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## Monitoring wet stream dynamics in ephemeral streams: stage-cam system experimental evidence

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Scientific interest in ephemeral streams increased in the last decades, but monitoring their dynamics remains a major challenge in hydrology. Motivated by the last advancements in computer vision techniques, we propose an optical-based and non-invasive low-cost approach to provide a continuous estimation of the water level fluctuations. The system comprises a consumer grade wildlife camera with near infrared (NIR) night vision capabilities and a target pole set in the thalweg. The water level estimated through a simple white pole is compared to estimations obtained through different types of targets, such as broader coloured bars, with the aim to identify the optimal stage-cam setup. The feasibility of the approach is demonstrated through a set of benchmark experiments performed in natural settings with different illumination conditions and during rainfall events. Our findings show that broader bars enhance the visibility of the target but also increase the reflection effect of the water. Therefore, using the stage-cam configuration comprising the narrow target and optimizing the parameters involved in the image analysis procedure may be sufficient to monitor water level dynamics.