

Interactive comment on “Vertical transport of sediment-associated metals and cyanobacteria by ebullition in a stratified lake” by Kyle Delwiche et al.

Anonymous Referee #1

Received and published: 24 January 2020

Delwiche and others quantify the particle transport by bubbles released from the lake sediments. Although interesting, I found several flaws in both the field and laboratory set-up, suggesting a severe limitation of the work.

• Authors state that the particles associated with the bubbles, almost entirely originated from the sediments, rather than from the water. Will this statement hold true in case of turbid waters? Please clarify.

• Add the details of dissolved oxygen concentration, temperature and total suspended matter in the water column at the lake sampling station.

• Did you observe any bubble breakup during the transport through the flexible tub-
C1

ing? If yes, does it affect the final bubble size count and volume transported?

• Line 114, please add the grade of HNO₃ used for rinsing.

• Authors dropped a cinderblock to trigger bubble release. Please state the difference in bubble volume during natural release and forced release.

• The impact of cinderblock on the lake floor would have re-suspended a significant amount of sediments. Does the forced release, thus suggest a much larger than natural bubble release mediated particle transport?

• The collection of sediment by dredge and subsequent transport in bucket, would have resulted in the release of a significant amount of gas from the sediments. Can the authors provide the difference in the gas content of in-situ sediments and those collected by dredge and brought to the lab in a bucket?

• What was the percentage of bubbles breaking up, when striking the inverted funnel and releasing the cyanobacteria?

• Authors used air, instead of methane in the laboratory experiment. Will there be a difference in the particle transport by an air bubble as compared to methane bubble? Please discuss in the text.

• How did the authors decide the rate of injection of air into the sediments? What happened to the gases already present in the sediments when authors injected the air?

• Line 266, authors did not estimate the gas reserve in the sediments. How can they infer that the lower gas volume did not indicate a smaller gas reserve?

• If the positing of boat influenced the bubble release, then how can they quantify the bubble volume and associated particle transport?

• Line 273, I do not agree with the comparison of experimental column release with that from the natural lake environment. As stated above the conditions in the lab were completely different than that in the lake, and thus any comparison between the two is

superfluous.

â€” Authors state a large difference in the size of natural and forced release of bubbles. Then what is the reliability of the volume and particle transport estimated by the authors?

Line 25, change 'Concentrations' to 'Concentration'

Line 27, change 'concentrations' to 'concentration'

Line 40, modify 'et. al.' with 'et. al.'

Line 48, insert space after 2008;

Line 71, change 'volumes' to 'volume'

Line 74, change 'greatest' to 'a considerable'

Line 79, change 'distribution' to 'distribution'

Line 119, change 'mixing from of the' to 'mixing from the'

Line 123, change 'an' to 'a'

Line 148, change 'column is comprised' to 'column comprised'

Line 176, change 'um' to ' μm '

Line 180, change 'metals analysis on bulk sediment' to 'metal analysis in bulk sediment'

Line 185, change 'which use' to 'with use'

Line 186, change 'analysis on' to 'analysis of' Line 188, 5 μmol filter? Is it correct?

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-243>, 2019.