Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Quantifying Suspended Sediment Diffusion Through Direct *in situ* Measurements of Turbulent Schmidt Number IAN TSE, EVAN VARIANO, University of California, Berkeley — In this study we investigate how the diffusion of suspended sediment differs from the diffusion of fluid momentum using both laboratory and *in situ* field measurements. The most common model for turbulent diffusion considers eddy diffusivity (D_T) to be proportional to the eddy viscosity (ν_T) scaled by the turbulent Schmidt number (σ_T). But accurate selection of σ_T values is challenging because sediment, by virtue of its inertia, is transported differently than either momentum or passive scalars. We directly measure σ_T over a variety of flow cases using a novel Volumetric Particle Imager (VoPI) developed for this purpose. VoPI is a field-deployable quantitative imaging device that can obtain three-component particle velocity records in a volume. By computing velocity variances and integral timescales from measured Lagrangian velocity records, we compute D_T (for particles) and ν_T (for tracers) directly using Taylor's (1921) formulation. We present the construction and calibration of the device as well as validation of its measurements. We also report the connections between the measured σ_T values and the flow conditions in which they occur and suggest predictive methods for when direct measurements are unavailable.

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Date submitted: 03 Aug 2012 Electronic form version 1.4