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Using ice dices to measure surface streamflow velocity

Flavia Tauro (1) and Salvatore Grimaldi (1,2)

(1) University of Tuscia, Department for Innovation in Biological, Agro-food and Forest systems, Viterbo, Italy (flavia.tauro@unitus.it), (2) New York University Tandon School of Engineering, Department of Mechanical and Aerospace Engineering, Brooklyn 11201, New York, USA

Non-intrusive observations are fundamental to monitor river flows and understand water processes in natural systems. Recently, the introduction of optical methods has fostered the establishment of numerous image-based techniques for characterizing the kinematics of water bodies. However, RGB image-based methods are still severely affected by illumination conditions and tracers' visibility. In this contribution, the integration of particle-shaped tracers and thermal imagery is applied to characterize the surface velocity field of a natural stream. Specifically, the trajectories of a few grams of artificially deployed ice dices are reconstructed by analyzing thermal images with particle tracking velocimetry. Average surface flow velocities are in agreement with benchmark values estimated with a current meter. This proof of concept experiment demonstrates the efficacy of thermal imagery for hydrological monitoring and paves the way to the integration of thermal signals in standard water gauging systems.