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Assessment of Tsunami Damaged Buildings using High-Resolution Satellite Imagery, GIS and GPS Data

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ABSTRACT

Due to an increase of natural hazards in coastal areas, satellite remote sensing has been used as an important tool for recognizing, rescuing, management and recovery tasks in the event of a disaster. This paper presents a methodology and results of an assessment of tsunami damaged building detection algorithm employing an object recognition task based on Differential Morphological Profile (DMP) for Very High Resolution (VHR) remotely sensed images. Its applications include both urban and rural mapping, natural disasters, and change detection. Automatic extraction of damaged and undamaged man-made structures is a fundamental task in image processing. In this research, a method is applied to assess damages to buildings using high-resolution satellite imageries and GIS and GPS data. In this method, after the building position is extracted using ENVI 4.7 programme, the extracted structures in both images are located in the pre-event and post-event satellite images. Results of the proposed method, indicates the capability of this method for tsunami damaged assessment of building structures from high-resolution satellite images. IKONOS-2 satellite panchromatic gray color images consisting of a pre- and post-tsunami damaged site of Kalmunai area in the East coast of Sri Lanka and an earthquake site of the Sichuan area in China were used.