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Platform for monitoring water and solid fluxes in mountainous rivers

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The project aims to develop a platform that electronically integrates a set of existing sensors for the continuous measurement at high temporal frequency of water and solid fluxes (bed load and suspension), characteristics of suspended solids (distribution in particle size, settling velocity of the particles) and other variables on water quality (color, nutrient concentration). The project is preferentially intended for rivers in mountainous catchments draining areas from 10 to 1000 km^2, with high suspended sediment concentrations (maxima between 10 and 300 g/l) and highly dynamic behavior, water discharge varying of several orders of magnitude in a short period of time (a few hours). The measurement of water and solid fluxes in this type of river remains a challenge and, to date, there is no built-in device on the market to continuously monitor all these variables.
The development of this platform is based on a long experience of measurement of sediment fluxes in rivers within the French Critical Zone Observatories (http://portailrbv.sedoo.fr/), especially in the Draix-Bléone (http://oredraixbleone.irstea.fr/) and OHMCV (http://www.ohmcv.fr/) observatories. The choice was made to integrate in the platform instruments already available on the market and currently used by the scientific community (water level radar, surface velocity radar, turbidity sensor, automatic water sampler, video camera) and to include also newly developed instruments (System for the Characterization of Aggregates and Flocs – see EGU2016-8542 – and hydrophone) or commercial instruments (spectrophotometer and radiometer) to be tested in surface water with high suspended sediment concentration. Priority is given to non-intrusive instruments due to their robustness in this type of environment with high destructive potential. Development work includes the construction of a platform prototype "smart" and remotely configurable for implantation in an isolated environment (absence of electric network and wired communication network). This platform should enable interaction between different sensors, remote management and real-time sensors, sending SMS (Short Message Service) and e-mail alarms, remote data transmission and data archiving. A test of the current platform is planned in 2016 on a site of the French Critical Zone Observatories.