

Acoustic Doppler Velocimeter Limitations

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Abstract. Acoustic Doppler velocimeters (ADV) can be used to provide detailed, three-dimensional velocity profiles cost effectively. From the extensive ADV data collection performed at the Colorado State University Hydraulics Laboratory, limitations for their use have been determined. The two primary problems encountered have been the inclusion of the channel bed in the sample volume and insufficient lag between pulses. The primary data quality indicators presented in literature and by the manufacturers are data correlation and signal-to-noise ratio (SNR). However, these values alone do not necessarily provide an indication that the sample volume includes a portion of the bed or that the lag between pulses is insufficient. An algorithm was developed to setup a framework for understanding these problems. In order to understand how extensively the problems have influenced velocity profile data, the algorithm was applied to data collected in a scaled model of the native topography of Middle Rio Grande bends. Based on the algorithm and data analysis, more detailed guidelines for ADV data collection have been developed to better ensure that data collected are not influenced by instrument limitations.

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