Point-by-Point Reply to Comments

Referee #2 and the editor requested minor revisions. The revised manuscript includes minor changes to a few sentences and a couple of additional sentences to address suggestions from Referee #2. Our point-by-point response is organized as a response to the comments from Referee #2, with our responses in blue.

Response to Referee #2

Dear Editors,

The authors have addressed the challenges of hydrological monitoring in these environments with clarity, rigor, and creativity. I would like to commend the authors for their thoughtful and detailed responses to reviewer comments and their willingness to substantially revise the manuscript. The improvements in clarity, methodological detail, and contextual discussion are evident throughout, and the new appendices addressing transferability and uncertainty are particularly appreciated.

While the manuscript is now in excellent shape, I would like to offer a few minor suggestions that, if addressed, could further strengthen the work:
Thank you for this thoughtful review of the manuscript. We will address your suggestions below.

1. Quantifying Benefits of Image-Based Quality Control
The manuscript describes the important role of image classification in quality control of sensor data. However, it would be helpful to briefly quantify the impact—such as an approximate number or percentage of erroneous data points identified and removed thanks to this approach. This would concretely demonstrate the practical utility of the method.
Thank you for this feedback. The image classifications were used in tandem with standard quality control. To make the impact of the image classifications clearer, we present figure 9 and then add a sentence describing how the image classifications supported quality control (l. 406-410): "The final corrected and quality-controlled PEC stage time series (fig. 9) is the product of standard quality control (i.e. removal of stage observations taken during sensor maintenance) and using image classifications to support quality control. Specifically, image classifications helped identify when the stage was zero for August 2017 to September 2023, supported the removal of erroneous data for most of January 2023, and revealed that stage observations are likely artificially low from late 2017 to early 2018."

2. Discussion of Model Transferability Conditions
The new appendix on transferability is a strong addition. To further aid practitioners, please consider explicitly summarizing in the main text the primary conditions and limitations for successfully transferring the method to other sites, such as the need for consistent camera positioning, presence of a staff plate, or minimum number of labeled images.

Thank you for this feedback. We provide recommendations to practitioners (including the need for consistent camera positioning) in the final paragraph of the Conclusion section (l. 626-634), with supporting information in Appendices 4 and 5. We added a sentence to the Conclusion to address that a staff plate is not needed for image classification and that as few as 100 labeled images may be sufficient for basic image classification (l. 630-631): "For the classification of categorical flow states, installation of a staff plate is not necessary, and basic image classification can be achieved with a limited number of labeled photos (on the order of 100 per site; see Appendix A4."

3. Objective Thresholding for Classification Confidence
The qualitative approach to determining classification confidence is reasonable and well-explained. For completeness, a brief mention of potential objective, quantitative methods (e.g., maximizing a statistical metric like Youden's J index) could be included in the Discussion, to guide future work in this area.
Thank you for this feedback. In line 604, we mention "In addition, a more objective strategy for evaluating classification confidence for other sites could be developed." We agree that quantitative approaches, such as maximizing a statistical metric (e.g., Youden's J index), could be used in place of the qualitative approach adopted here. However, the selection of a specific quantitative method depends on the objectives of the analysis and the characteristics of the site(s) under study. A systematic evaluation of such objective strategies is therefore beyond the scope of this work.

4. Ongoing Operational Considerations
While the manuscript emphasizes the low-cost nature of the method, it would be valuable to briefly acknowledge in the conclusion or discussion the practical challenges and ongoing costs associated with long-term field camera maintenance, especially in harsh or remote environments. This would help set realistic expectations for practitioners considering deployment at scale.
Thank you for this comment. We address this in the last paragraph of the revised Discussion (l. 608-609), where we reference Appendix 5, which provides estimates of the cost of setting up and maintaining a field camera site. In addition, we provide practical recommendations for implementing our method in the last paragraph of the Conclusion (l. 626-634).

In closing, I wish to thank the authors for their thoughtful revisions and for their clear commitment to advancing hydrological science. I am confident that the manuscript, with these final minor improvements, will be a significant and widely appreciated contribution to the literature.
Thank you for your thorough review and for helping to improve the quality of our manuscript.

Sincerely,
Referee #2