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Using the theory of shear dispersion to estimate river mixing CHRIS REHMANN, Iowa State University, MEREDITH CARR, University of Illinois at Urbana-Champaign, JUAN GONZALEZ, South Florida Water Management District — We evaluate the use of river velocity and bathymetry data measured with an acoustic Doppler current profiler (ADCP) to estimate the longitudinal dispersion coefficient K. If shear dispersion controls the mixing, the dispersion coefficient can be estimated from a theoretical formula involving velocity measurements in a cross section. The relative ease and detail with which ADCPs measure velocities allows the dispersion coefficient to be estimated with greater frequency and spatial coverage in U.S. rivers. Comparing values of K computed from ADCP measurements from the U.S. Geological Survey with values derived from tracer studies shows that the ADCP works as well as or better than empirical formulas for the dispersion coefficient. A possible source of discrepancy in this comparison is that the ADCP measurements and tracer measurements were conducted many years apart. To address this issue, we conducted simultaneous ADCP measurements and tracer studies in two Florida rivers. In both rivers, the ADCP method underestimated the dispersion coefficient, but compared to empirical formulas, the ADCP method provides the most reliable estimate.

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