3D modelling for digital archive of monuments that records historical Nankai earthquakes at Kochi Prefecture

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Nankai earthquakes have occurred repeatedly along southwest Japan. In Kochi Prefecture, historical disasters about the great Nankai earthquakes are recorded in the local stone monuments. There are at least 25 monuments in Kochi Prefecture which are related to Nankai earthquakes from Hoei (in 1707) to Showa (in 1946) era, and especially the most monuments are related to the Ansei Tokai and Ansei Nankai great earthquakes (in 1855). The earthquake monuments are regarded not only as memorial and cenotaph but also as highly valuable historical documents. However, weathering by wind, rain, and vegetation could have damaged the stone monuments and made us difficult to read the several characters on them. In addition, most of the monuments in Kochi Prefecture, which are owned by local people and temples, not by public institutions, have to be conserved individually. Therefore, we may lose the stone monuments by natural disasters such as future Nankai earthquakes. In this project, we construct three-dimensional digital images of the stone monuments for the preservation of the historical records on the earthquake monuments in Kochi Prefecture, and provide information that links the moments and location on the web browser. We then promote to use our content as an education for disaster prevention so that the future generation can inherit the disastrous earthquake history.
The stone monuments have been researched mainly in deciphering the content of the characters engraved on the stones. However, rock physical/chemical properties (such as mineral composition, color, and magnetic susceptibility) and shapes also contain the cultural background at the era when the monuments were built. Therefore, in this project, we construct the three-dimensional digital image of the monuments and measure the rock physical/chemical properties, and then, to publish the information on the web.
We used the commercial software (PhotoScan, Agisoft company) to reconstruct 3D models from digital photo images. Photos were taken by compact digital camera (GR, RICOH imaging company). We plan to view 3D images on web or ask to download to personal computers. Large numbers of face are necessary to display the characters on monuments clearly, though, it may take time to display in browser. Therefore we use the existing platform (Sketchfab, https://sketchfab.com/) that can display and share 3D models based on the WebGL technology. 3D pdf were chosen as format to view 3D models on PC. Spectrophotometer (CM-700d, KONICA MINOLTA Inc.) were used to measure the color, and magnetic susceptibility were measured by KT-10 S/C (Terraplus inc.).
In this presentation, we report our project on progress and preliminary data.

Keywords: stone monument, digital archive, education for disaster prevention, Nankai Earthquake, SfM-MVS

Risk Perception and Actual Reaction for Natural Disaster of Younger Generations in Visayas, Philippine

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The face-to-face interviews over the Internet were carried out awareness survey for natural disasters in younger women in Visayas region, Philippines. Total number of the interviewees is 55 people. 57.3% of people cited an earthquake as the most horrible natural disaster, and a typhoon (26.4%) was in second. Both top two total exceeded 80% in all answers. As a reason to fear, own direct experiences (51.9%) and indirect experiences (13.5%), e.g. TV report on natural disasters, were main answer. It was found that the emotion of fear has been building due to past experiences. About 70 percent of the interviewees have experiences of earthquake drills in their elementary school days. During the earthquake drills, most of the teachers instructed interviewees to hide under a desk as immediate responses if an intensive earthquake struck the school. However, many interviewees were evacuated to the outside first and foremost in the Bohol Earthquake (Oct. 15, 2013). Based on their explanations, the reason that they didn't stay at an interior may be distrust of the strength of the building.

Keywords: natural disaster, earthquake, typhoon, school disaster education

Potential for Intergenerational Risk Communication Through Nigechizu Evacuation Map Workshop

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Nigechizu is a map helping to visualize evacuation process. The color of the route on the map represent the time in minutes needed to reach the safe place nearest to your site. It facilitates citizens discussion of dangers which is a difficult topic and helps to raise the awareness of the risks. It was shown before that in the process of making Nigechizu participants have risk communication. The effectiveness of this method for disaster prevention education was also proved. The purpose of this study was to evaluate the potential of the Nigechizu as a method contributing to intergenerational communication in the community. We found that Nigechizu worksop can activate intergenerational risk communication, give both adults and children opportunity to communicate easily on a daily basis henceforward and broaden children’s perspective.

Keywords: Workshop, Nigechizu, Disaster prevention education, Intergenerational communication

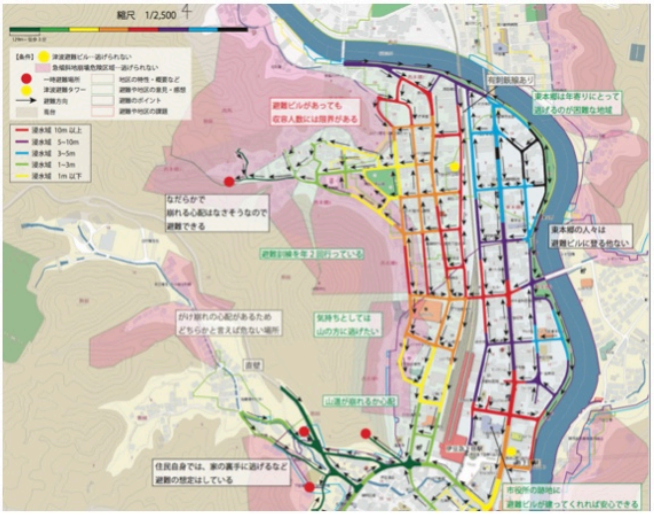

図1:静岡県下田市で作成された逃げ地図の完成図の一例

逃げ地図の作成手順

①対象とする災害の情報を行政資料等を用いて、地図に記入する。
②予め決められた避難場所、必要であれば新たな避難場所を設定し、印をつける。
③避難場所の近くから距離に応じて「逃げる道」に色を塗り、より近い方向に矢印を記入する。
④地図を見ながら、まちの改善の可能性を考える
⑤作成した逃げ地図から得られた情報を発表する。

※作成中、知っている情報等々を地図に記入していく。

図2:逃げ地図作成の手順

図3:逃げ地図の「時間軸」

Okawa Elementary School Calamity in Ishinomaki City from the Disaster Prevention Education Perspective

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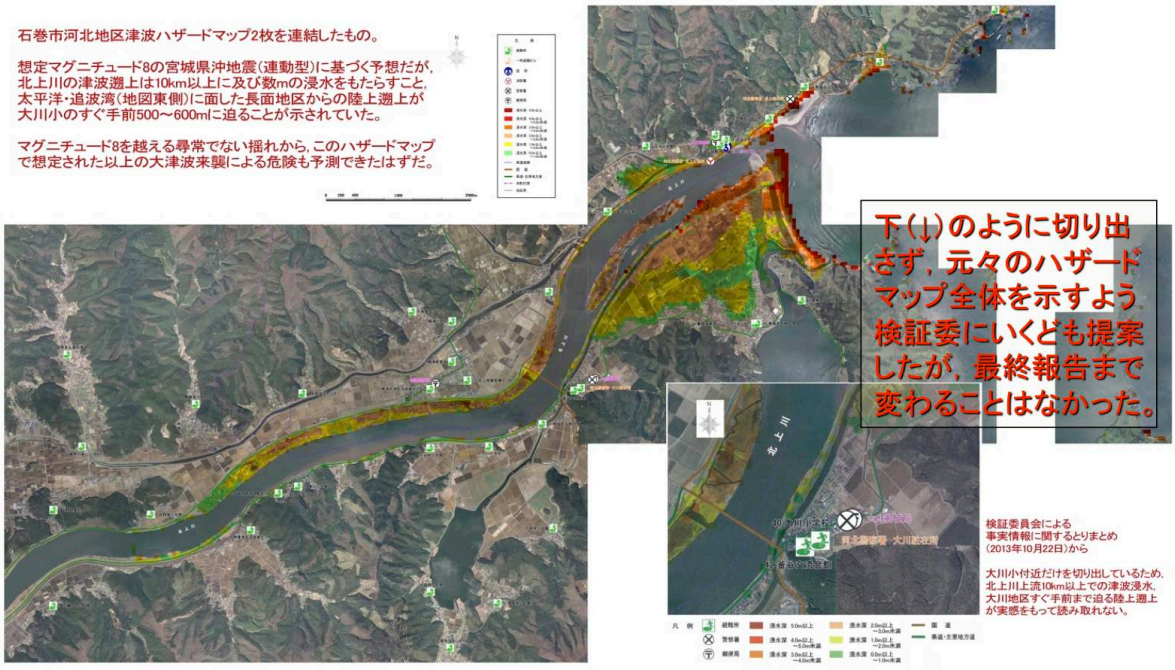
In the hazard map of Ishinomaki city, distributed to citizens before the Great East Japan Earthquake, it was predicted and shown there may be a 3.5 km tsunami run up from the river mouth to the alluvial plain along Kitakamigawa River. Okawa Elementary School, seriously affected in the earthquake, was located only 0.5 km upstream from the predicted inundation area. Taking into consideration the diversity of tsunami mechanism and tide, 0.5 km in the plain area can be considered as a "margin of error". In the hazard map, there was also a note about an earthquake that could trigger an enormous tsunami in comparison to the seismic intensity felt by people. In other words, the occurrence of a magnitude 8 quake had been officially foreseen in the case of Miyagi-ken-oki Earthquake, so it is not possible to say the inundation at Okawa Elementary School, provoked by the tsunami, was an unexpected one.
Although emphasis has been given on the importance of evacuation drill and creation of manual, disasters may not occur as anticipated. Approaches will be made about man-made disasters in natural catastrophes for not taking into consideration Geoscience knowledge, as in the case of the predictable unexpected calamity at Okawa Elementary School.

Keywords: Great East Japan Earthquake and Tsunami Disaster, How Should We Study Tsunami Hazard Map, A Man-made Disaster Side

3.5kmもの津波陸上遡上が予言
マグニチュード8以上では明確に危険



Disaster prevention education for spaceguard

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The Spaceguard is the activity that studies the issues of collisions of celestial bodies to the Earth. It has past about 20 years after this activity became popular. The number of the discovery of asteroids that will approach the Earth closely has increased dramatically recently. But there are lot of such object remained undiscovered, so the observations are continued actively now. At the same time, the studies of collision avoidance are also done in various aspects. However, we have not found the definite way. In such situation, the public education about spaceguard is considered now very important. When collisions of celestial bodies are discussed, sometimes it becomes rather sensational. It is not good to make people have fear, but we must inform them the correct information. In this paper,
we introduce the activities related public educations about spaceguard up to now,
and discuss what we should do in furure.

Keywords: spaceguard, collision of celestial bodies

Development of medical demand survey system in disaster first response phase

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In the Great East Japan Earthquake, we suffered serious damage on both government offices and medical institutions. Telecommunications and roads was disconnected and did not contacted in disaster area. Disaster medical coordinators could not collect damage information. For that, medical support had to be delivered ad hoc. For delivering medical support effectively and efficiently, we try to apply aerial disaster survey in disaster first response phase.
In this system, special camera for aerial disaster survey take very high resolution photo even flying with over 100km/h, and measured photo-center coordinates simultaneously. Photos are filed on geographic information system (GIS). Aerial photos display only external damage situation of facilities, and we never know the functional damage or number of refugee there. In order to solve this problem, we made damaged information sheet for facilities (SOS sheet).SOS sheet show the damage situation by numbers and pictogram. This sheet spread on the roof to be identified from aerial vehicles.
Demonstration experiments was held in Kesennuma, joined 7 organizations. We could recognize SOS sheet from aerial photos, and find easily the photos from GIS system. And , to draw numbers and spread SOS sheet performed easily.
This methods is available in any type facilities like hospitals, nursing home , schools and shelters.

Keywords: Disaster Medicine, communication, Disaster first response phase, Geographic information system, Emergency Medical Information System