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# *Interactive comment on* "Can assimilation of crowdsourced streamflow observations in hydrological modelling improve flood prediction?" *by* M. Mazzoleni et al.

**Anonymous Referee #2**

Received and published: 29 January 2016

Thank you for the opportunity to review the article "Can assimilation of crowdsourced streamflow observations in hydrological modelling improve flood prediction?" (hess-2015-415). This article presents an evaluation of methods for improving the accuracy of hydrologic models by incorporating crowdsource (social sensors) data. This is an interesting idea and the first paper on the topic that I have read. The opportunity to get the public to engage in extreme-events using technology they are already familiar with is exciting and will likely be a great success. I think the paper is generally written well and accurately presents the methods and results and that the discussion and conclusions are reasonable. That said, I have included a few comments/suggestions/questions for the authors to consider. I have not provided an editorial review, though I do believe

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Interactive Discussion

Discussion Paper

the paper should have a thorough editorial review prior acceptance. There are several instances with subject / verb agreement, some words are unnecessarily plural, and acronyms that do not appear to have definition (DA for example). Additionally, figures need to be checked to make sure they include relevant information included in the text (for example, include "setting A" on figure 15 or describing (a) and (b) on figure 13).

Comments / suggestion / questions:

1. Are there any methods currently in use to quantify the accuracy of crowdsource (CS) data? This is particularly important given that the methods you for including crowd-sourced data are workable. I think you mention briefly about assessing accuracy of actual social sensors. Please expound on this in terms of current ideas, particularly ideas that would assess accuracy in an objective manner. 2. Please consider re-structuring the Introduction. While the Introduction is very informative, it is quite long and digresses into a discussion of sensor technologies, issues of quality control, other CS networks, oceanographic models, and assimilation of asynchronous observations among other things. The paper is suppose to be about assimilation of CS data assimilation. The Introduction should go directly to this point. As written, the introduction of the topic and explanation of the objectives are separated by a considerable amount of material. Please shorten the Introduction to clearly present the topic, current understanding of how to include CS data, gaps in that understanding, and what you propose to do to fill that knowledge gap. The other information should be retained, but put into a different sections ("Background", "Existing CS Networks"). I personally find the material on existing CS networks very interesting and would like to see that information discussed a bit more. 3. Is the discussion about oceanographic studies / models needed? It was not clear to me what that material added to the paper. If it is needed, please make it more clear what the connection is? Is it technology of oceanographic models that can be used in your process of including CS data into models? 4. Why is the MIKE11 model presented as the model for representing flood propagation on the main channel in the Bacchiglione basin? Immediately after stating that the MIKE11

model was used, it appears that it was replaced by the Muskingum - Cunge model. Maybe they were used to represent two different processes in this basin? Obviously, this was not clear. If you used the M-C model, then why even bother with the MIKE11 part of the discussion? Please reconsider your wording to make it clear. If both were used, please explain the role of each. 5. Increases in model accuracy due to assimilating CS observations needs to be presented in different ways. I understand the value in evaluating model accuracy and improvements in accuracy in terms of NSE. Several times in the paper, the value of including these CS observations is couched in terms of increased accuracy of flood peak magnitudes and timing. Discussing this increased accuracy in terms of NSE only is not all that informative. Statistics such as NSE only speak to overall model accuracy, not to real increases/decreases in prediction error. Please include discussion about percent change in flood peak prediction (in text and/or table) for a few of the peaks in your evaluation period.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 11371, 2015.