

Abstract Submitted  
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**Simultaneous Measurement of Fluid and Particle Motion in Shear Induced Erosion**<sup>1</sup> PAUL S. KRUEGER, ZHONGFENG AN, SMU — Fluid particle interaction is fundamental to shear induced particle erosion, but experimental measurements of this interaction are challenging due to differing optical characteristics of the fluid and particles and because of the high particle volume fraction in the particle bed. To address these challenges, monodisperse glass beads were used with a refractive-index matched aqueous solution of NaI flowing horizontally over the particle bed. Two cameras separately imaged the fluid and particle phase motion using optical filters to isolate the emission bands of the fluorescent fluid tracer particles and dye added to the fluid for the fluid and particle phase cameras, respectively. Then digital particle image velocimetry and particle tracking were used to obtain the full-field, time-varying evolution of the fluid and particle motion simultaneously. The results showed rapid, fluctuating particle transport near flow initiation for sufficiently high fluid flow rates. Increased slip in mean particle velocities was observed above from the particle bed surface and an approximately linear relationship was observed between particle and fluid velocity fluctuations.

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