HSC24-01 Room:101B Time:May 24 16:15-16:30

Positions of Geospatial Information Technology in the International Framework for Disaster Risk Reduction

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The Third World Conference on Disaster Risk Reduction (WCDRR) was held on 14th to 18th March 2015 in Sendai, Japan. WCDRR is the most important official conference hosted by the United Nations to discuss international strategy on disaster risk reduction. Japan hosted the first (Yokohama, 1994) and the second (Hyogo, 2005) conferences as well. The second conference adopted the Hyogo Framework for Action (HFA), international guiding principle on disaster reduction activities from 2005 to 2015. The main purposes of the third conference are to adopt the post-HFA framework for disaster risk reduction and to take the opportunity as the showcase of the status of reconstruction from the damages caused by the East Japan Great Earthquake and the international contribution through sharing our experiences and knowledges of disaster management, with all the forces of national and local governments, scientists, private sector and NPOs concerning the disaster risk reduction.

Although the geospatial information and its technologies play vital role in all the stages of disaster risk reduction, it was not properly recognized in the previous discussions.

In this presentation, actions and commitments taken by the geospatial information community in the preparation process for the third WCDRR, as well as the future roles of geospatial information for the promotion of d1saster risk reduction strategy, will be explained.

Keywords: UN World Conference on Disaster Risk Reduction, Post Hyogo Framework for Action, UN International Strategy for Disaster Reduction, Geospatial Information

Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

HSC24-02 Room:101B Time:May 24 16:30-16:45

Comprehensive geographical characteristics zoning from disaster and environment management

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When considering ground design of national land, it is important to specify an area with homogeneous natural and cultural special quality and doesn't damage the special quality of the area by organization cooperation of a residents, land owners and local governments. The authors are studying about the method to specify the spatial areas which enables such management.

Koarai et al. (2013) divided an area of the Kanto and Ko-Shin-Etsu regions into an area of 92 with 15 categories, based on disaster characteristics using landform and geological data. On the other hand, Ye et al. (2013) divided an area of the Kanto and Ko-Shin-Etsu regions into an area of 111 with 14 categories, based on landscape characteristics using landform and land use / vegetation data. This research tried to reconsider both repartition in the area of the Kanto and Ko-Shin-Etsu regions by the angle of the country management and integrate into one.

Keywords: geographical characteristics zoning, disaster characteristics, landscape characteristics

Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

HSC24-03 Room:101B Time:May 24 16:45-17:00

Needs and challenges of disaster information logistical support by pro bono

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This paper, through the activities of collaborative disaster training by the intermediate support organizations, to discuss the need and challenges of disaster information logistical support by pro bono.

Keywords: disaster information, logistical support, ICS, GIS, SNS

Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

HSC24-04 Room:101B Time:May 24 17:00-17:15

Tsunami hazard assessment project in Japan-in the case where tsunami sources are confined in Japan Trench region -

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In 2012, NIED started a probabilistic THA (PTHA) project in Japan to support various kind of measures by sectors such as local governments, life-line companies, etc (Fujiwara et al., 2013, JpGU). In our strategy, we divide nationwide coast lines into several regions such as Japan Trench, Nankai Trough, etc and will investigate region-wide PTHA for each region in turn so that we finally will get nationwide PTHA in Japan. Hirata et al. (2014, JpGU) reported the basic concept of region-wide PTHA and showed a prototype of PTHA for Japan Trench region last year. Here, we will report their revised ones.

Procedures for region-wide PTHA are follows; (i) we consider all of possible earthquakes in future, including those that the Headquarters for Earthquake Research Promotion (HERP) of Japanese Government evaluated. We assume probabilities of earthquakes' occurrence (PEO) determined by HERP if they gave those. If HERP does not, we calculate it by assuming that earthquake occurrence follows stationary Poisson process and a standard Gutenberg-Richter laws. We then introduce seven categories of earthquake type; (1) "repeating interplate earthquakes"(within single domain), (2) "Tohoku Earthquake-type earthquakes", (3) "tsunami earthquakes", (4) "intraplate earthquakes", (5) "maximum-sized earthquakes", (6) "multi-domain earthquakes other than (2) and (5)", and (7) "background earthquakes". HERP evaluated PEOs for (1)-(4). (ii) We construct a set of simplified earthquake fault models, called "characterized earthquake fault models (CEFMs)", for all of the earthquakes mentioned above by following prescribed rules (Toyama et al., 2014, 2015 JpGU; Korenaga et al., 2014, JpGU). (iii) We solve a non-linear long wave equation, using staggered leap-flog, finite difference method (FDM), including inundation calculation as coastal boundary condition, over a nesting grid system with the minimum grid size of 50 meters, to calculate tsunamis for each of initial water surface distributions generated from a large number of the CEFMs. (iv) Finally we integrate information about coastal maximum tsunami heights from the numerous CEFMs on the basis of probabilistic approach (Abe et al., 2015, JpGU) to get region-wide tsunami hazard curves, defining excess probability, for coastal tsunami heights, incorporating uncertainties inherent in tsunami forward calculation and earthquake fault slip heterogeneity (Abe et al., 2014, JpGU).

Next, we briefly show the latest result of PTHA for Japan Trench region, which are expressed by maximum coastal tsunami heights at exceedance probability in exposure time of next 30 years (measured from 1st Jan. 2014). For simplicity, we choose four points, Hachinohe (Aomori pref.), Okatsu (Miyagi pref.), Iwaki (Fukushima pref.) and Onjyuku (Chiba pref.) to discuss the PTHA results. By comparing at the same exceedance probability level, coastal tsunami heights at Hachinohe and Okatsu are assessed to be higher than those at Iwaki and Onjyuku. At Hachinohe, the most affecting tsunamis are "the northern Sankiku earthquake", included in the category (1), for coastal tsunami heights lower than 20 m and the category (5) earthquakes for those higher than 20 m. Coastal region in Hachinohe should continue to pay attention to "the northern Sanriku earthquake". At Okatsu, "the northern Sanriku earthquake" and the category (6) earthquakes evenly contribute coastal tsunami heights lower than 10 m, whereas the category (5) earthquakes become predominant for coastal tsunami heights higher than 10 m. At Iwaki and Onjyuku, on the other hand, the most affecting tsunami of higher than 5 m comes from the category (5) earthquakes and the second contributing one is the category (6) earthquakes. Especially, coastal tsunami heights of higher than 3 m is mostly controlled by the category (6) earthquakes, because the category (6) includes multi-domain earthquakes that rupture a region off Boso Peninsula which the 2011 Tohoku Earthquake (M9.0) did not break.

Keywords: tsunami, hazard assessment, probability

Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

HSC24-05 Room:101B Time:May 24 17:15-17:30

Investigation of Inundation Prediction Method Linked with Real-Time Precipitation Information

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1. Introduction

In order to guard oneself from an inundation damage, a citizen has to receive precipitation information and judge the need of evacuation by oneself. However, it is difficult for citizens to comprehend a flood risk from precipitation information because the precipitation information actually provided at the time of heavy rainfall doesn't link with a flood hazard map. In this study, I try to develop the inundation prediction map that a citizen can remind the inundation situation easily from the precipitation information and/or heavy rain warning by making the inundation prediction dataset linked with the precipitation information to be provided at the time of a heavy rain.

2. Method

The method of this study composes of 4 steps, (1) setting on the precipitation scenarios, (2) runoff / inundation analysis, (3) categorization of the weather information assumed to be issued at each precipitation scenario, (4) making of the inundation prediction map according to weather information and/or precipitation.

In setting on the precipitation scenarios, I set several rain duration (1, 2, 3, 6, 12, 24, 48 hours), and several precipitations on the basis of occurrence probability (1/30, 1/50, 1/100, 1/200). A conventional inundation prediction map often assumes the uniform distribution of precipitation. However, in the case of short-period heavy rain, it is the local rain. Therefore, I set several number of the rainfall area, and increased the rain areas sequentially, 5km$*$5km, 10km$*$10km, 15km$*$15km.

I use Rain-Runoff-Inundation (RRI) model developed in Public Works Research Institute as the method of the inundation prediction.

At each precipitation scenario, I categorize weather information assumed to be issued. The high risk precipitation scenarios is extracted in each subregion according to categorized weather information.

In this presentation, I report the result of case study for basin of Katsura-River.

Keywords: inundation prediction, weather warning, hazard map, evacuation judgement