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Hydrology and Earth System Sciences
Discussions
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Interactive comment on "Spatial distribution of tracers for optical sensing of stream surface flow" *by* Alonso Pizarro et al.

Anonymous Referee #1

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This study reports a novel approach to refining image-based flow velocity estimates, with a specific focus on the effects of particle seeding. The use of simulated images to isolate these factors while eliminating the confounding effects of other environmental variables is innovative and could be a useful approach for conducting similar controlled experiments in the future. The paper is generally well-organized and reasonably well-written, and the figures are clear and insightful, so I am generally supportive of the work and believe that the manuscript could be published pending some minor revisions. Please refer to the attached PDF for the details, as well as a large number of in-line text edits to improve English usage, but here are a few of the highlights:

> Title: I suggest augmenting the title a bit to make what you actually did in this study more clear, perhaps start with "Identifying the optimal density and ..."

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> Line 11: You need to clarify from the beginning what you mean by aggregation. It wasn't until well into the paper that I got a clear understanding of what you mean by this term. Essentially clustering or dispersion of the tracers, right?

> Line 17: Similarly, clarify what you mean by converging seeding density - is this only in areas where the flow streamlines come together? I never really got a clear sense of what this refers to.

> Line 58: This would be a good place to elaborate a bit on what you mean by this term (aggregation).

> Line 78: Relative in what sense? In comparison to field measurements? Please clarify.

> Line 88: This (unidirectional, constant velocity) is a significant and somewhat unrealistic assumption and I think you should acknowledge this in some way within the text.

> Line 134: What kind (of current meter)? Please provide more detail, similar to the level of detail used to describe the camera system.

> Line 138: Were there two different kinds of tracers? The last couple of sentences of this paragraph are unclear.

> Line 156: This figure (3) appears to have only one image, not an original and enhanced version. Please modify the text and caption to remove the reference to the original image, or update the figure to include the raw image.

> Line 168: Did you try the new ensemble correlation method available within PIVlab? This approach is designed for low particle densities and could be helpful in this study, so I suggest adding a bit of analysis to assess the performance of the ensemble correlation method in addition to the standard PIVlab technique.

> Line 170: Were the SA and IA the same? Typically, the step size is half the size of

the IA.

> Figure 4: These graphs are a bit confusing at first glance because the error values are all negative, which makes the axes appear backward because smaller errors actually plot higher on the graph. You might want to point this out in the text to help the reader understand how to interpret these plots.

> Line 218: I still don't know what you mean by converging seeding density.

> Line 270: You should provide some more information about this algorithm.

Please also note the supplement to this comment:
https://www.hydrol-earth-syst-sci-discuss.net/hess-2020-188/hess-2020-188-RC1-supplement.pdf

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