Next Generation Surface Water Measurements and Discharge Inversion Methods

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Recent advances in surface water measurement techniques are changing how surface water is monitored. One of the primary drawbacks of traditional surface water monitoring techniques, such as acoustic or pressure measurements, is the need for direct contact with water, which limits the spatial resolution of sampling often to a single point location, such as a stream gage. In addition, traditional direct contact measurements are difficult or dangerous in numerous situations where measurements are desired, such as for steep or flooding streams. Recent developments of non-contact measurement techniques, using radar, lidar, and photogrammetry, can be applied to surface water measurements over a range of temporal and spatial scales. In this talk, non-contact surface water measurements will be discussed, including near-field applications (e.g. bridge or bank deployments) up to far-field applications in satellites, including the upcoming NASA Surface Water and Ocean Topography (SWOT) Mission. Discharge inversion methods for converting these surface water measurements into discharge also will be discussed.

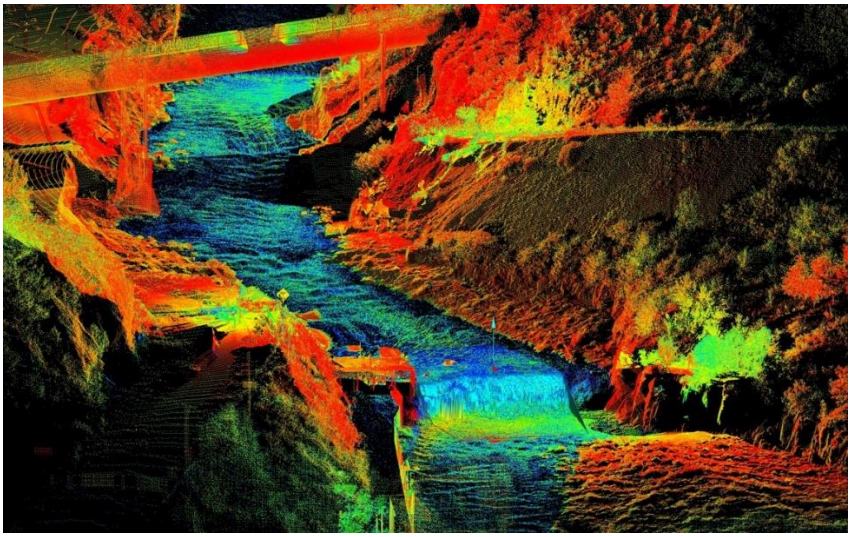

Figure 1. Image from terrestrial laser scans of Big Thompson River, CO, immediately following the Sept 2013 floods. Damage to Highway 34 and flood debris can be seen on the left side of the image. (Minear)

Dr. Minear completed his undergraduate degree at Colorado College and later received Masters and PhD degrees from the University of California, Berkeley. Before joining CIRES at CU Boulder, Dr. Minear worked as a Research Hydrologist at the United States Geological Survey at the California Water Science Center and the National Research Program. Dr. Minear works on a variety of river research and hydrodynamic modeling projects in California and the Western U.S., including the San Joaquin River, Trinity River, Klamath River, Merced River in Yosemite National Park, and Elwha River Dam Removal Project. Dr. Minear is a Science Team and Cal/Val Team member for the upcoming NASA Surface Water and Ocean Topography (SWOT) Mission and serves on the U.S. Subcommittee on Sedimentation.