Referee 3

Some of the findings relating to gas fluxes has been already reported elsewhere, which leads this reviewer a sense of lack of novelty or insufficient search for references by the authors. Data shown in Figures 2 and 3 present processes that are already described and well known for those lakes.

We partially agree with this comment. As suggested by the other referees, the presentation of the chemistry of the studied lakes was transferred as "site background", and removed from the "results" section, the objective being no longer to show that these lakes are representative of the region, but to claim it in the presentation of the site. This reorganization of the article makes it possible to meet this demand.

On the other hand, it does not seem to us that the data presented in fig 3 are known. Notably, exceeding the O2 bubble point for the green water lakes (>500% saturation) has not been described, as well as the resulting "purging" of the lake. The objective of this figure is to show the daily evolution of the parameters, and in what range.

Static chamber: how did the authors assure that anchoring a chamber at about 10 meters apart would not disturb the nearby sediment? Have the authors carried out any experimental validation? It is unclear how gas sampling in the anchored chamber was carried out avoiding disturbing the sediments.

We have specified in this version of the manuscript that the floating chambers are anchored at 10 m and that the anchorage site is equipped with a float. We assume that these precautions and this distance (10 m for a water column of less than 0.5 m) are sufficient not to disturb the sediment vertically under the chamber. We mention that the gas collects for fixed chambers were carried out from an inflatable boat.

Usually, dynamic chambers determine fluxes through on-site gas measuring system and requires the use of air pump systems. The "dynamic" approach presented by the authors is peculiar and might not negligibly disturb the water-air boundary layer. Please, verify and clarify the method. Multimedia material are welcome as pictures or video streams.

We agree with this remark, the terminology "Dynamic chambers" is not adapted and has been replaced by "slowly moving chambers". As also suggested by the other referees, a photograph was inserted to present the sampling procedure (Supplement material). Although the movement is very slow, it may induce artificial turbulence inside the chamber. In this case, the fluxes derived from this technique should overestimate real fluxes. However, "slowly moving chambers" gas collection was only used twice on Lake M (see table). If the results were overestimated, values are among the lowest in our dataset. This has no influence on the main message we want to convey, the emissions are largely changed when the bubble point is exceeded, and these key data have been obtained from "fixed" chambers.

Here is the Table

Table 1: Date, location, lake characteristics and general conditions during greenhouse gas emission monitoring.

Date	Type of lake (name) Surface km^2	Weather conditions	Phyt. Bloom conditions	EC range $\mu S.cm^{-1}$	pH range	DOC $mg.L^{-1}$	Procedure Numb of chambers	Water column range meter	Time of gas coll. Minute
Sept. 13, 2012	Black (P) 0.087	Sunny	-	1400-1599	8.81-8.99	51	Fixed 3	0.3 – 0.8	20
Sept. 14, 2012	Green (V) 0.109	Sunny	Moderate	2420-2888	9.48-9.73	236	Fixed 3	0.1 – 0.4	20
Aug. 30, 2013	Black (P) 0.091	Sunny	-	1715-1855	9.21-9.33	37	Fixed 3	0.3 – 1.1	20
Sept. 1, 2013	Green (V) 0.109	Partially cloudy	Strong	2302-2410	9.67-9.78	265	Fixed 3	0.1 – 0.5	20
Dec. 2, 2014	Green (M) 0.053	sunny	No	2014-2204	9.37-9.51	102	Sl. moving 6	0.1 – 0.4	23 to 43
Jul. 7, 2015	Green (M) 0.055	sunny	No	1940-2030	9.28-9.37	82	Sl. moving 3	0.1 – 0.4	21 to 37
Sept. 10, 2015	Green (G) 0.285	Sunny (evening storm)	Strong	34000-35100	10.3-10.44	326	Fixed 3	0.1 – 0.2	20
Sept. 12, 2015	Black (P) 0.093	Strongly rainy	-	1382-1450	9.3-9.4	36	Fixed 3	0.4 – 0.7	20

How did the authors calculated and sum both fluxes by diffusion and ebullition? How many gas samples were obtained for determining a single gas flux estimate? It would be relevant to provide in the annexes the linear fits and their corresponding coefficients of determination (R2) for all measured gas fluxes. Why gas flux data are only presented hourly? Table 1 lacks information about the days of sampling; it shows only year and month.

We acknowledge that the method of collection was not clearly presented. We have detailed: "Each chamber was collected twice, about 2 minutes apart. Thus, for example for a 6-chambers protocol, the mean and standard deviation on 12 measurements is presented as single gas emission value for a given hour corresponding to the launching of the first chambers. This operation was repeated approximately every two or three hours in order to present a complete 24-hour cycle". The day of sampling is now mentioned in the table.

The number of samples is also mentioned in the figure caption Supplement S1. See below:

Photo 2: Gas collection from a train of 6 slowly moving chambers on green water lake M in the absence of cyanobacteria bloom (December 2014). The first floating chamber has just

reached the point of collection. Two samples will be collected in each chamber. The average of these 12 samples will provide 1 flux data for each gas (CH_4, CO_2 and N_2O).