Reviewer #1

> *Traditionally static chamber might largely bias the flux measurements of trace gases on plant shoots due to plant physiological activity. This study developed a novel system, PlasTraGAS, for continuous and automated measurements of trace gas exchange at plant shoots by regulating temperature, humidity, and CO2 concentrations in the shoot enclosure. This system holds the potential for providing insights into the role of plant foliage in the global budgets of trace gases.*
>
> *This is a good work.*

We thank Reviewer #1 for their positive feedback and we have further improved our manuscript following the their suggestions.

> *However, I have the following concerns.*
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> *As we know, leaf chamber in LiCor series instruments is used for measuring photosynthesis. Please provide a discussion on difference between your new system and LiCor series instruments. What is advantage of your new system?*

Licor manufactures a series of instruments (LI-6800 and its predecessor LI-6400XT) optimized for measuring leaf-level CO_2 and water fluxes in a dynamic chamber setup. When combined with external analysers, these systems can also be used for dynamic-chamber measurements of other species. They are optimized for a quick installation on individual leaves and cannot provide sufficiently leak-tight closures for static chamber measurements. These systems can therefore not be used to measure CH_4 and N_2O fluxes at the rates at which they occur at typical plant shoots.

We added the following wording to the Introduction: "[…] as currently commercially available leaf-level trace gas exchange measurement systems (e.g. Licor Li-6800) are limited to dynamic chamber measurements and provide insufficient leak tightness for static chamber measurements" (L48-49).

> *When an instrument is expensive and complicated, it is hard to be widely applied in the field. Can your system be widely used in forests in nature?*

Briefly, we are currently working on making *PlaSTraGAS* field portable. At this point, we are aiming at developing a version that can be installed for whole-growth-season deployment at long-term research sites. The system is indeed burdensome and requires sufficient infrastructure (power, pressurized air supply, CO_2 in gas cylinders) and not likely to result in a system that can be carried to remote field sites by the user. However, we think that this is acceptable given that this is the first prototype of a system capable of measuring shoot CH_4/N_2O fluxes.

We added the following point to the conclusions section: "Future development will aim to adapt the system to allow its deployment under field conditions, e.g., at long term monitoring sites" (L439-440).

> *I find your system is tested in pine saplings. Obviously, in nature most of tree stems are much larger than your shoots. Can your system be extended to large stems of trees in forests?*

Yes, the system can be combined with any type of measurement chamber. However, we deliberately de-emphasize this point as such systems already exist (Barba et al. 2019b) and do not require the degree of temperature, moisture, and CO2 regulation we implemented for shoot measurements.

We added the following sentences to the Methods section: "*PlaSTraGAS* follows a modular design, such that different types of static chambers can be connected to the measurement system. This allows the system to be adopted to plants with distinct shoot geometries (e.g., coniferous versus deciduous trees), and to include other surfaces (e.g. tree stems)" (L79-81).

Thus, I recommend a revision with additional discussion.

We hope that we were able to address the reviewers concerns in the revised manuscript.