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Simultaneous two-phase flow measurement techniques using Particle Image Velocimetry. HADIS MATINPOUR, JOSEPH ATKINSON, SEAN BENNETT, State Univ of NY - Buffalo — Most geophysical and environmental flows in nature are turbulent flow and entrain suspended sediments. Turbulent-sediment interaction is one of the most challenging and complicated phenomenon. Many studies have investigated turbulent modulation by suspended sediments. However, there is little investigation on studying sediments in suspension as a two-phase flow, one phase of sediments and another phase of fluid. In this study, we designed and employed a state-of-the-art two-phase PIV method to measure each phase instantaneous velocities simultaneously and separately. The technique that we have developed is employing a computer-vision based method, which enables us to discriminate sediment particles from fluid tracer particles based on two thresholds, dissimilar particle sizes and different particle intensities. To validate two-phase PIV method, we also measured only fluid phase velocities by florescent tracer particles and a camera equipped with a narrow-band filter. Results from imaged processing method are compared with results from physically discriminated two phase method.

Hadis Matinpour
State Univ of NY - Buffalo

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