



## **Sediment transport monitoring for sustainable hydropower development**

Nils R  ther (1), Massimo Guerrero (), and Siri Stokseth ()

(1) NTNU, Trondheim, Hydropower and River Engineering, Hydraulic & Environmental Engineering, Trondheim, Norway (nils.r  ther@ntnu.no), (2) University of Bologna, Department of Civil, Chemical, Environmental, and Materials Engineering – DICAM, (3) Statkraft AS, Norway

Due to the increasing demand of CO<sub>2</sub> neutral energy not only in Europe but also in World, a relatively large amount of new hydro power plants (HPP) are built. In addition, will existing ones refurbished and renewed in order to run them more cost effective. A huge threat to HPPs is incoming sediments in suspension from the rivers upstream. The sediments settle in the reservoir and reduce the effective head and volume and reduce consequently the life time of the reservoir. In addition are the fine sediments causing severe damages to turbines and infrastructure of a HPP. For estimating the amount of incoming sediments in suspension and therefore planning efficient counter measures, it is essential to monitor the rivers within the catchment of the HPP for suspended sediments. This work is considerably time consuming and requires highly educated personnel and is therefore expensive.

Consequently will this study present a method to measure suspended sediment concentrations and their grain size distribution with a dual frequency acoustic Doppler current profiler (ADCP). This method is more cost effective and reliable in comparison to traditional measurement methods. Having more detailed information about the sediments being transported in a river, the hydro power plant can be planned, built, and operated much more efficiently and sustainable. The two horizontal ADCPs are installed at a measurement cross section in the Devoll river in Albania. To verify the new method, the suspended load concentrations will be monitored also in the traditional ways at the same cross sections. It is planned to install turbidity measurement devices included with an automatic sampling devices. It is also planned to use an optical in situ measurement device (LISST SL by Sequoia Inc.) to have detailed information of sediment concentration and grain sizes over the depth.