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A surface PIV approach for the remote monitoring of mean and turbulent flow properties in an open channel ERIKA JOHNSON, EDWIN COWEN, Cornell University — In an effort to develop a reliable, continuous and efficient method of remotely monitoring bathymetry, water column turbulence levels and mean velocities, a surface PIV (particle image velocimetry) experiment is conducted in a wide open channel ($B/h > 12$) for a range of flow depths. Mean velocity, turbulence intensities, dissipation, divergence, vorticity as well as integral length scale statistics have been calculated from the surface PIV data. The results reveal the presence of secondary flow within the channel, which leads to heterogeneous turbulence metrics on the surface; for example, the streamwise turbulent intensities and dissipation vary strongly as a result of the secondary motion. The integral length scales vary predictably with the flow depth ($L \approx 0.3h$) and a correlation between the surface dissipation and dissipation in the water column allows estimates of the bed shear stress. These findings have important implications for developing new technologies for stream gauging, near shore and estuarine monitoring.

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