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ScourBuoy – concept for scour monitoring system

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The objective of this paper is to present the ScourBuoy – concept for scour monitoring system. The ScourBuoy prototype is currently under development within the R3PEAT project (Remote Real-time Riprap Protection Erosion Assessment on large rivers), which aims to investigate scouring processes next to the riprap protection around bridge piers. ScourBuoy integrates commercially available technical devices into a functional system for scour monitoring during flood conditions. Sensors used are single beam echo sounder that collects depth and temperature data, multi-GNSS device for 3D positioning, compass for orientation respective to the True North and motion sensor for pitch and roll data. Combined output from the sensors allows user to calculate river depth and monitoring of scour development during floods. Advantage of ScourBuoy is adaptability to the field conditions, such as placement over the scour hole, as well as simpler deployment and reallocation in comparison to fix-mount solutions. ScourBuoy prototype was built using a common small-scale pipe float with an 80 mm inner diameter hole, which was used as a holder for an aluminium pipe. Aluminium pipe is used as a casing for echo sounder, positioned as downward-looking, so it stays submerged during deployment. The rest of the sensors are enclosed in the waterproof housing placed atop of the buoy, permanently above the waterline. The ScourBuoy will be a practical and affordable system which will allow researchers and engineers to collect measurements for scouring estimation. It will be used as a support system for rapid and timely decision making. Finally, developed Scour Buoy will present an alternative for real-time scour monitoring which allows responsive adapting to the specific conditions at the locations affected by scour.