Review

"Automated gas bubble imaging at sea floor – a new method of in situ gas flux quantification" by K. Thomanek, O. Zielinski, H. Sahling, and G. Bohrmann

General comments

Reliable data on methane gas flux from the seabed is urgently needed for assessing the likely impact of seabed-derived greenhouse gases on climate change in relation to terrestrial sources. There are hardly any data for the marine environment at present.

This paper presents a substantial volume of work on the optical characterisation of bubble streams in water. The resulting knowledge and technology can be used to quantify methane gas flux venting from the seabed within reasonable levels of uncertainty, i.e., error bars have been calculated for given flux rates.

Specific comments

The paper is well written but perhaps a little too long. The authors could make some efforts to shorten the paper by perhaps removing small details not critical to the main results. On the other hand, the technical developments are significant as they enable methane gas bubble fluxes up to 10 L/min to be quantified to within ± 33% for the worst case scenario. However, this value of 33% seems rather large to me, although no doubt a significant improvement on a total lack of data or error bars. I think the readership would benefit from a statement on the most likely level of accuracy for typical deployments or flow rates seen *in situ* in the abstract and discussion section, as presumably, this is generally much better than ± 33%?

Technical corrections

p294, line 10, excited not exited.

p298, lines 12-15. Awkward English. Perhaps could rephrase as "The bubble quantification system was designed in a modular fashion to assist various stages of development."

p298, line 15, notebook IBM compatible computer?

p298, line 19, inductive capacitance?

p298, line 25, … triggering of camera and illumination…

p299, line 2, elaborate filters?

p299, line 29, …for a sufficiently long time?

p300, line 17, notebook IBM compatible computer?

p303, line 5, …the larger n is, the smaller is the contributing error.

p303, lines 15-16, what is a more typical error? 33% maximum error is quiet large.

p303, line 21, left not top.

p303, lines 25 to p304, line 5, … the uncertainty of ±4 px comprises ± 2 px for the edge determination and ± 2px for estimating the major and minor axis orientation respectively… etc.

p304, line 6, right not bottom.

p304, line 20, what do you mean by highly shaped bubbles? What shape?

p304, line 26, left not top.

p305, line 9, what does differential diameter mean?

p305, lines 19 -20, delete vertically – repetition.

p308, line 27, Table 1?

p309, line 10, delete some.

p309, line 12, … of bubble clusters on the total volume…

p310, line 1, For example, Fig. 7…

p311, line 6, For simplicity, the total volume…

p311, line 8, tap water.

p311-p312, The decrease in rise velocity can be explained by… bubble surfaces as bubble size increases?

p315, line 20, On the other hand, frequencies that are too low inhibit…?

p325, Fig 1 caption, what does Eq stand for?

p328, Fig 3 caption, use left & right not top & bottom.

p332, Fig 7, figures too small to see detail, text, etc.