

The Effectiveness of WebGIS and Remote Sensing for Natural Disaster Management in Japan

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Geospatial data can be effective in notifying the stakeholders about the disaster risks they are involved with. Remotely sensed data is also one of geospatial data. GIS is an essential technology for supporting the various phases of risk assessment and communication (i.e. acquisition of information, creation of information, and presentation and distribution of information). Especially, WebGIS can integrate various disaster risk information on internet directly and it is easy way for people to access disaster risk information. “e-Community Map”, which we have developed as open source software based on WebGIS technologies, integrates geospatial data provided through interoperable data interfaces of various distributors and bottom-up data inputted by local communities. The system delivers dynamic, geo-registered maps using standard international geospatial HTTP protocol services (Web Map Service (WMS), Web Feature Service (WFS), and Web Coverage Service (WCS)) via an interoperable environment. The local communities input their legacy information and tabulated data using PCs, GPS-equipped phones, and other tools. The system outputs maps, including printed maps for off-line communication and field surveys.

We have held workshops and events for disaster preparedness in many areas in Japan, using this system. Now, the system is applied to “The 2011 Japan Earthquake” and supporting rescue and recovery since 11 Mar 2011. I have recognized the effectiveness of WebGIS and remote sensing during these activities.

In the disaster preparedness, WebGIS was effective for understanding the local environment and discussing their action. The participants compared and overlaid various geospatial data included remotely sensed data and understood hazards and risks corresponding with them. Then, they checked out points of interests and inputted various data, photos and memos. In the discussion, they examined the adequacy of preparation and built cooperation with stakeholders. Finally, they made their own maps and maintained them through the participation. And they used their maps for individuals, families and children and improved their preparedness and relationship. These case studies demonstrated the usefulness of “e-Community Map” for risk communication and decision making in disaster preparedness for local communities and individuals.

On 11 Mar 2011, the huge and severe earthquake and tsunami hit east Japan. About 20,000 people died or were missing. We used “e-Community Map” for supporting rescue and recovery. A lot of remotely sensed data were quickly provided and used for making volunteered geographic information. Our system collected new information dynamically and compared “before and after” disaster for understanding the disaster impacts. Local governments and volunteer centers used this system to map and update volunteer-needs, to publish disaster victim certificates, and so on. And we are archiving data, photos and movies of “before and after” disaster and recording activities of recovery for our future. These activities still continue even now, and we also continue developing more advanced systems.