Specific comments:

Was the APGS system tested for pressure differences between the inside and outside of the chamber during a measurement period? The pressure vent is designed to address this issue and this has been tested for the Licor systems "special pressure vent" to show that there is no alteration of pressure, but it is unclear if the APGS has done the same type of test for their system and their specific vent.

The AGPS is originally sold by the company without a vent. We asked them to add a vent designed on the basis of the equations developed by Hutchinson & Mosier (1981) as e.g. proposed in the GRACEnet Project Protocols (see Parkin & Venterea 2010 in the reference list of the manuscript), but we did not specifically test its suitability to alleviate pressure disturbances. However, in summer 2014, we participated with one AGPS chamber in a lab-based inter-comparison campaign of soil N_2O chamber systems organised by the University of Helsinki (Finland). For the campaign, a stainless-steel tank (diameter 1.6 m, height 1.0 m, volume 2.6 m^3) which contained known concentrations of N_2O, was covered with a perforated lid on which a layer of dry sand was set to act as porous media. The chambers were placed on top of the sand bed for the single measurements. The known reference flux of N_2O through the sand bed was than compared with the simultaneously measured soil chamber flux, thus allowing direct comparison between both fluxes. N_2O concentrations within the sand bed during chamber deployment were quantified as well. For more details see http://www.ingos-infrastructure.eu/wp-content/uploads/gravity_forms/9-f1d8134bfe220ac6a429fad17f6eaada/2014/10/tna_1_2_activ_rep_InGOS_TNAid-1.docx.
For the AGPS chamber, no immediate changes in soil N_2O concentrations were observed at the time of chamber placement. Thus the chamber design seems to compensate at least for pressure changes during chamber placement, mainly avoidance of pushing excessive ambient air trapped in the chamber into the soil.

The tubing lengths vary between systems (Table 1). For the AGPS system, each chamber appears to have a different tubing length (11-25m), while the Licor system has one tubing length (15m), and presumably it is the same for each chamber. Was there any examination of the influence of different lengths of tubing on fluxes? For the AGPS system: ie .were there less discarded data during QC for chambers that may have had a shorter tubing length? The issue from tubing length is that [CO2] from one time point, moving through the long tubing lines is then returned to the chamber volume, presumably this [CO2] is lower than what is currently in the chamber, thus possibly diluting or affecting the subsequent measured fluxes. Chamber volume may be sufficiently large that this small dilution is undetectable but can the authors comment on this potential artefact?

It is correct that each AGPS chamber had its own tubing length, presenting the shortest possible distance between the respective chamber and the multiplexer box. We examined the effect of tubing length on the amount of discarded data, but we found no correlation. In the revised version of the manuscript we add a sentence to the Results section to clarify this.

With a multiplexer flow rate of 3 lpm, 50 cm^3 of sampled air is returned to the chamber per second (0.2 % of the AGPS chamber volume). Even if the chamber CO_2 concentration would (unrealistically) be 100 ppm higher than the CO_2 in the sampled air, the chamber CO_2 concentration would change by less than 1 ppm. So, any dilution effect would be negligible and also undetectable by the AGPS system.

The Lloyd and Taylor temperature function was used to model soil C fluxes for each system, filtered and unfiltered. In Table 3, can the authors provide the number of measurements used for the model fits for each time period (E, OC and CC). These models were then applied to soil temperature to estimate the cumulative soil C fluxes for each system: for comparison of how each system and QC altered estimates of carbon loss. More data was discarded from the AGPS system via QC protocol and mechanical issues, compared to the Licor system (Table 2). This indicates to me that the estimate of cumulative flux from the AGPS system were more dependent on model fit compared to the Licor system. It would be useful for the authors to address a direct comparison of fluxes, ie when both systems were working and passed QC protocols at the same time points. This would obviously be a smaller dataset, and the authors could only compare means as opposed to cumulative flux estimates, but should eliminate any influence of model fit on the comparison of fluxes from each system.

The number of measurements has been added to Table 3 as requested by the reviewer.

We have made a direct comparison of the highest quality fluxes. From the filtered data set we selected those 4-hour-windows (i.e. the time needed for the AGPS to complete one full cycle with 8 chamber measurements) in which at least 5 of the 8 AGPS chambers passed the QC protocol. The fluxes for each window were averaged and then compared to the average flux rate from the LI-8100A chambers in the wide rows which also passed the QC protocol for the respective 4-hour-windows. The resulting figure showed that the difference observed between the LI8100 and the AGPS did not depend on the flux rate. However, the AGPS fluxes from the open canopy phase were largely lower than the LI8100A fluxes, whereas the opposite was observed for the closed canopy phase. This result was in line with the conclusions drawn from the Lloyd and Taylor modelling. We will add this additional information to the revised manuscript text.

Technical Corrections

Pg 14703 line 17 and pg 14709 line 18: the authors mention that fluxes were calculated over either 4min or 9min periods on pg 14703 but then on page 14709 they say 3 min and 8 min calculation. Is this just a typo?

No, this is not a typo. As described in the following sentences on page 14703, the first minute of each flux curve was discarded before the actual flux calculation. i.e. a 4 min measurement resulted in a 3 min flux calculation curve. We have rephrased the text on page 14709 to avoid any further confusion.

Pg 14714 line 23: “rot” should be changed to “root”

Thanks, done as suggested.