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## ***Interactive comment on “Climate and site management as driving factors for the atmospheric greenhouse gas exchange of a restored wetland” by M. Herbst et al.***

**Anonymous Referee #2**

Received and published: 18 September 2012

Title: Climate and site management as driving factors for the atmospheric greenhouse gas exchange of a restored wetland Authors: M. Herbst, T. Friberg, K. Schelde, R. Jensen, R. Ringgaard, A. G. Thomsen, and H. Soegaard

This paper presents an extensive multi-year dataset of CO<sub>2</sub> and CH<sub>4</sub> eddy covariance data over a restored wetland. The authors explore the influence of both management and climate on the interannual variability of the greenhouse gas fluxes.

Some general comments.

To come to an overall conclusion I would be interested to know which of the two GHG has the most impact on the total GHG budget, which one has the largest variability

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and what are the drivers are of this variability. The drivers of the variability are largely discussed in the manuscript. However it would be interesting to answer the first two questions explicitly in the text. Additionally it would be of great interest to see some kind of quantitative measure to relate the management to the GHG-fluxes. A footprint weighted index which represents the amount of grazing cow days per day could maybe help to clarify the variability in the CH<sub>4</sub> fluxes.

Specific comments:

P9031 L 17 insert 'grassland' between managed and sites P9034 L 16 How good is the correlation between the H<sub>2</sub>O measured by the LI-7000 and the LI-7500?

P9035 L 26 insert Reichstein et al, 2005 reference for gapfilling P9036 L5 could you mention model performance (eg  $r^2$ )? P9036 L5 Please mention how large the storage term is. P9037 L24 It is interesting to see that the peak emission increased over the years. Is there a pattern in these emission? Can this be related to grazing? Or after grazing? Rainevents?

P9038 L7 please explain a bit more about the way you calculated the uncertainty of the fluxes. Which uncertainties did you consider? Gapfilling? U\*? random uncertainty?

P9039 L15 What about the role of plant mediated transport?

P9039 L22 What is this 'clear' functional switch based on? Is there a water table threshold?

P9045 L1 I think it is a bit strong to say that there is no interannual variability in seasonal courses of temperature and water table height (looking at table 1). Especially because the temperature response of Fig 5 is exponential, so a small change in temperature has a potential large impact on the fluxes.

P9045 L28 please add that cows were only present during a short period of the year.