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Improving H-Q rating curves in temprorary streams by using Acoustic Doppler Current meters

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Intermittent rivers pose different challenges to stream rating due to high spatial and temporal gradients. Long dry periods, cut by short duration flush flood events explain the difficulty to obtain reliable discharge data, for low flows as well as for floods: problems occur with standard gauging, zero flow period, etc.

Our study aims to test the use of an acoustic Doppler currentmeter (ADC) for improving stream rating curves in small catchments subject to large variations of discharge, solid transport and high eutrophication levels. The study is conducted at the outlet of the river Vène, a small coastal river (67 km^2) located close to the city of Montpellier (France). The low flow period lasts for more than 6 month; during this period the river flow is sustained by effluents from urban sewage systems, which allows development of algae and macrophytes in the riverbed.
The ADC device (Sontek ®Argonaut SW) is a pulsed Doppler current profiling system designed for measuring water velocity profiles and levels that are used to compute volumetric flow rates. It is designed for shallow waters (less than 4 meter depth). Its main advantages are its low cost and high accuracy ($\pm 1\%$ of the measured velocity or ± 0.05 m/sec, as reported by the manufacturer).
The study will evaluate the improvement in rating curves in an intermittent flow context and the effect of differences in sensitivity between low and high water level, by comparing mean flow velocity obtained by ADC to direct discharges measurements. The study will also report long-term use of ADC device, by considering effects of biofilms, algae and macrophytes, as well as solid transport on the accuracy of the measurements.

In conclusion, we show the possibility to improve stream rating and continuous data collection of an intermittent river by using a ADC with some precautions.