Rapid analysis and assessment of earthquake-induced secondary mountain disaster chains based on multi-platform remote sensing

Bingwei Tian[1], Katsuaki Koike[2], and Jianrong Fan[3]

1. Graduate School of Science and Technology, Kumamoto University, Kumamoto, Japan
2. Department of Civil and Environmental Engineering, Faculty of Engineering, Kumamoto University, Kumamoto, Japan
3. *Institute of Mountain Hazards and Environment, Chinese Academy of Sciences, Chengdu, China*

Abstract: The Wenchuan earthquake, which measured at 7.9Mw on 12 May, 2008, induced large quantities of secondary mountain disasters. Since it occurred in the mountain areas, there were many kinds of secondary disasters such as collapses, landslides, debris flows and barrier lakes, which then seriously formed disaster chains that caused even more hazards to human being and property after the earthquake and after-shocks. This study focused on investigating the secondary mountain disaster chains formed after the earthquake using multi-platform remote sensing and moreover better understanding the patterns of disaster chains, with final purpose of building a model to prevent the hazards.

Exploiting the real-time multi-platform remote sensing imagery data before and after the earthquake, we have discovered the disasters induced by the earthquake and aftershocks, acquired the distributions of these disasters as shown in Fig.1.
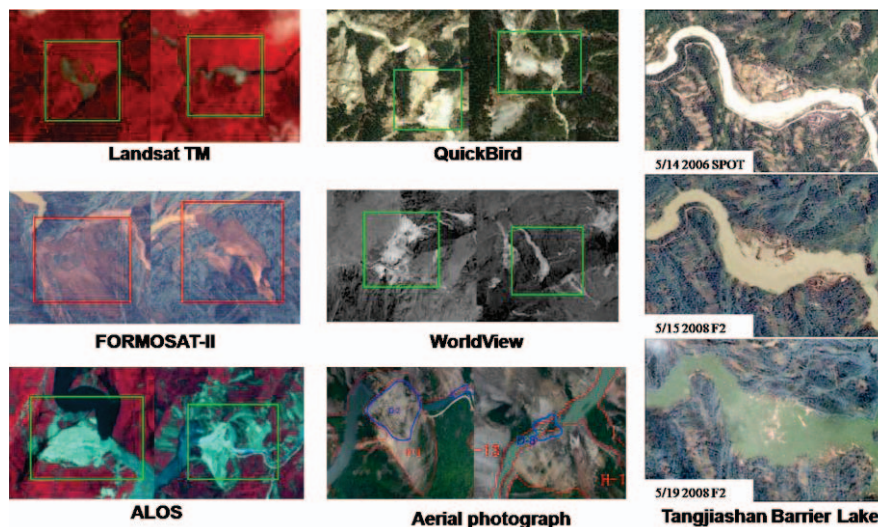

Fig.1   Identification of secondary disasters from multi-platform remote sensing image

According to this study, the disaster chains were formed and made a very destructiveness in mountain areas after the earthquake and aftershocks; It is efficiency through combing the multi-platform remote sensing and digital elevation model (DEM) data to discover, dynamic detect, and prevent disaster chains development; The secondary mountain disaster chains are more active and much longer in an fluvial systems as shown in Fig.2.
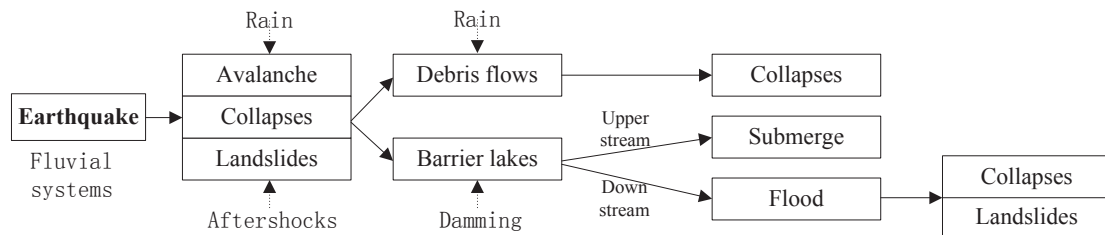
Fig.2   The secondary mountain disaster chains in fluvial systems

Through build a model of barrier lake disaster chains, we can monitor the change of lake area using multi-platform remote sensing imagery. Moreover, integrating the DEM data, we can compute the speed change of water amount. Finally, a risk assessment and impact evaluation towards eco-environmental systems and human beings will be derived.

Key words: The china earthquake; multi-platform remote sensing; secondary mountain disasters; disaster chains.