

EGU2020-10080

<https://doi.org/10.5194/egusphere-egu2020-10080>

EGU General Assembly 2020

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## Extraction of River Planforms from Synthetic Aperture Radar Imagery using Superpixel Classification

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Algorithms for the detection and extraction of river planforms from remotely sensed images are of great interest to numerous applications including land planning, water resource monitoring, and flood prediction. Synthetic Aperture Radar (SAR) is a very promising modality for river monitoring and analysis as it can provide high resolution imagery regardless of weather conditions and the day/night cycle.

In this work we present an algorithm for the detection and segmentation of rivers in SAR images, with emphasis on accurate riverbank extraction. The algorithm utilises a novel superpixel segmentation algorithm that segments the image into perceptually uniform clusters of pixels based on a modelling of the SAR data with the Generalised Gamma Distribution.

The generated superpixels adhere to the edges of objects in the image (such as riverbanks) with great accuracy. Superpixels are then characterised according to several features that describe their statistical and textural properties which allows for the discrimination between river- and land-cover superpixels. The river-forming superpixels are then grouped together using unsupervised agglomerative clustering to produce river planform masks.

We demonstrate our proposed method on high resolution SAR images from the SENTINEL-1 and ICEYE platforms. Future work will focus on incorporating more complex heuristics for the identification of false positives and to circumvent apparent river discontinuities (e.g. bridges), as well as on the release of a toolbox providing open access to the geosciences community.