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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Technical Note: Surface water velocity observations from a camera: a case study on the Tiber River" *by* F. Tauro et al.

Anonymous Referee #3

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General

The present manuscript concerns an interesting discharge measurement method, which is a clear example of the potential of image processing and pattern recognition techniques for hydrological observations. As in earlier publications, the authors show that LSPIV is a promising technique to measure the surface velocity in streams. The authors correctly point out that this is especially of interest when accessing a river is complicated during flood events. The article is well-written, and the text is clear and provides a good description of the steps that the authors carried out.

On the other hand, according to the HESS website, a technical note should present

"new developments, significant advances and novel aspects of experimental and theoretical methods and techniques". Looking at the developments concerning the apparatus and the registration technique, these were already presented in more detail in Tauro et al. (2014) and therefore do not add anything new, except for the use of sub-FOVs which constitutes only a small part of this paper.

The lack of new developments was pointed out earlier in this discussion. The authors replied by stating that the novelty is the method's opportunity for "the urgent issue of real-time monitoring during a flood event". However, this was also pointed out in Tauro et al. (2014).

Another argument is more interesting: "we implement a novel LSPIV configuration to enable environmental monitoring in an extremely challenging condition, that is, during a flood event at night". This is also supported by line 11 of the manuscript's abstract, where the authors point out the "different illumination and weather conditions". However, the conditions do not seem to be the major focus of the current manuscript, which implies that the article should largely be rewritten in order to put the focus on the effect of adverse illumination and weather conditions.

My advise to the editor therefore is to reject the current article. I would suggest to the authors to rewrite the article and really focus on the illumination and weather conditions, for which it seems the authors have interesting data. This would also require a better description of these conditions, for example more than that there was "some artificial light", and a better discussion of the exact conditions in which the application is favorable. Currently, the conclusions do not mention the light conditions at all. In the case of resubmission, or if the editor decides not to reject the article, I would advise the authors to include the following major and minor revisions as well.

Other major revisions to the article

First of all, it seems likely that the chosen FOV directly downstream the bridge is influenced by its pillars where eddies occur. Although the authors do mention inhomogeneities accross the FOV, they do not touch upon its implication when extrapolating the measured velocities to the complete cross-section. Of course, the considerations to select this cross-section are clear, since a bridge facilitates the placement of the apparatus and is accessible also during flood events. However, a quantification of the effects of eddies is required to promote the application of this technique in this setup. Of course, LSPIV is also interesting to quantify the flow velocities in eddies themselves, when sufficient tracers are available.

Further, the presentation of the data in Table 1 did not convince me that the technique works appropriate yet, even in the case of the favorable conditions in Test2. The v_{99} values are also still deviating significantly from the velocities obtained by visual inspection.

Minor revisions

The following lists some minor textual issues and minor points that need more clarification. Some of these points are already explained above and are just mentioned in this list.

Page Line(s)	-	*Comment*
11884 24-26	-	The literature review presents a wide variety of discharge measurement techniques, but could include references to recent more related research (e.g., Hilgersom et al. (2012) also present a not necessarily intrusive method and apply image processing techniques to obtain flow data from floats)
11886 - 17		Skip *occured*
11886 - 19		The meaning of a *historical hydrological cross-section* is unclear here. Only later, it turns out that it has been historically monitored. Consider skipping *historical* in this case
11887 - 18		*a considerable amount*
11888 - 5		It seems important here that both lasers are aligned perpendicular to the water surface, since the smallest tilt causes a considerable offset in distance on the water surface. How is this made sure?
Figure 1		Numbers 1 and 2 do not seem to clearly indicate the ultrasonic water meter and the apparatus
Figure 6		Add headers "Test1", "Test2", and "Test3" to the graphs. This makes the figure more readable at first sight and would prevent from the necessity to explain this in the caption
Figure 7		Add headers "Test1", "Test2", and "Test3" to the graphs. This makes the figure more readable at first sight and would prevent from the necessity to explain this in the caption

References

Hilgersom, K.P. and Luxemburg, W.M.J.: Technical note: How image processing facilitates the rising bubble technique for discharge measurement, in: Hydrology and Earth System Sciences,

16(2), 345-356, 2012.

Tauro, F., Porfiri, M. and Grimaldi, S.: Orienting the camera and firing lasers to enhance large scale particle image velocimetry for streamflow monitoring, in: Water Resources Research, 50(9), 7470-7483, 2014.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 11883, 2014.