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Interactive comment on "Quantifying environmental stress induced emissions of algal isoprene and monoterpenes using laboratory measurements" *by* N. Meskhidze et al.

Anonymous Referee #2

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General comments:

In this paper, the authors discuss variations of BVOCs including isoprene and monoterpenes during light- and temperature-controlling culture experiments. The authors show BVOCs' production rates in each incubating condition, and point out that the BVOC production rates are depending on both light intensity and temperature. Interestingly, the feature of time series of BVOCs' emission rate is obviously different between two successive days while the experimental procedure was the same. Even though the authors admit that further investigation continuing for longer period should be performed, the findings in this paper is worthy to be published in Biogeoscienses. However, I recommend that the authors consider and revise the following points before publication.

Specific comments:

1. Repeatability of experiments:

The authors carefully addressed the determined data by calculating the uncertainties of the analysis, and I agree that the presented data was analyzed precisely. But, I'm worrying about repeatability of the experiment. Generally, this kind of experiment repeats more than three times, and the universality should be argued. Did the authors check the universality of this experiment? I recommend that the authors check the repeatability by carrying out the extra experiments or add some comments regarding the repeatability of their experiments at least.

2. Page 13544, Lines 19-20:

How are the concrete values of purging efficiencies for all BVOCs? While the authors carried out the experiments of temperature dependence for BVOC emission, is there no temperature dependence of purging efficiencies? As solubility varies depending on the temperature, purging efficiency may vary as well. I recommend that the authors add a table including the values purging efficiency as a supplemental information.

3. Page 13546, Lines 5-6 and Table 1:

What is "analyte i" meaning here? In Table 1, "RSDi" is not listed. Please revise the sentence and maybe Table 1 to make it easier to understand for readers.

4. Page 13548, Lines 13-15:

As far as I understand, α-pinene production rate markedly increased for T. pseudonana especially for higher light condition (>150 mmol m-1 s-1) from Figure 3. The pattern of increases are similar to P. carterae rather than T. weissflogii. Is it my misunderstanding?

5. Page 13551, Lines 6-18:

I suppose that these arguments are written in conclusion section rather than discussion

section.

6. Page 13553, Lines 20-23:

I agree that the mechanical stress from purging may be one of the factors of making difference in BVOC emission for the two dinoflagellates. On the other hand, how is the influence of the stress on other group such as diatom, prymnesiophyte and cryptophyte? The authors should describe the evidence which the mechanical stress was not responsible to BVOC emission for other group.

7. Page 13554, Lines 12-15:

I agree the authors' argument that the experiment periods are short to fully evaluate the light and temperature dependences of BVOC emission from phytoplankton species. Ideally, additional experiments over the full photoacclimation period should be performed while I understand it is hard to re-setup the experimental instrumentation. Otherwise, I recommend that the authors describe their surmise or speculation on BVOC emission pattern from the phytoplankton species after day 3. I also recommend that the authors add discussion referring to Kameyama et al. (2011) in which the variation of isoprene emission from the same diatom T. pseudonana was investigated by using continuous monitoring with PTR-MS system over 2 weeks.

Kameyama, S., H. Tanimoto, S. Inomata, K. Suzuki, D. D. Komatsu, A. Hirota, U. Konno, and U. Tsunogai (2011), Application of PTR-MS to incubation experiments of the marine diatom Thalassiosira pseudonana, Geochemical Journal, 45, 355-363.

8. Figure 2:

Readers probably misunderstand that the second light cycle starts after 2 h from the end of the first cycle. I recommend that the authors add a shaded area (maybe note "12-h dark period" in the area) between the cycles and renumber the incubation times of the second cycle from 0 h to 12 h.

Technical correction:

Page 13547, Line 28:

I suppose that the authors would write it as not monoterpene but isoprene here.

Interactive comment on Biogeosciences Discuss., 11, 13533, 2014.