

## Field Survey for the Memorial Matters from the 1923 Great Kanto Earthquake in Eastern Kanagawa Prefecture, Japan

\*Masayuki Takemura<sup>1</sup>

1. Disaster Mitigation Research Center, Nagoya University

Many memorial towers and monuments have been constructed for the heavy toll of life and for the restoration of villages or cities in Southern Kanto district. Death claimed a toll of about 105000 totally from the 1923 Great Kanto earthquake. These towers and monuments must be forever witnesses to the tragedy of the earthquake damage and spokesmen for the victim's dying wish "don't repeat such damages". However, most of them have been already forgotten by the citizens. We thought it's sacrilege and must use them for the public education of earthquake disaster prevention. This presentation is a report on the field survey for the memorial matters from the Great Kanto earthquake in Eastern Kanagawa Prefecture. The number of the matters examined is 338. The survey in Central and Western Kanagawa Prefecture had been summarized in the last year and the year before last, respectively.

Keywords: Great Kanto Earthquake, Kanagawa Prefecture, memorial matter

## Consciousness Survey toward Disaster Mitigation and Evaluation of Disaster Mitigation Action Card Game for International Students

\*Ryosuke Kaneko<sup>1</sup>, Akifumi Hisamatsu<sup>1</sup>, Shunsuke Watanabe<sup>2</sup>, Yuko Murakami<sup>3</sup>, Miwa Kuri<sup>4</sup>

1.Graduate School of Engineering, Tohoku University, 2.Graduate School of Science, Tohoku University, 3.Graduate School of Arts and Letters, Tohoku University, 4.International Research Institute of Disaster Science, Tohoku University

Disaster Mitigation Action Card Game (DMAC)<sup>[1]</sup> was developed as an teaching material for junior school and junior high school students to promote quick thinking in disaster situation. Watanabe et al.<sup>[2]</sup> showed that the DMAC enables junior school students to learn disaster mitigation over times. Meanwhile, education for disaster mitigation is also important not only for Japanese students but also for international students. Tohoku University published a report for Great East Japan Earthquake and Tsunami in 2011<sup>[3]</sup>, which mentions that it was difficult for international students to access disaster information and to utilize evacuation centers as well as to get local information as Japanese students. In this research, we evaluated consciousness for disasters occurred in Japan and an effect of education for disaster mitigation using the DMAC by questionnaire surveys for foreigner students in Tohoku University.

Surveys with questionnaire sheet were carried out as a part of safety lecture for new nine international students in Graduate School of Arts and Letters in Tohoku University. Questionnaire survey was conducted before and after the DMAC. On the former questionnaire, we surveyed consciousness for disasters occurred in Japan. On the latter questionnaire, we set questions to evaluate the DMAC and their motivation for learning disaster mitigation. We also asked them to give feedback for the DMAC on the latter questionnaire. We will also discuss results of questionnaire surveys at communication events for international students and Japanese high school students in the future.

As a result of the former questionnaire survey, almost 50% of international students were anxious about disasters occurred in Japan and almost 60% of them did not recognize flood and tornado as disasters. As a result of the latter survey, over 80% of them agreed that it was easy to understand its rule and questions of the DMAC, and all of them agreed they enjoyed playing the DMAC. Many students commented that they learned various things regarding disaster mitigation from the DMAC. Moreover, over 90% of them had motivation for learning disaster mitigation. Some students also commented their motivation for playing the DMAC again in the future to consider as many disaster situations as possible, and to discuss actions for disaster mitigation with other students, and so on.

Keywords: International Students, Disaster Mitigation Action Card Game, teaching material for disaster mitigation

## Measuring the effects of disaster risk awareness education

\*Mari Yasuda<sup>1</sup>

### 1. TOHOKU UNIVERSITY INTERNATIONAL RESEARCH INSTITUTE OF DISASTER SCIENCE

Beginning in the 2013 fiscal year, this study utilizes "Science Delivery" based education, beginning within disaster risk awareness activities in Miyagi Prefecture's disaster struck areas in 2014. The "Science Delivery" approach, adopts an easy to understand explanation of natural hazards and disaster science to children ages 10 and 11.

The basis of this study is to observe and cultivate three primary themes: situational cognitive ability, judgment, and crisis avoidance behavior. This study examines the changes in risk perception between the period prior to the lecture and activities, and one month after, utilizing questionnaires to measure these changes.

This year, we were able to shorten the section, where we explain natural hazard mechanisms and the current situation of disaster, by 10 minutes. As a result, the time was used towards group work activities. In the second half, a game that allowed participants to view images during a disaster while utilizing a stamp game, allowed participants to consider and locate dangerous areas at home and what kind of actions to take in the next disaster. The through the use of colors, the design of the stamp was devised to identify actions that promote self-resiliency, mutual assistance, and public assistance. These categories allowed participants to understand that there are a variety of approaches, deepen the understanding of actions that could help each other, and to envision and stimulate a disaster event that led to such actions. These actions become real experiences, knowledge, and contribute to improved judgment, leading to a deeper understanding of actions towards disaster risk reduction.

This time, in addition to the pre and post questionnaire, an additional survey was conducted one month after the activity. The results of the Science Delivery based approach witnessed an increase of households prepared for disasters from 61 percent from before the activity to 78 percent after, but regressed to 72.1 percent one month after.

Additionally, children who strongly considered the safety of the family changed from 43.3 percent prior to the questionnaire to 62.4 after the questionnaire, and regressed to 47.9 percent a month later. One school experienced an increase in disaster awareness as it experienced local flooding one month after the questionnaire. Inferred from this result, gains in scientific knowledge were recorded and disaster risk reduction awareness is increased. It is expected that continued future lessons of this nature will continue to foster children's situational cognitive ability, judgment, and crisis avoidance behavior at home. From now on, we want to elevate disaster risk reduction awareness when approaching natural hazard and disaster risk reduction education.

Keywords: natural hazard, improved judgment, risk reduction awareness

## Current legislative education within disaster management education

Natsumi Okada<sup>1</sup>, \*Eiichi Yamasaki<sup>1</sup>

### 1. Kansai University

In Japan, where disasters frequently occur, survival from the disaster is considered a minimal condition of success. There is the much more important standpoint of how to live following the disaster. The legislative system related to disasters shall be discussed in order to further develop this point.

What kind of study exists on disaster management in the school setting. Is there study on systems of disaster legislation, and moreover, is there study that permits consideration on the disaster recovery stage? Having experienced the Great East Japan Earthquake, have many more opportunities for this type of study been presented?

In this paper we examine this topic with elementary school textbooks. Education of legislative knowledge is done especially in the subject of public affairs. The study of public affairs in elementary school can be found in the second half of 6th grade social studies content. There are five publishing companies of elementary school social studies textbooks, but here we present the revised 2013 version of the Tokyo Shoseki, one with an especially high rate of adoption by school districts.

Chapter 2 of the second half of the 6th grade text is a segment for learning about the government, entitled "Our Lives and Government." In there, firstly the issue of "When disaster occurs, who and how helps people, and who repairs collapsed buildings and roads and how do they do it." is raised. The first section has a piece entitled, "the Governments Making the Earthquake Disaster Recovery Real." It has pages for learning how the government functioned in response to the Great East Japan Earthquake, as well as what kinds of relief efforts were being carried out. There were actually 12 pages in total, an amount that accounts for 10% of the entire textbook. The first problem presented is eye-catching. "What hopes did the disaster victims have? What should be done to make those real?" There is also the study problem of "In what way were the hopes of those who experienced the disaster realized through government action?" This is clearly a content with awareness on the recovery and reconstruction process following a disaster. The text describes that when the Great East Japan Earthquake occurred, the "Disaster Relief Act" was applied as part of emergency management procedures. It further describes how disaster relief dispatch requests were filed for the Japan Self Defense Forces, and how other efforts such as supply assistance were put forward. With regards to the "Disaster Relief Act", it is literally explained as "legislation for the country to maintain public order and the safety of disaster victims, and for conducting needed temporary assistance." In addition, there are also descriptions on the "establishment of the Basic Act on Reconstruction in Response to the Great East Japan Earthquake", and on how budget adjustments were repeatedly made to provide support to the disaster victims. Necessary laws for conducting relief efforts in disaster areas are introduced.

While extremely simple, the aforementioned is an examination of learning content in elementary school pertaining to disaster management laws and systems. Within this content, the Great East Japan Earthquake was addressed, a disaster having a large social impact, with descriptions on specifically how the government functioned and what legislative systems there were for providing aid to victims. In other words, education on disaster management laws and systems is already being carried out in Japan, albeit superficially, at the elementary school level. It was discovered that this content is even covering to what extent the government is actual functioning. In the future, further discussion is needed on what types of development would be best based on the current study

of disaster management laws and systems.

[References]

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Keywords: disaster management education, legislative education

## Actual disaster prevention educational activities of the "earthquake disaster learning train" by "Sanriku Railway"

\*shigeru kuramata<sup>1,2</sup>, mamoru nihashi<sup>3</sup>

1.Science Textbook section,Sanseido co. Ltd., 2.Japanese Association of Science & Technology Journalists, 3.Sanriku Railway co. Ltd.

In the last year of the session announcement, we went the report of disaster prevention learning activities related to the Great East Japan Earthquake by operation of the "earthquake disaster learning train" by "Sanriku Railway". "Sanriku Railway" is a company that has suffered its own disaster. This time, we introduce some of the examples of organizations that take the "earthquake learning train" so far. Then, the introduction of the actual disaster management activities of the "earthquake disaster learning train".

"Earthquake disaster learning train" is, wants to understand the disaster area, the following people,

1- elementary school, junior high and high students and college students, 2- local residents, 3- citizens and companies who want to understand the disaster area, while riding on the train, listening to the description in the actual disaster site, and is a train to drive in order to see the disaster site. By operating this, the disaster prevention learning activities related to the Great East Japan Earthquake, has been carried out from 2012. As this time of the report example, examples of the local university initiatives, examples of initiatives from other local schools and the like. At the same time, I want to do a report of the current state of the Sanriku region that is a actual disaster area.

Keywords: the earthquake disaster learning train , the Great East Japan Earthquake, Sanriku railway

The result and subject of the disaster prevention and reduction activity in a coastal village by the university students

\*Haruhiro Doi<sup>1</sup>, Takushi Koyama<sup>1</sup>

1.Faculty of Education, Oita University

The departments of geography and housing study in the Faculty of Education, Oita University, have jointly cooperated the disaster prevention and reduction activity by university students at Tsurumi-Fukiura District (following, Fukiura District), Saiki City, Oita Prefecture after 2013. The purpose of the activity is to improvement the disaster prevention and reduction consciousness and related skills for a university student and local resident. The report describes the result of the activity for three years, and a future subject. Fukiura District is a typical small-scale coastal village facing Bungo Straits in southeastern Oita Prefecture. This village is assumed by the attack of the tsunami exceeds 5 meters by the estimated Nankai Trough Massive Earthquake.

The activity for three years is summarized as follows. The students carried out the questionnaire asking the consciousness to disaster prevention and reduction to all the households of the village in 2013. In 2014, the university students had a volunteer program for the household for which it is difficult to perform to fixing work of the furniture for the disaster prevention by oneself. In addition to the activity in 2014, in 2015, the program gave the students the fieldwork to training the ability which checks the possibility of a natural disaster on-site.

It is a significant result that the university student who is a social core actor in the near future raised each one of consciousness, and knowledge and skill of disaster prevention and reduction in the possible area of a natural disaster. And such activity by the university student affects the consciousness to disaster prevention and reduction of the local residents. There is a subject in however carrying out such activity continuously. For example, it is difficult to continue the program of the same contents in the same area, and it is necessary to recruit other villages and also to create bonding with a new village society with mutual trust

Keywords: natural disaster, volunteer, stakeholder

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

\*Wataru Tanikawa<sup>1</sup>, Uramoto Go-Ichiro<sup>1</sup>, Shoichiro Uchiyama<sup>2</sup>, Arata Orinaka<sup>3</sup>, Tadashi Yamashina<sup>3</sup>, Keisuke Okamoto<sup>4</sup>, Tadashi Hara<sup>3</sup>

1.Japan Agency for Marine-Earth Science and Technology, Kochi Institute for Core Sample Research, 2.National Research Institute for Earth Science and Disaster Prevention, 3.Kochi University, 4.Kochi Prefectural Museum of History

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 (Terraplius 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

\*Takashi Ito<sup>1</sup>

1.Faculty of Education, Ibaraki University

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

\*Mitsunari TERADA<sup>1</sup>

1. Graduate School of Horticulture, Chiba University

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 workshop 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

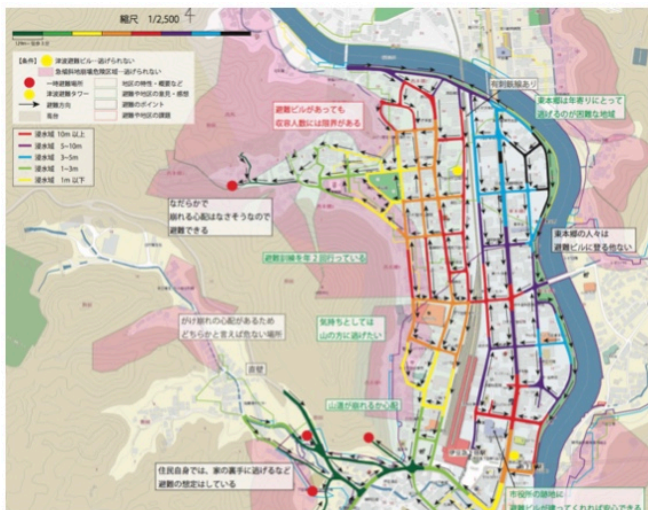


図1:静岡県下田市で作成された逃げ地図の完成図の一例

### 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

\*Mamoru HAYASHI<sup>1</sup>

1.University of TOYAMA

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.

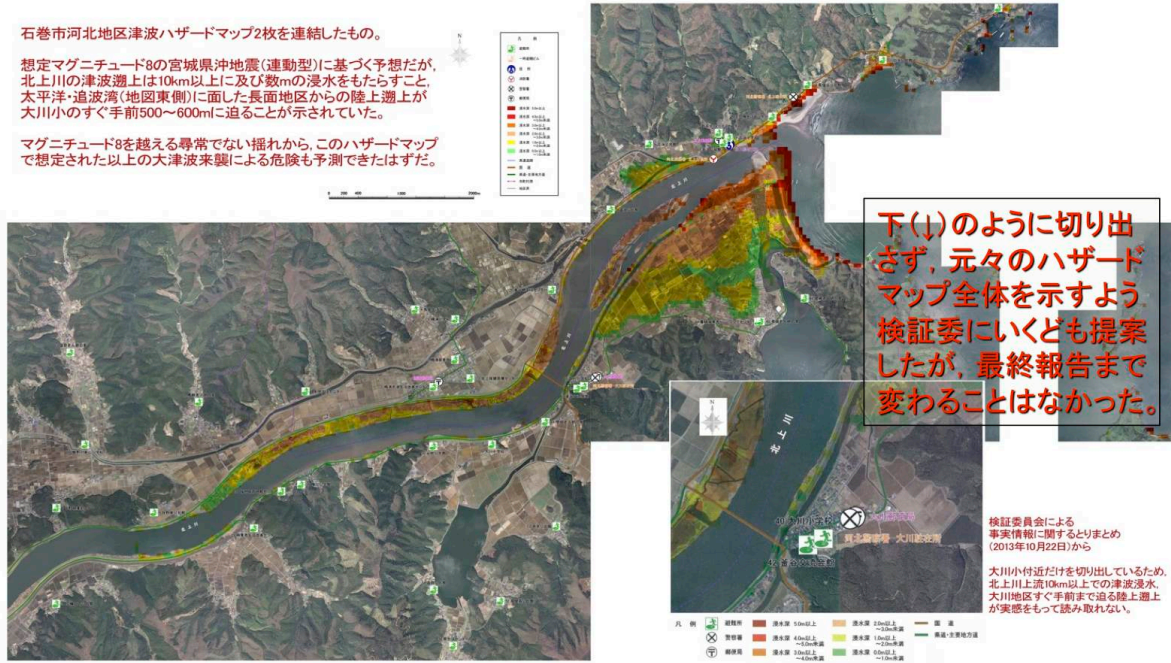
Keywords: Great East Japan Earthquake and Tsunami Disaster, How Should We Study Tsunami Hazard Map, A Man-made Disaster Side

# 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

石巻市河北地区津波ハザードマップ2枚を連結したものの。

想定マグニチュード8の宮城県沖地震(運動型)に基づく予想だが、北上川の津波遡上は10km以上に及び数mの浸水をもたらすこと、太平洋・追波湾(地図東側)に面した長面地区からの陸上遡上が大川小のすぐ手前500~600mに迫ることが示されていた。

マグニチュード8を越える尋常でない揺れから、このハザードマップで想定された以上の大津波来襲による危険も予測できたはずだ。



## Disaster prevention education for spaceguard

\*Makoto Yoshikawa<sup>1</sup>

### 1. Japan Aerospace Exploration Agency

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 future.

Keywords: spaceguard, collision of celestial bodies

## Development of medical demand survey system in disaster first response phase

\*NORIO NARITA<sup>1</sup>, AKIRA FUSE<sup>2</sup>, TSUNEKI SAKIBARA<sup>3</sup>

1.Kesennuma City Hospital, 2.Nippon Medical School, 3.PASCO corporation

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

ヘリコプター  
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