Seismic Micro-Zonation and Remote Sensing Technology

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Contents (1)

In order to evaluate the damage losses of future massive earthquakes, it is essential to compile and estimate shake-maps by using appropriate site characteristics of a wide area across administrative districts. The geomorphologic classification and average shear-wave velocity from the surface to 30 m depth (Vs30) estimated from geomorphological unit are introduced for mapping the amplification capabilities in this lecture.

Then, based on the Grid and Web technologies, a near-realtime shake-map generation system, which provides wide and detail strong ground motion maps such as PGA, PGV, and I_{JMA} soon after an earthquake occurrence in and around Japan using combined usage of amplification capability map and observed seismic records, has been developed. This lecture also gives the specifications of the system.

Contents (2)

Obtaining an accurate overview of large-scale natural disasters in metropolitan areas of developing countries can be difficult. Observations of damaged areas by helicopter, airplane, and satellite provide information to fill in initial quick damage estimates with actual damage assessments that are timely, cover a large area, and have high accuracy, respectively. In particular, remote sensing by satellites can provide observations of a wide area with a single image, and it may be possible to use this technology to improve the accuracy of large-scale damage estimates. The damage detection algorithm using spaceborne Synthetic Aperture Radar (SAR) imagery and the examples of the integration of SAR images and seismic intensity information are presented for building damage estimation.

Key Points

In order to estimate earthquake damage,

- Shake map ESTIMATION
  - Amplification of soil condition
  - Shake map estimation system

- Remote sensing MONITORING
  - Damage detection using optical sensor
  - Damage detection using synthetic aperture radar

- Data INTEGRATION
  - Building damage estimation
  - Data integration of shake map and remote sensing

Handout

1. Amplification Capability and Geomorphologic Classification

2. Strong Ground Motion Map (Shake map) Generation System

3. Remote Sensing and Earthquake Damage Detection Using Optical Images

4. Synthetic Aperture Radar Remote Sensing and Damage Detection

5. Integration of SAR-based Information and Shake Map Information to Estimate Building Damage Ratio