

EXTRACTING CONTINUOUS URBAN RIVERS FROM HIGH-RESOLUTION IMAGERY

C. Zeng^{a, *}, J. Wang^a, S. Bird^b

^a Department of Geography, the University of Western Ontario, London, ON, Canada. chqzeng@gmail.com; jfwang@uwo.ca
^b Fluvial Systems Research Inc. White Rock, BC, Canada. sbird@fluvialsystemsresearch.com

THEME: WACY ---Water cycle.

KEY WORDS: feature extraction, river, water body, optical imagery, SAR

ABSTRACT:

Urban rivers are a vital resource to residents, and generate concerns for water resource managers related to public health and safety (e.g. pollution, flooding), fish stocks, and recreational use. Remote sensing is an efficient and relatively inexpensive approach to detect and update urban rivers for various applications. Current river extraction methods using different pixel-based or object-based methods focus on the detection accuracy, while the connection of river segments is usually ignored. Rivers detected from remotely sensed imagery are broken into segments due to imperfect detection methods and interference from other ground features such as bridges, dams, shadows and ships. In this study, we propose to use an innovative method to connect different river segments according to reliable rules. Three critical rules have been used to connect river segments: (1) the image information consistence (e.g., based on the mean values for both optical and synthetic aperture radar images); (2) the river centre line direction consistence; and (3) the segment width consistence. The experiments on a section of Bow River near Calgary in Canada demonstrated the effectiveness of this proposed method. A continuously detected river provides a reliable data source for hydraulic models and the assessment and management of water quality, quantity and aquatic habitat.

* Corresponding author.