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Hydrology and Earth System Sciences Discussions

Interactive comment on "Ephemeral stream sensor design using state loggers" *by* R. Bhamjee and J. B. Lindsay

Anonymous Referee #2

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The paper presents an innovative sensor for a difficult to capture flow and measurement environment. The paper is, however, not well balanced: it has many considerations on the need and history of instrument development for such flows, but less attention is paid to the thorough description of the sensor and – most importantly- on the sensor sensitivity to various adverse environmental conditions (such as the effect of wind-driven ripples, or supercritical flows). The material reported in this paper does not qualify for a full paper. It can be brought to the level of a technical note by further addressing concerns posed by the present reviewer.

Major concerns 1. The senor is placed at an unspecified height from the base plate. Given that it appears that the wire heads are at about 10 mm from the soil and that the sensors were place in the field "on a local riffle rather than in a pool to minimize the possibility that sensors could be situated in standing water. . ." (p. 6391) there is a big probability to miss water levels of more than 2 cm flowing through that location. Perhaps this is not a considerable problem for the case studies in discussion, but these measurements limits are important to be assessed and stated for guiding the deployments of the probes. 2. I am not convinced that the shape of the sensor head was robust enough to not be sensitive to change in flow direction of up to 45 degrees. The Authors mention on p. 6385 that "Refinements were made on sensor heads that showed promise until a final design was chosen". These details are really needed when reporting about the development of a sensor. 3. The figures are very poor in general, with Figures 1 and 5 barely intelligible. Minor comments 1. Introduction too long and in parts redundant 2. The operating principles of the probe is not described (it assumes that the reader knows about the ER sensors) 3. Figure 1 is not clear (indicate the flow direction, the add more labels to describe the elements and specify the height of the sensor head from the base 4. Figures 1 and 2 can be combined. 5. Figure 3 and 4 are not very helpful in the current form. 6. I cannot find where is referenced in the text Figure 6 7. What is the basis for the deposition/scour pattern shown in Figure 2 (what flows, what geomentry for the deposits, duration of the experiment leading to these patterns)? Are thepatterns representative for a range of field conditions, soils, etc? 8. A photo of the probe will help (including an additional object to convey the actual size) 9. Figure 5 is not clear at all (scales are not labeled , the signals cannot be distinguished from the other geometries in the figure, not correlation with an actual precipitation, there are some boxes seeming to suggest something to readers but no explanations)! I might guess, but I do not have to! 10. Not sure how can we say that the spatial resolution is increased by this sensor (beside the cost saving, the senor does not increase the spatial resolution per se)