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

HSC05-01 会場:101A 時間:5 月 26 日 15:15-15:30

Japanese Tsunami Early Warning System and the Information Delivery
Japanese Tsunami Early Warning System and the Information Delivery

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KOIZUMI, Takeshi[1*] ; NAKAMURA, Kouji[1] ; KIYOMOTO, Masashi[1] ; UEYAMA, Tetsuyuki[1]

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Japan Meteorological Agency (JMA) has conducted computer simulation of tsunamis with around 100,000 earthquake scenarios involving various locations, magnitudes and fault mechanisms, and the results related to tsunami arrival times and heights are stored in a database. When a large earthquake hits, the operation system searches the tsunami database with reference to the source parameters of the earthquake and selects the most closely matching results. JMA then issues Tsunami Warnings/Advisories using the estimated tsunami heights in around 3 minutes.

The information is transmitted to disaster management section of each municipality through the jurisdictional prefecture as well as fire and police department, then delivered to local residents via Municipal Disaster Management Radio Communication Network with household-equipped receivers, speakers and municipal information cars. People can also get the information via the recent ”Area-Mail” services of cellphone companies as well as via mass media with TV and radio. The transmission to prefectures has been double-tracked and thus is secured by J-Alert system operated by the Fire and Disaster Management Agency (FDMA) of the Ministry of Internal Affairs and Communications.

JMA also operates the Northwest Pacific Tsunami Advisory Center (NWPTAC), which covers the northwestern Pacific and some of its southwestern part, and on an interim basis, the South China Sea region. NWPTAC monitors earthquakes in the region, and when a large tsunamigenic earthquake occurs, NWPTAC promptly issues tsunami advisories to countries in the region via the Global Telecommunication System (GTS)∗, facsimile and email. NWPTAC has been in operation under the framework of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS) and contributes to tsunami disaster mitigation in the region in cooperation with the USA’s Pacific Tsunami Warning Center (PTWC) which is responsible for monitoring earthquakes and tsunamis and providing information for the whole Pacific area.

∗Global Telecommunication System (GTS) is the communications and data management component implemented and operated by National Meteorological Services of WMO Members and International Organizations.

Japan Geoscience Union Meeting 2015
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HSC05-02 会場:101A 時間:5 月 26 日 15:30-15:45

津波防災と減災教育へのリアルタイムデータとシミュレーションの利活用
Application of the real time data and simulation data base for tsunami disaster mitigation and education

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Based on the lesson learnt from East Japan Earthquake 2011, we are developing early tsunami detection system using the real time data and advanced simulations. DONET systems deploying around the Nankai trough, will be applied to Tsunami early detection for the Nankai trough large earthquakes and tsunamis. And S-Net system is under construction around off Tohoku seismogenic zone for early detection of earthquakes and tsunamis. Especially, real time data from ocean floor networks are very important and indispensable for early tsunami detection. However, not only real time data system, but also advanced simulation researches are important too. For instance, the integration of real time data of tsunamis and advanced tsunami propagation and inundation simulation will be more powerful and practical information for evacuations and rescues. If we can detect tsunamis using ocean floor networks, we can estimate tsunami propagation and inundation based on the advanced tsunami data base. Furthermore, education and outreach using advanced and visualized tsunami simulation including propagations, inundations and evacuations are more important for saving lives from tsunamis. For the recovery and revival of damaged areas, evacuated people are the most important, indispensable and irreplaceable. In our presentation, we will introduce the early tsunami detection system and advanced simulation for evacuations from tsunamis and disaster mitigation.

キーワード: リアルタイム, 地震と津波の早期検知, シミュレーション, 防災, 海底観測ネットワーク
Keywords: real-time, early detection of earthquake and tsunami, simulation, disaster mitigation, ocean floor network

Japan Geoscience Union Meeting 2015
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HSC05-03 会場:101A 時間:5 月 26 日 15:45-16:00

東日本大震災の復興をいかに評価するのか
How can we evaluate recovery from disaster?

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東日本大震災の復興モニタリングについて、自治体の事例ならびに研究者が提案する手法についての分析を行い、今後の復興モニタリングのあり方について提案する。

キーワード: 東日本大震災, 復興
Keywords: Great East Japan Earthquake, Recovery

Japan Geoscience Union Meeting 2015
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HSC05-04 会場:101A 時間:5 月 26 日 16:15-16:30

リスク認識と津波避難行動に関する研究ー東日本大震災の事例より
The Study on Risk Awareness and Tsunami Evacuation Behavior: The Case of the Great East Japan Earthquake

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本研究では、人々のリスク認識と避難行動について、2011 年 3 月 11 日の東日本大震災において被災した岩手県陸前高田市広田町の事例調査に基づき検討する。広田町は、明治三陸津波（1896 年）、昭和三陸津波（1933 年）、チリ地震津波（1960 年）というように繰り返し地震津波災害に見舞われてきた地域である。東日本大震災の発生時に、人々は過去の津波災害に関する知見を持っており、地域の津波リスクを認識しており、ハザードマップを知っており、津波避難警報も聞いていた。これらの取り組みのうち何が避難を促進するためには重要であったのであろうか。本研究では、陸前高田町の住民への質問票に基づく調査とヒアリング調査に基づき、避難を促進するための方策を検討する。

キーワード: 津波, 東日本大震災, リスク認識, 避難
Keywords: tsunami, The Great East Japan Earthquake, risk awareness, evacuation

Japan Geoscience Union Meeting 2015
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HSC05-05 会場:101A 時間:5 月 26 日 16:30-16:45

Seasonal Flood in wetland with socioeconomic view in Phu My, Kien Giang, Vietnam ? a case study

Seasonal Flood in wetland with socioeconomic view in Phu My, Kien Giang, Vietnam ? a case study

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Phu My is locate in the Ha Tien Plain, a shallow basin, in the southwest corner of the Mekong Delta. Floodwaters create a large area of grasslands where the Phu My Lepironia Project has been implemented. The project started in 2004 in response to several failed attempts to change the plain for rice paddy fields and shrimp aquaculture; and a partnership between researchers, experts, and local village community has established so that the wetland resources can be used and managed for the purposes of environment conservation and income generation for local people. The project covers the area size 2,890 hectare of wetland with Lepironia grasses (*Lepironia articulata*). Local community people participate to this project to collect and dry the grass stems to produce high-quality handicrafts for sale. It is reported that their average income has increased as much as 500%. Yet, their main income source is still rice cultivation, which is affected by acidic water and seasonal floods. Although flooding prevention system and three dykes to prevent saline water intrusion have been built, it is not certain how much local people understand and respond to such information as they are Khmer and not full-literate in Vietnamese language. This study discusses a balance and relation between wetland conservation, extreme climatic conditions such as floods, and the local traditional cultural values for future sustainability and resilience.

キーワード: wetland, flood, Lepironia, sustainable rural development, Vietnam
Keywords: wetland, flood, Lepironia, sustainable rural development, Vietnam

Japan Geoscience Union Meeting 2015
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HSC05-06 会場:101A 時間:5 月 26 日 16:45-17:00

Constraints on scenarios of great earthquakes along the Nankai trough based on historical records of tsunami heights
Constraints on scenarios of great earthquakes along the Nankai trough based on historical records of tsunami heights

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For a verification of many possible scenarios of great earthquakes along the Nankai trough, we examine the effects of the expansions of source areas on resultant tsunami heights at the Pacific coasts and Seto Inland Sea (Hyodo et al., 2014). For a maximum class scenario (M ? 9), predicted tsunami heights exceed real damage records of 1707 Hoei tsunami at the Tosa bay and Pacific coastlines near the Kii channel owing to large slips on the up-dip extension of fault segments off Shikoku Island. Such discrepancy indicates that large slips nearby the trough axis was not remarkable even in the 1707 Hoei earthquake which is considered to be one of the largest historical Nankai Trough earthquakes. While, since the proposed M9-class scenario also includes large slips with several meters at the down-dip side up to about 35km depth, coseismic crustal subsidence reaches to the further landward than usual Nankai Trough earthquakes. Hence, the maximum subsidence at the Seto Inland Sea region becomes one or two meters. Such crustal subsidence makes Inland Sea tsunamis effectively higher, and then, simulated tsunami heights corrected by crustal subsidence is consistent well with some of real damage records in the Seto Inland Sea region. However, the tsunami height cannot be explained at some places where the tsunami height reaches to three meters. We consider such higher tsunami could be explained if we include dispersion effect in the tsunami simulation. The calculation of dispersive tsunami wave for longer time period of more than several hours is challenging. We are trying it and will discuss the results in the presentation.

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HSC05-07 会場:101A 時間:5 月 26 日 17:00-17:15

津波遡上計算とマルチエージェントモデルの避難シミュレーションとの連成計算手法の開発
Development of agent based evacuation simulators coupled with STOC-CADMAS

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In this paper, development of agent based evacuation simulators are described. The agent based model was coupled with STOC-CADMAS (Arikawa and Tomita, 2014), which connects tsunami propagation simulator and 3-D numerical simulator. The STOC-CADMAS system calculates detailed inundation processes occurring in a town from a tsunami source location.

By using this system, the effect of the vertical evacuation and seawall were verified. The three different parameters, which were the evacuation place, the existence of seawall and the beginning time to evacuate, were changed. The tsunami condition is given as the elevation velocity. In this paper, this velocity is assuming that 1.0m/min.

The results are the followings;

1) The result of comparison of existence of seawall indicated that the effect of the seawall depended on the beginning time to evacuate. If the people started to run away after tsunami overflow the seawall, then the mortality with seawall was larger than that without seawall.

2) The vertical evacuation is better than the horizontal evacuation in this paper. But this depends on the tsunami condition, of course. So, the numerical simulations with various conditions should be needed.

キーワード: 津波シミュレーション, 3 次元, 避難シミュレーション, 連成計算
Keywords: Tsunami simulation, 3 dimentional, Multi Agent, Coupling simulation

Japan Geoscience Union Meeting 2015
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HSC05-08 会場:101A 時間:5 月 26 日 17:15-17:30

Disaster Information and Awareness: A Study on Typhoon and Storm Surge in The Philippines

Disaster Information and Awareness: A Study on Typhoon and Storm Surge in The Philippines

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LEELAWAT, Natt[1*] ; SUPPASRI, Anawat[2] ; YASUDA, Mari[2] ; YI, Carine J.[2] ; MATEO, Cherry may R.[3] ; GASPAY, Sandy mae[3] ; IMAMURA, Fumihiko[2]

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Introduction

"Use knowledge, innovation and education to build a culture of safety and resilience at all levels" is one of the priority actions addressed by Hyogo Framework for action 2005-2015. In many developing countries, there are a large number of young age who have less experience in natural hazards. Philippines is located in the typhoon belt of the Pacific, which frequently encounters strong precipitation (Mateo & Oki, 2011). During Nov. 6-8, 2013, the central region (Visayas) was attacked by a heavy storm and storm surges caused by Super Typhoon Haiyan. The typhoon primarily impacted Leyte and Samar (Daniell et al., 2013).

Research Design

In Dec. 2013 (less than 2 months after the impact), we did surveys in some Barangays of Tacloban City in Leyte to observe the perspective of people in terms of disaster information and awareness (Leelawat et al., 2014). Also, in Aug. 2014, we conducted surveys via the IRIDeS disaster education program (similar to Yasuda et al., 2014) with 218 elementary school students (9-15 years old) at 4 schools located in Palo, Tacloban, and Tanauan. These schools were in Leyte, an island in the Visayas group. Leyte is more than 616 km far from Manila.

Disaster Information & Warning

Based on Leelawat et al. (2014), we found that the most preferred method for officials to announce disaster warning was TV for any period of time (i.e., 1 week before, a few days before, and just before impact). Nevertheless, the score of TV decreased as the typhoon approached while the preference of radio increased as its impact approached. While most samples received warning message, 47% did not evacuate to shelters. The reasons for not evacuating were Safety of all family members must be ensured first, [Believing that it was] More dangerous to go outside, Uncertainty of expected typhoon level - might subside, etc., respectively.

Disaster Understanding & Awareness

First, we found that students in different locations have different level of awareness. The students in a school near the sea considered natural disasters are dreadful higher than the schools far from the sea, probably because their location is along the coastal area. Second, students whose school is on the mountain where the landslide occurred at that time have higher awareness of the immediate future disasters than students whose school is on the plain area. Third, students whose school is on the mountain considered the natural disasters are dreadful higher than students of plain-area school. Better understanding of disaster information and awareness would be helpful for supporting improvement of disaster management preparation.

Acknowledgements

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Research Seminar on Disaster Science.

キーワード: awareness, education, information, storm surge, typhoon
Keywords: awareness, education, information, storm surge, typhoon

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HSC05-09 会場:101A 時間:5 月 26 日 17:30-17:45

Tsunami Early Warning-Mexico and Spain-
Tsunami Early Warning-Mexico and Spain-

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The Caribbean as well as the Mediterranean region are earthquake and tsunami-prone areas therefore many coastal countries have developed Early Warning and Awareness Policies and Protocols to predict, protect and ameliorate the impacts from these naturals hazards.

Mexico, due to its geographical location and holding more than 9,000 kilometers of coastline it faces the Gulf of Mexico, the Caribbean and the Pacific Ocean. Spain, with almost 5000 kilometers of coastline, is a country located in Western Europe facing the Mediterranean Sea, the Atlantic Ocean and the Gulf of Vizcaya (Cantabrian Sea). The latter has a higher population density and coastal development than the former.

The Pacific Cocos-North American subducting plate in the south west of Mexico is active earthquakes prone zone hence a potential tsunami prone area, while the presence of the Caribbean Plate could also expose its Caribbean Coastline (2). In the case of Spain, although not common, tectonic faults in the Mediterranean Sea and Atlantic Ocean could also be the source of earthquakes and tsunamis like the one, which occurred in 1775.

Despite this situation both countries have just recently started to develop early warning and mitigating measures and policies, which may include remote and rural areas although the concept of remoteness may be different between both countries due to their coastline length and degree of development, hence the access to information and awareness programs as well as protection and disaster amelioration in these areas may largely differ. General differences and similarities are discussed.

キーワード: tsunami, Mexico, Spain, Early Warning, Protocol, Policy
Keywords: tsunami, Mexico, Spain, Early Warning, Protocol, Policy