NIED Observation Network for Earthquake, Tsunami and Volcano and Contribution to Disaster Resilience

*Shin Aoi[1], Yuichiro Usuda[1], Hiroyuki Fujiwara[1]

1. National Research Institute for Earth Science and Disaster Resilience

The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted at the Third World Conference on Disaster Risk Reduction held in March 2015. In the framework, priorities for action were addressed to reduce disaster risk and loss for next 15 years. Understanding disaster risk is written as the first priority with the following sentence: To achieve this, it is important for the national and local levels to promote the collection, analysis, management and use of relevant data and practical information. Considering the above action, this presentation will introduce the NIED observation network for earthquake, tsunami, and volcano that is integrally expanded to the land and offshore regions, and use and application of the data.
Based on the lessons learned from the 1995 Kobe earthquake and the 2011 Tohoku-Oki earthquake and tsunami, observation system is essential to obtain the accurate and rapid information for seismic intensity as well as tsunami height and inundation. As the preparedness for forthcoming earthquakes concerned in the Tokyo metropolitan area and along the Nankai Trough as well as volcanos, NIED established the nationwide observation network with more than 2000 stations that covers the land and offshore regions. This unique network consists of various measures to capture diversity of natural phenomena from damaging strong ground motions toward very small earthquake signals , and wave propagation from the other side of the Earth. Various measures are also seen in the observation wells reaching 3500 m in depth, sensors at the dead-end tunnels longer than 50 m, and seismometer and pressure gauge installed along the ocean bottom cable longer than 6000 km along the Japan Trench and the Nankai Trough. Most observation data are open to the worldwide users for disaster resilience and related research. As familiar examples, the data are provided in realtime to the Japan Meteorological Agency for utilization of earthquake early warning and tsunami warning. These observation data are also used for seismic and tsunami hazard assessment such as the National Seismic Hazard Maps in Japan at the national (e.g., the Cabinet Office and the Headquarter of Earthquake Research Promotion) and local government levels. Furthermore, the realtime observation data are used for rapid estimation of disaster. NIED developed and operates test runs J-RISQ (Japan Real-time Information System for earthQuake), in which the number of collapsed building with a resolution of 250 m mesh size were estimated in a few minutes after the 2016 Kumamoto earthquake. The observation data and analyzed information are applied for facilitating the disaster response, and NIED operates crisis response portal sites to disseminate disaster information via websites immediately after the disaster.
In last decades, according to the improvement of observation technology, nationwide dense observation network data are available in realtime with a delay of sub seconds. Utilizing the data are expected to improve seismic and tsunami hazard assessment, disaster risk estimation, managing disaster response and relief activities, and effective recovery from the damage.

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