# Editor comments on egusphere-2024-1426

**Comments to your reply to the referee comments:**

1. I think the term ensemble spread should be still used since this is a commonly used term in the meteorological/assimilation community. Instead you should explain somewhere that it corresponds to the standard deviation.
2. Section 3.4: If you refrain from adding these results in the manuscript, doesn't this mean that you have the results already? In your first sentence you state that you do not know the outcome.

**General comments on the manuscript:**

1. Consider restructuring Section 2. Ten pages are needed to reach the result section. Make subsections for the real and idealized experiments, where the respective data sets are described.
2. Discuss better the limitations of the experiment with real data. How can these be optimized? Wouldn't this be the aim? Which regions have been considered? Europe? You should clearly state in the text which regions are considered.

**Specific comments on the revised manuscript:**

L89: Why perturbed? Do you mean unperturbed? Isn't the perturbation of the background coming from the emissions?

L91,92: Why does $CH_4^{tot}=CH_4^{bg}+CH_4^{emis}$ represent transport uncertainty?

L94 and L97: "10 ensemble members" and "10 members" written  -> repetition?

L105: GOSAT, IASI and TROPOMI -> abbreviations of the instrument names should be introduced.

L106: the "driving data" has not been introduced. Which data is this? $CH_4^{bg}$, $CH_4^{emis}$ or something different?

L139: Here the term "spread" is still used. This contradicts to your reply to the referee comments.

L161-163: Introduce abbreviations used.

L178: real -> What data is included in which experiment? Where is the nighttime data included? Didn't you in your answer state that only daytime data was used for the real experiments?

For the experiment with real observation pseudo observations are used, isn't this a contradiction?

L211ff: Here you use the term standard deviation.

L267: Here "spread" used.

Figure 6 caption: Figure label "std", but caption "spread".

L369: Add which figure.

**Technical corrections:**

L88: Space between full stop and "In the global" missing.

L165: according -> according to

L220: a similar principles -> a similar principle

L291: supports -> support ? Please check the sentence.

L395: add comma to the sentence?