

Referee2#

R2#:

A very sound, thorough and thus convincing study, which will contribute significantly to the precision of national GHG reporting in the case of disturbed peatlands, which are particularly relevant in this respect. There are very few aspects where something could be readjusted.

AR: We thank referee 2# for the encouraging general comments.

R2#:

The categorization of monitoring sites was partly pragmatic, i.e. an important criterion was the availability of meaningful measurement, auxiliary and site data. This is perfectly fine in terms of the concern of the study. However, in order to use the limited capacity for measuring GHG fluxes efficiently in filling particularly relevant knowledge and data gaps, it would be helpful to conclude with a small summary overview of the site categories where particular action is needed. At present, this is done only sporadically and scattered (e.g., 575-577) . And in the case of the temperate zone, which is probably particularly affected (line 664), detailed information on the categories that require particularly urgent investigation is completely missing.

AR: We'll add more detailed description of the knowledge and data gaps in the conclusions.

R2#:

Several times in the manuscript, the methodological problems in GHG flux monitoring are mentioned (e.g. lines 138-140, 633-638). However, this is done in a relatively abstract, stand-alone way, but not in concrete or specific connection with the discussion of the own results. Of course, this would not make sense everywhere either; but e.g. in the case of the lack of an explanation for high N₂O emissions in mixed stands (lines 496-497), and especially in the context of the contradictory findings discussed in 4.3, methodological **deficits** could play a role. The importance of measurement aspects could also be briefly referred to in the conclusions with the suggestion that efforts to standardize, verify, and improve GHG flux monitoring (e.g., increased use of automated chamber approaches and isotope methods for flux separation) must also be continued.

AR:

Thank you for pointing this out. We have analyzed the methodological problems in detail in an earlier paper (Jauhiainen et al. 2019), and thus did not include much of that discussion in this paper. However, while analyzing this comment we realized that we did not really tell this to the readers of this paper! We'll both state this at the end of the Introduction, and add short notes in the locations pointed out by the Reviewer. However, for some issues, such as the anomalies related to high N₂O emissions from mixed stands, or high CO₂ emission values from poor sites based on inventory methods but not flux methods, we have found no plausible explanations in the data. In such cases we just acknowledge that. We hope that these revisions can be found satisfactory, but will be happy to do further revision if deemed useful.

R2#:

Minor things that need clarification

Lines 58-60: Doesn't this also apply to Russia, Canada and Belarus?

Line 118: Complete/precise statement in parentheses, as not understandable at the moment.

Lines 496-498: Is there a connection in content between the two sentences? At the moment this is not apparent. Please specify.

AR:

- Lines 58-60: We'll omit listing of individual countries and instead provide main climate zone regions. Assessments of wetland areas in individual countries can be found in the provided references.
- Line 118: We agree that this added detail makes the sentence too complicated and decided to omit it.
- Lines 496-498: We agree that this is complicated text structure. We'll modify the text for creating the needed connection in two sentences and a better text flow. Two supporting references will be added.