



Application of Airborne LiDAR Bathymetry to Monitor Hydro-Morphological Units

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Full geometrical topographic information about the riverbed is necessary for characterizing morphological structures in river systems, for understanding river processes and for analysing habitat changes. To achieve a good data basis for the bathymetry of the river bottom on mesoscale for long river stretches, the classical cross-section survey is a method, which is very time consuming. The technology of Airborne LiDAR Bathymetry (ALB) scanning is an innovative remote sensing method for measuring the 'underwater topography' in rivers in a very high resolution. This method enables a fast and detailed aerial survey of the river bathymetry and can be applied successfully even in inaccessible alpine regions. The water-penetrating laser system uses the green region of the electromagnetic spectrum (wavelength = 532 nm) to detect and measure morphological structures. The point density can be up to 50 points/m².

This study addresses the application of high-resolution LiDAR bathymetry data regarding river morphological changes of the river Mareit/Mareta in South Tyrol, Italy. With a repetitive survey, it is possible to determine spatial relocation of hydro-morphological units and measure the amount of bed level changes at the same time. The data processing of ALB data for each survey needs a number of specific steps to achieve high-quality digital terrain models (DTM) suitable for comparison needs. These DTM's represent different time states and are very valuable sources for bed-load transport model calibration and validation processes. The work is part of the research project FHARMOR – Fish Habitat in Alpine Rivers: Integrating Monitoring, Modelling and Remote Sensing (<http://www.fharmor.it/>), which is dedicated to improve state-of-the-art habitat simulation and evaluation methodologies.