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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Monitoring surface water quality using social media in the context of citizen science" *by* Hang Zheng et al.

Hang Zheng et al.

zhenghang@tsinghua.edu.cn

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Anonymous Referee #2

This is an interesting paper that addresses the question of using crow sourcing to obtain water quality reports and thereby identify pollution issues. The paper implements platform on We-Chat in China. It is generally well written (there are suggested wording changes in the marked up manuscript). I found the introduction to be well written but there was little discussion of the many existing citizen science water quality programs. A quick scopus search revealed a number of papers with title that appear relevant. This context and the learning from those studies would need to be integrated in here. While the ideas are sound, there is little evaluation data. The quality of reports is assessed using a small group of contributors with water quality expertise specifically recruited

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to the project and with experience of the site they were making reports from. A wider group of reporters is also discussed but the quality of their reports can't be validated. I think this evaluation needs to be extended somehow, and in particular the reporting by general untrained users would need to be evaluated for this to be a publishable paper. I would encourage the authors to pursue that option as the platform and approach seems like a sound idea - but it needs better evaluation. I have included a range of more detailed comments to help the authors improve their manuscript in the marked up version of the paper. Please also note the supplement to this comment: http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-359/hess-2016-359-RC2- supplement.pdf

Reply: Thank you for your comments. We revised the manuscript accordingly. 1. A literature review on community-based water quality monitoring programs are presented in the Introduction section of revised manuscript.

2. We fully agree that the data needs to be evaluated somehow. First, it is not sufficient for comparison and regression using 15 samples to evaluate the monitoring data in the Yellow River. We reduced the manuscript and removed the section of data comparison in the Yellow River. In the current revised paper, we concentrate on analyzing the behaviors of volunteers basing on the reports over the China, including the spatial distribution of the reports, the proportion of anonymous reports, and the utility of cash prizes, etc.

Second, we evaluate the monitoring data through the photos of water bodies. The monitoring reports with photos are regarded as higher credible data than those without photos. It is very difficult to validate the volunteers' monitoring data across China, because the volunteers distribute all over the country and they submitted the reports randomly once they saw the dirty water nearby. There is rarely an official gauge site just locating on a volunteer's report point. The current manuscript demonstrate that the proposed framework and platform are practicable to collect water quality monitoring data through social medial. It provides a foundation to validate the data through big data method if we can obtain a huge amount of reports in future.

3. The details comments are responded as follows. (1) The reviewer suggested that "Rather than giving the results here, perhaps rephrase to say what issues were analyzed." in Page 4, Line 25∼27. We have deleted the sentences "Results revealed a spatiotemporal relationship between social media messages and real-world environmental status changes. The results also suggested new methods to monitor water pollution using VGI and social media in the future." We added "The impacts of photographed function, anonymous submission and economic incentives on increasing data credibility and volunteer motivation are analyzed".

(2) The reviewer mentioned that "This rating scale seems to be the reverse of the others where poor quality was 10" at Page 5, Line 15. Number 10 means the water is extremely smelly, completely turbid and full covered by floats. We believe it is convenient for volunteers using larger number to express heavier pollutants in and on the water.

(3) The reviewer asked that "Not clear - does this mean Mode 2 was done before Mode 1? If so why not reverse the order?" in Page 6, Line 15. We have revised this expression to "In Mode 2, The TEMP can recruit specific volunteers and collect a number of data more quickly than in Mode 1."

(4) The reviewer asked that "Were the observers aware of the official water quality test results from the days before each Q observation? This is important as it could impact on their perceptions." " in Page 10, Line 7. In this section, we agree that the data is limited to verify the volunteers' reports. We remove the section in the revised manuscript.

(5) The reviewer suggested that "Remind the reader about the time frame - start and end of the reporting included here." in Page 11, Line 9. We changed the text to "TEMP received a total of 265 reports from volunteers in China between 12 October 2015 and 30 May 2016. Out of the 265 reports, 172 were validated in the present study."

(6) The reviewer asked that "Is it 10 provinces with between 2 and 9 reports?? If 13

have only 1, then there must be at least 13 with less than 10!" in Page 11, Line 10. Sorry, there is a mistake. We have revised the text to "A total of 23 provinces have under 10 reports. A total of 14 provinces have only 1 report during the period."

(7) The reviewer asked that "Is there any means of comparing some of the reports in this section to WQ data from stations?" in Page 13 Table 2. It is quite hard to compare the reports to the gauged data across China. The volunteers submit the reports when they meet the dirty water. It could be anywhere and anytime. The coverage of gauged sites is not enough for comparison. If we have plenty of volunteer reports, it is possible to select some reports and compare them with the nearest stations' gauged data.

(8) The reviewer asked and suggested that "In the longer term if this is widely successful, how would photo interpretation be automated? This is an issue for discussion section." in Page 13, Line 9. We have added a paragraph in the Discuss section to discuss the potential of automatic photo interpretation and smartphone-based external devices for water quality monitoring.

(9) The reviewer required to explain what red packet money is in Page 17. We added more details about the red packet money on Line 30 Page 14 in the revised manuscript.

(10) The reviewer suggested that some sentences in the Results Section could be better in Discussion, including "A few volunteers were concerned about their privacy; thus, they submitted 15 reports anonymously. The number of anonymous reports implies the necessity of setting up an anonymous function in TEMP because volunteers care about their privacy when they disclose the water pollution activities around them. (Page 11, Line 15)", "The volunteers were also concerned about the charge of the Internet data flow, through which they upload the photos without Wi-Fi. Additional incentive measures are required to encourage volunteers to upload the photos of water (Page 12 Line 3∼4)". We believe that those sentences provide explanations for the results and it is close to the Results section.

(11) The reviewer suggested to move the Table 3 in Page 13 to the supplementary

material. Table 3 is the main result of this study and we think it is better to keep it in the main body of the manuscript.

(12) The manuscript were edited according to the reviewer's comments on wording.

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-359/hess-2016-359-AC3-supplement.pdf

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