



Use of image velocimetry techniques on citizen videos of the November 2021 flooding event flows in Merritt, British Columbia

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In November 2021, an atmospheric river swept the Pacific Northwest region, causing one of the costliest natural disasters in Canadian history. Among others, the Coldwater River in Merritt, British Columbia caused widespread flooding on November 15th, 2021, resulting in extensive damage to the infrastructure and total evacuation of the residents.

Estimating the magnitude of this flood is difficult, as it damaged the local flow monitoring station and altered the surrounding landscape. However, parts of this flooding event, including the flow close to its peak, were filmed by local residents using mobile devices or drones. Though with significant perspective distortion and imprecision, they still provide valuable information on the extreme flow event, which would have otherwise been lost or neglected. The objective of this study is to apply image velocimetry techniques to these videos, with limited resources and geodata, for reconstructing surface velocities and discharges during the flood.

The analysis method consists of using LSPIV and Farneback optical flow on the original clips where possible. Objects are identified in the videos, then geolocated or surveyed after the flood, for rectification of raw velocities. This allows multiple iterations, accounting for uncertainties in the rectification parameters. Discharges are then calculated using surveyed or reconstructed transects, and water surface elevations estimated from the video frames.

Preliminary results of both methods will be presented and compared on the use of lens distortion correction, different contrast enhancement block sizes, and interrogation area or filter sizes. Validations of the calculated discharges against flow observations from the Water Survey of Canada will also be included.