

Response to Editor's comments:

I first would like to thank both the authors and reviewers for their patience and diligence through this review process. I believe that the discussion and reviews have served to improve the manuscript and increase the impact that this publication will have, particularly through the expansion of additional catchments and scenarios as well as in the clarity and value of crowd-sourced data. The manuscript, I believe, is novel and highly relevant and certainly appropriate for HESS.

I do, however, still find numerous editorial corrections that need to be made, which I list below. Once these changes are made, I look forward to accepting the manuscript for publication in HESS.

Minor edits:

EC 1. *The use of HESS conventions should be followed. I ask the authors to please carefully review the guidelines and edit the manuscript accordingly. In particular the naming variables and the notations are not according the guidelines in several instances. See section 4 when discussing the NSE properties for example. Specifically (but not exhaustive):*

a. Line 114: EnKF is not explained.

b. line 188: 3D-Var and 4D-Var are not explained before being abbreviated. It also not clear what is meant by these models.

c. In lines 403-404, the superscripts on Q appear to differ in each line. Please review the tables and figures carefully to be sure they stand alone and all variables are explained as the conventions followed. This is still not the case in several of the figures.

AC We thank the editor for her comments. Based on the HESS guidelines, we revised the variables and notations through the manuscript. All the variables in the equations have been modified accordingly. In particular, we modified NSE in N_{SE} both in the text and in all figures. The ensemble Kalman filter (EnKF) is now introduced for the first time in line 113 while 3D-Var and 4D-Var are explained in line 116-117. Finally, we corrected the superscripts on Q as the editor underlined.

EC 2. *Do not abbreviate DA for “data assimilation.” I do not think this warrants an abbreviation and adds confusion for the reader.*

AC Based on the editor's comment we removed all the data assimilation abbreviations in the manuscript to avoid any confusion.

EC 3. *I would refer to Experiment 1 and 2 in the singular. Each experiment has different scenarios but it is not necessary to call them Experiments 1 and 2; rather use Experiment 1, Scenario X when referring a particular experiment and Experiment 1 to refer to the set of all scenarios in Experiment 1.*

AC We modified the term “Experiments” in “Experiment” in the all manuscript

EC 4. *These specific edits are not exhaustive so please complete a thorough proof-reading of the manuscript.*

- a. line 16: Change “need of involving” to “growing inclusion of”*
- b. line 19: Change to read: “to participate in the collection...”*
- c. lines 21-22: Delete “if not discouraging”*
- d. lines 23-24: Delete “with the characteristics described above”*
- e. lines 26-28: Nice sentence.*
- f. line 39: Change to read: “...forecasting and uncertainties...”*
- g. line 40: Change to read: “...uncertainty of the model...”*
- h. line 43: Change to read: “...are two of the most used approaches to update a model when...”*
- i. line 48: Change “very expensive” to “cost prohibitive”*
- j. lines 49-50: Change to read: “For this reason, improvements to monitoring technology has led to...sensors to measure..”*
- k. line 51: Change to read “...defined in the paper as a “social...”*
- l. line 53: Change to read: “that, due to their reduced cost and voluntary labor by citizens, result in a more...”*
- m. line 55: EU-FP7 is not spelled out first before its use.*
- n. line 55-56: Delete “, which also sponsors this research” and replace to read “...(2012-2016) and various other projects that proposed to assess the usefulness...”*
- o. lines 78-80: Delete this sentence.*
- p. line 86: Change “just” to “only”*
- q. line 92: Change to “(the expertise level of the crowd), credibility (the volunteer group), and performance of volunteers as they relate to accuracy...”*
- r. line 93: Change to “levels of the model.”*
- s. line 98: Change to “at an operational level”*
- t. line 100: Add a comma after “real-time”*
- u. line 103: Add a comma after “mean”*
- v. line 104: Delete “Regarding the variable life-span” as this does not make sense.*
- w. lines 105-106: Change “sent just” to “taken”*
- x. line 107: Change to read “...and accuracy of the measurement.”*
- y. line 109: Change “has been” to “was”*
- z. line 112: Change to read “However, it was not considered that the...”*
- aa. line 121: Delete “not pre-determined, or”*
- bb. line 130: What is meant by the “appropriate time”?*
- cc. lines 139-141: Change sentence to read, “In light of the reviewed approaches, this study uses a pragmatic method, due in part to the...”*
- dd. line 143: Delete the word “novel”*
- ee. lines 144-146: This is a confusing sentence.*
- ff. lines 150-152: You do not discuss the study areas yet so I would remove these specifics from the introduction.*
- gg. line 165: Remove “which is funding this research.”*
- hh. lines 216-219: Very nice addition to the text.*
- ii. lines 225-228: This is a confusing sentence. Consider revising to: “In contrast, crowdsourced water level observations...of citizens at random moments (when a citizen decides to send data). Thus, from the modeling viewpoint, ...”*
- jj. line 454: Delete “the”*

kk. line 460: Pick either “estimate” or “calibrate” - it is confusing to have both there.
 ll. line 473: Change to read “...model - KMN - under...”
 mm. line 496: Change to “frequencies”
 nn. line 497: Change to “random accuracies”
 oo. line 522: Can you be more specific in referencing the settings rather than using A or B?
 pp. line 521: Decide whether to have a “the” in front of CSD or not. Then make this consistent across the manuscript. See example on this inconsistency on line 495 and line 521.
 qq. line 536-537: This sentence does not make sense. Please clarify.
 rr. Section 3.3: Only one of the study catchments is mentioned here; why are the others not mentioned?
 ss. line 537: Change to “forces”; also this sentence is not clear.
 tt. line 552: Change to “...model performances and consequent NSE value.”
 uu. line 582: Change to read “...difference that they are...”

AC We appreciate editor’s comments. We carefully addressed each one of them and, as suggested, we performed a complete proofreading of the manuscript. In particular, we modified the singular terms “frequency” and “accuracy” in “frequencies” and “accuracies” referring to the crowdsourced streamflow data. Between the lines 507 and 514 we better described each setting of experiment 2. Finally, we decided to remove “the” in front of CSD.