

ASSESSMENT METHOD OF BUILDING DAMAGE IN SICHUAN LUSHAN 7.0 EARTHQUAKE USING HIGH RESOLUTION AERIAL IMAGERY

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Abstract: The remote sensing technology has played an importance role in many earthquakes, such as the Indonesian tsunami in 2004, Wenchuan Earthquake in 2008, Yushu earthquake in 2010, Japan earthquake and tsunami in 2011, etc. A catastrophe earthquake with $M=7.0$ occurred on April 20, 2013 in Lushan, Sichuan Province, China. The buildings were seriously damaged, roads were broken and transportation was traffic disruption. After the earthquake happened, the Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Sciences (CAS), National Administration of Surveying, Mapping and Geoinformation (NASMG) and other companies quickly acquired the aerial remote sensing images with the high resolution up to 0.2 meter at the same day. Data preprocessed were shared with the institutes in relatively short time for emergency rescue, disaster assessment, post-earthquake restoration and reconstruction. Based on these images, we carried out the group and single buildings damage degree identification, remote sensing damage index quick determination, earthquake losing assessment, thematic mapping, and so on. After the earthquake, we got a lot of first-hand information by carrying out the field investigation of the damage degree, and comparing the damage characteristic in remote sensing with in the field. This paper discusses the data sources used for the assessment, the methodologies employed to evaluate building damage.

The paper begins with a brief discussion of the emergency response mechanism in Lushan earthquake about remote sensing data acquiring and sharing. Owing to Mosaic images with better quality quickly providing, we saved a lot of time to extract the disaster information. The disaster characteristics of building in the aerial images are analyzed and summarized in the city, town or village, which distribute in the different earthquake intensity region, then the performance identification such as spectral, shape, texture and shading was established. In the town which locate in the high earthquake intensity, a majority of buildings are brick-concrete structure, and many are seriously damaged, some building collapsed. Otherwise, in the villages which locate in the high earthquake intensity, a majority of buildings are brick-wood structure, almost are moderate damage. The buildings both in the city, town or village which locate in the lower intensity, is slight damage. Then building damage totals for severe damage down to moderate or lower damage levels is presented.

Furthermore, the paper presents a summary of the different damage evaluation methodologies, focusing on both automated and manual interpretation methods. The object-oriented method is used to rapidly identify the building damage. The classification result is more accurate than the supervised classification based on the pixel by comparison with the result of the ground survey.

Keyword: building damage, Lushan earthquake, extraction, remote sensing