when to sample best to be representative for estimating daily fluxes and it would have been easy to define an own protocol). In view of insufficient data evaluation a difference of 30% between chambers and EC measurements is unlikely to be significant. Consequently, wording in parts of the discussion/ results and abstract sections need to be changed and data evaluation should be improved.

Diurnal variations: I think that the discussion here may profit a lot from including information from previous publications. Specifically with regard to CH4 emissions from rice paddies and diurnal and seasonal patterns there is plenty of information available. It seems that the authors are not fully aware about results of previous research, therefore I provided some examples below. There is also a wealth of information on CH4 emission from rice paddies in Italy, also including EC measurements (Werle and Kormann 2001) and it would be good to see a discussion of own results as compared to previous finding e.g. with regard to magnitudes, seasonality, drivers and cumulative fluxes. Since I am assuming that measurements also included CO2 fluxes it would be of additional interest if results from the study of McMillan et al. (2007) about the stochiometry of CH4 and CO2 fluxes can be confirmed. Moreover, the authors only measured net fluxes and have not investigated pathways of CH4 production and oxidation or emission pathways. Therefore, major parts of the discussion on drivers of CH4 emissions is rather speculative and not well confounded by previous findings (see e.g. Frenzel et al., 1992, or ButterbachBahl et al 1997).

McMillan et al. 2007, Stoichiometry of CH4 and CO2 flux in a California rice paddy, JGR 112, G01008 TUNABLE DIODE-LASER MEASUREMENTS OF METHANE FLUXES FROM AN IRRIGATED RICE PADDY FIELD IN THE PHILIPPINES Author(s): SIMPSON IJ; THURTELL GW; KIDD GE; et al. Source: JOURNAL OF GEOPHYSICAL RESEARCH-ATMOSPHERES Volume: 100 Issue: D4 Pages: 7283-7290 DOI: 10.1029/94JD03326 Published: APR 20 1995

OXYGEN PROFILES AND METHANE TURNOVER IN A FLOODED RICE MICROCOSM Author(s): FRENZEL P; ROTHFUSS F; CONRAD R Source: BIOLOGY AND FERTILITY OF SOILS Volume: 14 Issue: 2 Pages: 84-89 DOI: 10.1007/BF00336255 Published: OCT 1992

Impact of gas transport through rice cultivars on methane emission from rice paddy fields Author(s): ButterbachBahl K; Papen H; Rennenberg H Source: PLANT CELL AND ENVIRONMENT Volume: 20 Issue: 9 Pages: 1175-1183 DOI: 10.1046/j.1365-3040.1997.d01-142.x Published: SEP 1997

Diurnal variation in methane efflux at different growth stages of tropical rice Author(s): Satpathy SN; Rath AK; Ramakrishnan B; et al. Source: PLANT AND SOIL Volume: 195 Issue: 2 Pages: 267-271 DOI: 10.1023/A:1004202515767 Published: AUG 1997 Fast chemical sensor for eddy-correlation measurements of methane emissions from rice paddy fields Author(s): Werle, P (Werle, P); Kormann, R (Kormann, R) Source: APPLIED OPTICS Volume: 40 Issue: 6 Pages: 846-858 DOI: 10.1364/AO.40.000846 Published: FEB 20 2001

Interactive comment on Biogeosciences Discuss., 8, 8999, 2011.