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Software utilized for image-based velocimetry methods focused on water resources

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ABSTRACT

Sustainable water resources management plans require advanced instrumentation to measure accurately both the water velocity and the discharge of the aquatic bodies. An innovative way to achieve this goal is with the use of non-contact, cost-effective, and efficient image-based methods. A studied water surface can be captured by subsequent images while surface velocity can be estimated by the movement of tracers on the water's surface. Various software have been developed in order to utilize such tracing algorithms and to monitor the surface velocity of fluids. The objective of this study was to present the current status of these software, describe the main parameters, and provide applied examples of image-based velocimetry application. To achieve this firstly, a comprehensive review was conducted that focused on the scientific publications that have utilized particle image and tracking velocimetry methods on water bodies. Secondly, the main scope of this research was to record and analyze these publications based on the software that were used. This paper presents 30 software with their main features and few of their application examples. This should help other researchers choose the appropriate image-based velocimetry software to measure water velocity and discharge based on the needs of their study.

Keywords: Fluid analysis; Hydrometry; Image velocimetry; Natural tracers; Seeding particles; Software database; Streamflow velocity; Tracking velocimetry; Water resources management

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