**Biogeosciences**
Discussions

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# *Interactive comment on* "Testing the applicability of neural networks as a gap-filling method using CH$_4$ flux data from high latitude wetlands" *by* S. Dengel et al.

**S. Dengel et al.**

sigrid.dengel@helsinki.fi

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Reply to the interactive comment by AMM Moffat. (Corresponding author: Sigrid Dengel) (The answer appears after the referee's comment)

As the authors mentioned "Neural net-works have the reputation of being a "black box" where transparency is limited in most cases (Elizondo and Gongora, 2005)." However, in our paper (Moffat et al, 2010) we show how the information contained in the ANNs can be used for interpreting ecosystem datasets. The inductive modelling approach is demonstrated for eddy covariance measurements of net carbon fluxes at the Hainich forest in Germany. By identifying the hierarchy of the climatic controls of the ecosystem

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response as well as their multidimensional functional relationships, ANNs can be used as a direct interface to the data. Reference: Moffat, A. M. et al., Characterization of ecosystem responses to climatic controls using artificial neural networks. Global Change Biology 16, 2737 (2010).

Reply: In the current manuscript we have applied a simple forward and backward stepwise regression in order to identify the driver/input hierarchy. We agree artificial neural networks can be used to identify this hierarchy in a similar way by increasing the performance and mapping ability of a network with increase in input information. Furthermore, we also integrated the quality assurance technique introduced in Moffat et al. (2010) in the current revised manuscript. This additional quality assurance (pointing out the possibility of cross-dependency of input variables and importance of the representativeness of data) does increase and guarantee a good performance of neural networks.

Interactive comment on Biogeosciences Discuss., 10, 7727, 2013.