

Flow velocity measurements in a large amplitude meandering flume using an acoustic doppler velocity profiler

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A natural meandering stream represents one of the most complex flow situations for its irregular topography and its changing plane shape. The modifications of its planform geometry can induce undesirable consequences and can disturb the ecological equilibrium of the areas neighboring the channel. The analysis of the morphodynamic evolution of the channel is strongly related to the kinematic characteristics of flow. Along the curved reaches of the channel, characterized by changing curvature in longitudinal direction, many interrelated factors occur and the definition of forecasting methodologies is complex. In this work, the results of an experimental investigation of flow conducted in a large meandering laboratory channel are shown. The experiments have been carried out over a deformed bed. During the experiments the flow velocity components have been measured by using an Ultrasonic Doppler Profiler (DOP2000), that allows to measure instantaneous flow velocity profiles. The analysis of the collected data confirm that when the aspect ratio is small (<10) the cross-circulation assumes a great importance. Furthermore, it seems that, in accordance with previous findings (Blanckaert and Graf, 2001), a second counter rotating secondary flow cell appears along the bend near the outer bank. Blanckaert K. & Graf W.H. (2001). Mean Flow and Turbulence in Open-channel Bend. *Journal of Hydraulic Engineering*, vol. 127, n. 10, pp 835-847.