

## **Segmentation of SAR and Optical Data Fusion for Urban Land Cover Mapping**

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Previous studies demonstrated that 1) fusion of data from different sensors could improve the quality of land cover classifications; and 2) segment-based classifications showed the advantages over pixel based approaches in various applications. Therefore, the objective of this research is to evaluate the fusion of ESA ENVISAT ASAR and Chinese EO HJ-1B data for urban land cover mapping using a segment-based approach.

Multi-temporal ENVISAT ASAR dual-polarization data were acquired in Beijing and Shanghai during 2008-2009 while HJ-1B multispectral data were acquired in May, 2009. Fieldwork was conducted in 2008 and 2009 to facilitate calibration and validation of the urban land cover classification. The segmentation method is based on a region growing and merging algorithm using spectral/backscatter and textural measures as well as other features. It runs in multiple iterations with parameters adapting to the requirements of increasing segment sizes and can thus be seen as a multi-resolution algorithm as well. The integration of edge detection techniques for better extraction of linear features is being tested since it was shown that the addition of linear features could improve the outcome of a segmentation algorithm significantly. Decision tree and support vector machines (SVM) will be used for post-segmentation classification. For comparison, pixel-based approaches are being carried out using SVM and decision tree on the same data.

The preliminary results indicate that the fusion of ENVISAT ASAR and HJ-1B optical data improved quality of urban land cover mapping even though the improvement in classification accuracy was not significant. The segmentation method developed in this research could meet the specific demands of SAR and optical data and provided better classification than pixel-based approach.