

— ADcp measurements of suspended sediment fluxes in banat rivers, Romania —

Acoustic Doppler current profilers (aDcp) are increasingly used to perform river discharge measurements. Water velocity profiles are computed from the Doppler frequency shift measured between emitted and received ultrasonic signals. The intensity of the sound backscattered by suspended solids depends on water (temperature, absorption coefficient, etc.), aDcp (frequency, beam spreading, etc.) and particle (size, concentration, absorption coefficient, etc.) hydroacoustic properties. The field tests reported here mainly aim at comparing suspended sediment concentration and flux values provided by aDcp and conventional procedures routinely followed by the Romanian hydrometric network. Test measurements have been performed at two hydrometric stations in the Banat Basin, Western Romania. We used a Teledyne RDI WorkHorse Rio Grande 1200 kHz aDcp mounted on a tethered board. First, stationary aDcp profiles were acquired simultaneously and close to bottle sampling verticals. These linked measurements were later used to calibrate hydroacoustic parameters and convert backscatter profiles to concentration profiles. This calibration step and further analysis were supported by the Sediview commercial software (DRL Software, UK). Several successive aDcp transects were acquired across both hydrometric sections of Faget, on the Bega river, and Lugoj, on the Timiș river. Due to shallow water depths and technical restrictions, linked concentration measurements were not possible at Faget, but discharge measurements are in good agreement. In the Lugoj study case, sediment calibration was carried out and concentration contours show some contrast throughout the cross-section. Water discharge and sediment mean concentration and flux are similar to the values provided by standard measurements (respectively about 35 m³/s, 85 mg/l and 3 kg/s). Further experiments are required to evaluate more accurately the potential of the aDcp method, especially in wide and deep river cross-sections and during floods.

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