

Interactive comment on “Cushion bogs are stronger carbon dioxide net sinks than moss-dominated bogs as revealed by eddy covariance measurements on Tierra del Fuego, Argentina” by David Holl et al.

Anonymous Referee #1

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The manuscript by Holl et al. (BG-2019-156) describes 2 years of CO₂ fluxes and their drivers in two different bog types in Argentina. The manuscript is written in detail, and data are thoroughly analyzed and shown with various angles. Flux data are scarce in this region, so the publication of this manuscript to Biogeosciences will be of a great interest to readers. However, I suggest some revisions for the publication.

The introduction (Section 1 and 2) contains a lot of information. It is informative to read the general characteristics of the study site, but some sentences are redundant and it can be written more concisely. In particular, Section 2.3 is interesting to read but it

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does not add any information (i.e. it does not contain results of those past studies) to understand this study or the study site. In spite of the extensive introduction, some important components seem missing, for instance, why measuring multi-year CO₂ fluxes is important, why two bog types are chosen, what the definitions of raised/cushion bogs are, and etc. (with the given sentences in line#9 on page#2, cushion bogs seem to be defined as ombrotrophic bogs dominated by vascular plants). In addition, having this extensive introduction makes the readers expect it to continue throughout the results and discussion. However, it feels that some questions remain unanswered after reading the whole manuscript, such as ‘why are the CO₂ flux patterns of these sites different from other bogs? Can it be from different vegetation communities, climate conditions, or the combination of both?’ To improve this, the results should be discussed more thoroughly in relation to the topics raised in the introduction.

Section 4.4: 2 years of data is too small to discuss inter-annual variability. Will it be possible to find long-term climate data from those study sites and discuss what these 2-years of CO₂ data (response of CO₂ fluxes to climatic drivers) mean in relation to climatic variability? Also, Table 2 can be shown with actual numbers. It is easier to grasp the patterns with + and – signs, but less informative.

Section 4.7: What were the criteria for choosing these literatures for comparison (on page#21), similar plant types and climate conditions? Please add some more information to clarify this. On page#23, some more studies were mentioned, but the causes of the differences in CO₂ fluxes were not discussed comprehensively. Were the differences from the latitude only, or annual temperature, radiation, or something else? These questions continue to arise until the conclusion part, why these two bogs in Argentina show different CO₂ flux patterns than other bogs.

Usually either the names of the study site or plant types was used to refer to the sites, and having consistent names would be easier for the readers to follow. Especially, both the site names and plant types can be written in all the Tables and Figures.

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