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Comment on hess-2021-36

Nils Kaplan (Referee)

Referee comment on "Technical Note: Low cost stage-camera system for continuous waterlevel monitoring in ephemeral streams" by Simone Noto et al., Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2021-36-RC1, 2021

Interactive comment on „Technical Note: Low cost stage-camera system for continuous water level monitoring in ephemeral streams"

General comments:

This paper presents a promising re-interpretation of an image-based water level monitoring system for intermittent rivers and ephemeral streams (IRES) using a consumer wildlife camera with integrated time-lapse function. The continuous image-based monitoring of water level adds valuable information of the temporal dynamics of flow in IRES that were traditionally only monitored sporadically during field campaigns or with intermittency or EC sensors. However, those sensors cannot provide the visual information of an image, which allows for the evaluation of automated water level detection, the presence/absence of water in the channel or clogging of the stream channel. The presented method has a high potential to support future monitoring campaigns in the IRES research. However, some minor corrections and supplementary information needs to be added to the manuscript. Thus, I recommend the publication after minor revisions of this manuscript.

Specific comments:

Line 10: What are the “severe hydrometeorological conditions”? Only strong precipitation events or also extreme dry conditions? Please clarify.

Line 23: […]“uppermost” catchment “areas”

Line 23: “posit” seems to be an unusual wording in this context

Line 26: I suggest to use “Conventional” in stead of “Traditional”

Line 35: The citation of Kaplan et al., 2019 is a bit misleading as the presented dataset achieves it spatial resolution of an combination of EC-sensors, time-lapse imagery and conventional gauging.

Line 38: I would not recognize the noise of the sensor as biggest thread for EC-data accuracy for presence/absence of water but the accurate position of the sensor at the deepest point in the channel cross-section. The noise introduced by clogged material at the sensor is rather well to handle by using a little large thresholds for the EC-values.

Line 45: is very close to the sentence in Line 1. Maybe consider small changes to the wording.

Line 110: I experimented with a similar setup using a white pole, but the reflection of the pole through a clear water surface were too bright to extract the water line. Thus, I am interested in the paint you used for the pole (special matt color used?) and if the paint had any ability to prevent growth of algae, which would potentially affect the image processing algorithm. This would add valuable information to the manuscript.

Line 112: A little more details on the mounting system would be beneficial. Were specific measures be taken to prevent theft and/or camera movement?

Line 119: In this section a note on programming language and potentially packages used to write the image processing software would be great.

Line 122: Is the ROI static or set by an algorithm? Is the algorithm capable to respond to issues with movement of either the pole or the camera?

Line 124: Is the number thresholds individually calibrated for each site or automatically set according to the illumination conditions?

Line 137: Please add the information about the size of the moving average window already in this sentence to avoid confusion.

Line 138: […] "difference" between moving average and raw value […]?

Line 138: […] "set to the 90% quantile" of the moving window.

Line 138: The 90% quantile threshold might be a little bit too low to capture the fast dynamics of extreme events in ephemeral streams.

Line 163: May consider to use "Light scatter" or "Scattered sunlight" instead of "sunflecks".

Line 182: Due to the specific dedication of the method to monitoring IRES it would be very beneficial to add an analysis for the MAE for the dry states of the channel compared to the flowing conditions. In case only the site "C" had dry conditions, it would help already to add this.

Line 195: Many image sequences during severe rainfall events were acquired as NIR images in the study of Kaplan et al., 2019. Thus, the difference of MAE between RGB and NIR images might be also an interesting information to add (they might be a reason for the higher MAE here).

Line 202: Simple image saturation statistics might already be sufficient to remove some of the blurriest images before the actual analysis.

Line 210: From an image processing point of view a white pole should be the brightest object compared to other colors. However, the difference between glossy vs. matt paint could be interesting.

Line 211: Additionally, to the debris that could get stuck at larger poles, they may have also a larger potential to get eroded.

Line 241: The advantages of the system could also be stated earlier; potentially at the end of the introduction

Line 242: “with minimal flow disturbance through the pole” instead of “without deploying any sensors in the flow”

Technical corrections:

Line 223: “frequency of time-lapse image acquisition” or “image acquisition frequency” instead of “camera acquisition frequency”.

Line 224: “time-lapse interval” instead of “frame frequency”

Figures:

I suggest to include a figure describing the processing algorithm in a flow chart.