Assessment of Acoustic Flow Measurement Instrumentation for Mean Flow Measurements

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Abstract. The acoustic Doppler velocimeter (ADV) and acoustic Doppler current profiler (ADCP) are instruments that are commonly used for determining flow velocity at a point or in a profile. Both the ADV and ADCP are semi-intrusive with less spatial and temporal resolution than other technologies such as the laser Doppler anemometer (LDA). Initial study results are presented as a performance assessment of *Nortek Vectrino I* ADV and *Teledyne StreamPro* ADCP in comparison to measurements made by a *Dantec* LDA. Experiments were conducted in a laboratory flume to compare mean flow measurements. Impact of the ADV on the flow in the location of measurement was dependent on flow regime and varied between 0.5% and 3.4%. An average of 2.7% under prediction of the mean stream-wise flow velocity was found as when compared to the LDA measurements of instrument impacted flow. Location of the ADV sampling volume was found to be in a different location then published by the manufacturer. ADCP measurements were found to be significantly impacted by the total time of measurement. ADCP mean flow measurements were also found to under-predict mean flow velocities measurements made by the LDA between 1% and 7%. Recommendations for best use of these two instruments will be outlined.