Human Environment and Disaster Risk. (For example 2011 TOHOKU Great Earthquake)

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1.none

Abstract
1. Many, many buildings are leaning somewhat to one side at Sendai city, Kansai district and Tsukuba city.
2. I was oppressed by sorrow to new building slant in Sendai city.
3.
a) In the case to build the new coastal levee in the Ocean.
This is the same as medicine. The nature receives side effects. This side effect is too same as next term (b). The nature is a most delicate and more and more meaningful creature.
b) In the case to shave off wood and to destroy mountains.
We must plant many, many plants in the mountains entirely.
c) In the case of increasing coastal levee on ready-made coastal levee.
I propose the Great Wall of China. We can do it anyway. This is my living hope. Usable coastal levee as a highway or a park.
4. The nature (The universe) is the treasure on the earth. My inmost thoughts is that Mankind must coexist with the nature.

Reassessment of land condition of liquefied sites caused by the 2011 Tohoku earthquake and liquefaction potential

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A large number of sand boils caused by the 2011 Tohoku earthquake were observed at the refilled lot of gravel pits in the Kinu, Kokai, Naka and Kuji River basins, eastern part of Kanto region and Shiroishi, Naruse and Eai River basins, Miyagi Prefecture. Land condition (geomorphological condition) of these liquefied sites were considered as back marsh and former river channels by the previous studies and reports. These refilled gravel pits were mostly developed and buried by borrow materials since the latter half of 1970's.
Many gravel pits were identified in the middle and lower reach of Tama River since 1940's by using the aerial photos and old edition maps. These gravel pits were refilled before 1970's, and changed to the residential area, industrial site and parkland. In the alluvial plains of Japan, many gravel pits were developed and refilled in the past. Because of the duration of these gravel pits were short (only a few years), the detection of existence of gravel pits is difficult, and existence of gavels pits does not represent to the land condition map. Therefore, a number of areas with a high potential for liquefaction may have not detected in many alluvial plains.

Keywords: The 2011 off the Pacific coast of Tohoku Earthquake, Liquefaction, Gravel pits, Aerial photographs, Tama River

Study on the generation of digital inundation water surface elevation model by using SfM/MVS technique -- A case of flood inundation and natural dam

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Flood disaster around Kinu River associated with Kanto-Tohoku heavy rainfall on September 2015 caused severe damages around Joso City and Shimotsuma City, Ibaraki Prefecture. In this disaster response, drainage of inundation water by using pumper played an important part. When a lot of natural dams were generated by landslides or deep-seated slope collapse associated with the Mid Niigata prefecture Earthquake in 2004, the Iwate-Miyagi Nairiku Earthquake in 2008, and the Kii Peninsula flood disaster by Typhoon Talas (1112) in 2011, etc., pumping drainages were performed. It is important to grasp quickly the inundation water condition for drainage planning for these natural dam and evaluation of risk of dam burst.
Previous methods of estimation of inundation depth for a short period after inundation are followings: 1) Inundation area and inundation water surface elevation are estimated by manual interpretation of aerial photo or video, and then inundation depth is calculated from a difference between inundation water surface elevation and ground elevation before inundation. 2) Inundation depth is calculated from a difference between pre- and post-digital elevation model (DEM) by airborne LiDAR (ex. Konami et al.). Aerial photo of the method 1) is taken with comparative ease although it is affected by weather. Although the method 2) is enable to estimate precisely the inundation water volume, it is affected by weather and it needs many time on the measurement and analysis. On the other hand, SfM (Structure from Motion)/MVS (Multi-View Stereo) technique has advancing recently. This technique is able to generate quickly digital surface model (DSM) from plural aerial photos. Therefore, I tried to generate a digital inundation water surface elevation model (DWEM) from aerial photos by using SfM/MVS technique and to estimate a general inundation depth.
The aerial photos in this study are vertical photos with 60% over-lap and 30% side-lap taken from airplane. Also, this method has some preconditions and issues. In terms of generation of DWEM, the preconditions are 1) the bottom of inundation water is not taken, and 2) inundation water surface has not moving, wave, moving shadow of cloud, and halation. In case of flood inundation, structures over the inundation water or suspended materials on the inundation water are impeditive. In case of natural dam, there is possibility that DWEM cannot be generated under the influence of surrounding trees or suspended materials on the inundation water. In terms of estimation of inundation depth, the shape of collapsed soil under the inundation water surface is only presumed because it is not able to estimate in case of natural dam. In this presentation, I will report the composition result between the inundation depths estimated by this study and inundation depths estimated by previous method or inundation depths measured by field survey.

Keywords: SfM/MVS, digital inundation water surface elevation model, inundation depth, flood inundation, natural dam

Satellite observation of a glacier lake outburst flood in western Bhutan

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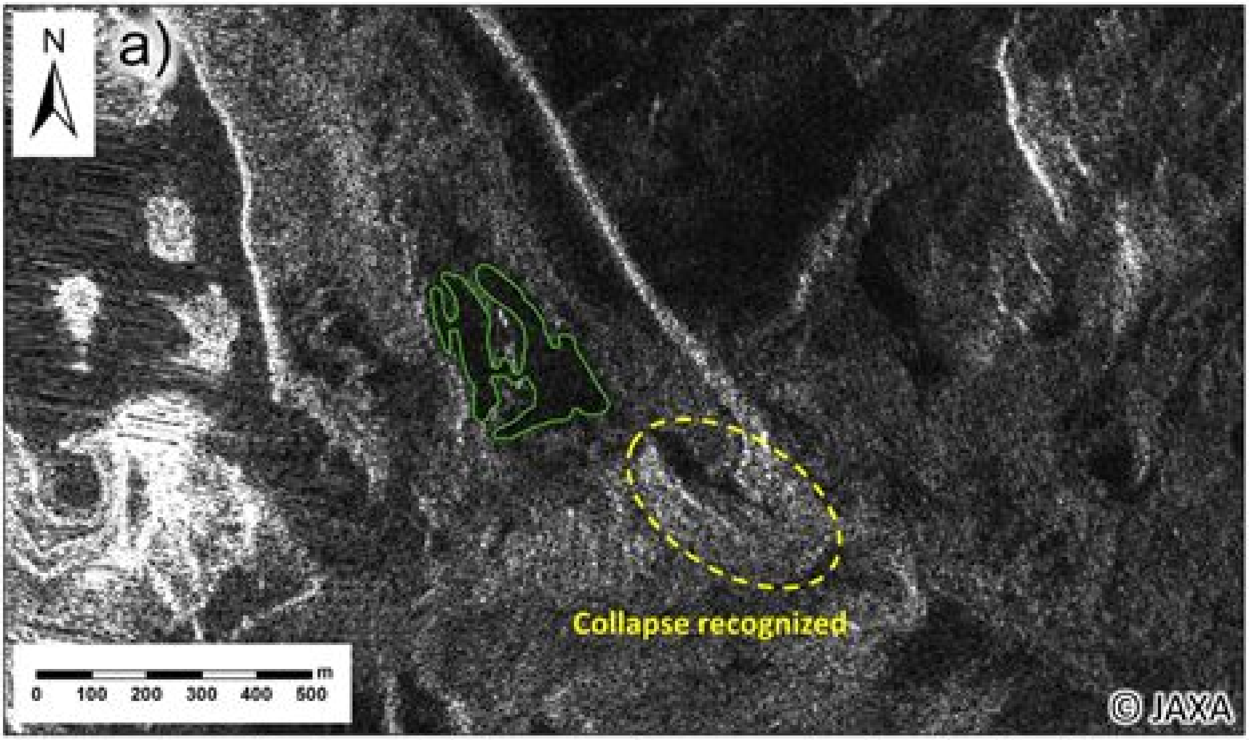
Following a glacial lake outburst flood (GLOF) on Jun. 28, 2015, in western Bhutan, the Japan Aerospace Exploration Agency performed an emergency observation on Jul. 2, 2015 using the Phased Array type L-band Synthetic Aperture Radar-2 (PALSAR-2) onboard the Advanced Land Observing Satellite-2 (ALOS-2, "DAICHI-2"). Based on a dataset generated from the Advanced Land Observing Satellite (ALOS) imagery, "The Glacial Lake Inventory of Bhutan using ALOS Data", the glacier lake that potentially contributed to this GLOF were identified at 28º4’7.7"N, 89º34’50.0"E, in a headwater of the Mo Chu river basin, western Bhutan.
A post-event lake outline was delineated manually using the acquired PALSAR-2 image. Pre-event outlines were delineated from previously acquired PALSAR-2 images (Apr. 23, 2015), Landsat 8 (Mar. 8, 2015), and ALOS (Dec. 22, 2010). The differences between these outlines reveal a remarkable expansion (+48.0%) from Mar. 8 to Apr. 23, 2015, followed by a remarkable shrinkage (-52.9%) from Apr. 23 to Jul. 2, 2015. This result indicates the lake to be a highly likely source of the flood. Topographically, it is located at a glacier terminus, surrounded by a moraine. Differing backscatter patterns between successive PALSAR-2 images in a certain part of the moraine suggest that it underwent some collapse, possibly as a result of the GLOF.

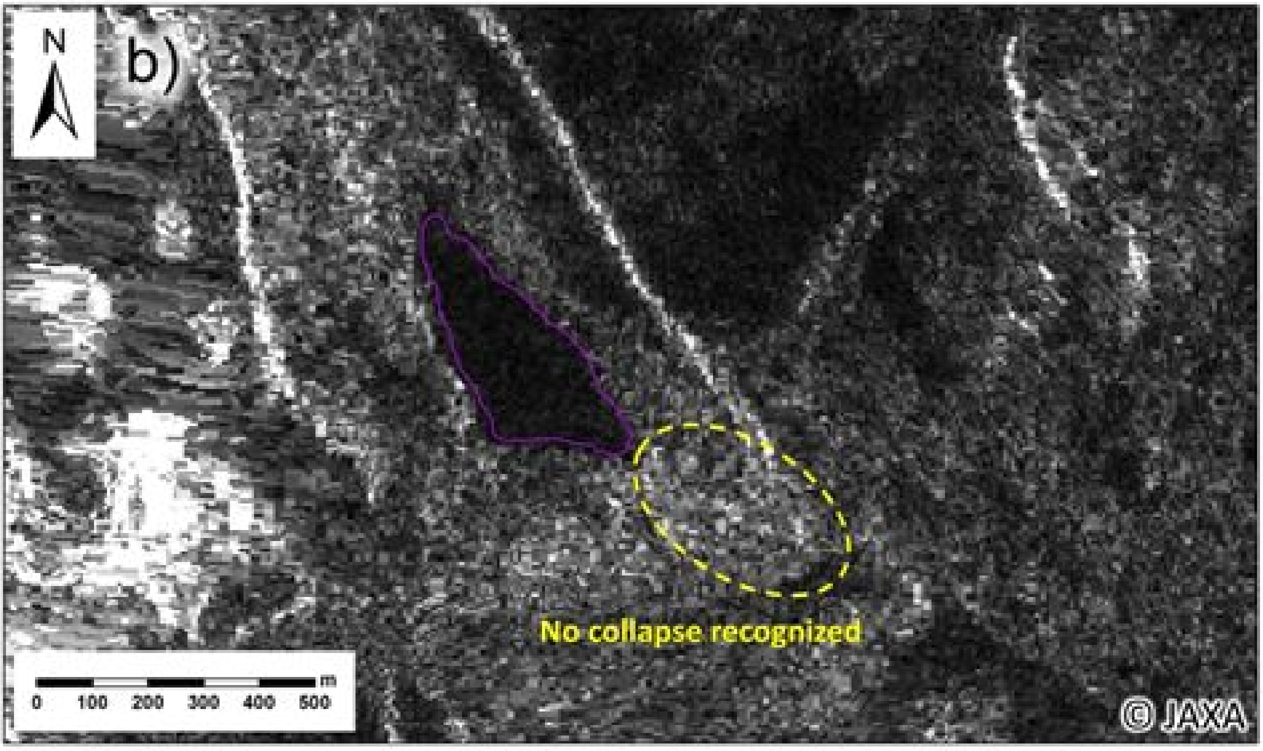
Keywords: GLOF, PALSAR-2, Bhutan

2015-07-02



PALSAR-2 / HH / Ortho-rectified amplitude imagery (Product level 2.1) /
Path: 46 / Spatial resolution: 3m

2015-04-23



PALSAR-2 / HH / Ortho-rectified amplitude imagery (Product level 2.1) /
Path: 46 / Spatial resolution: 10m

Tsunami Peculiar Points and Disaster Prevention
- Advice to Ooura Peninsula Coast, Maizuru City and Gobo City, Wakayama Prefecture as Examples

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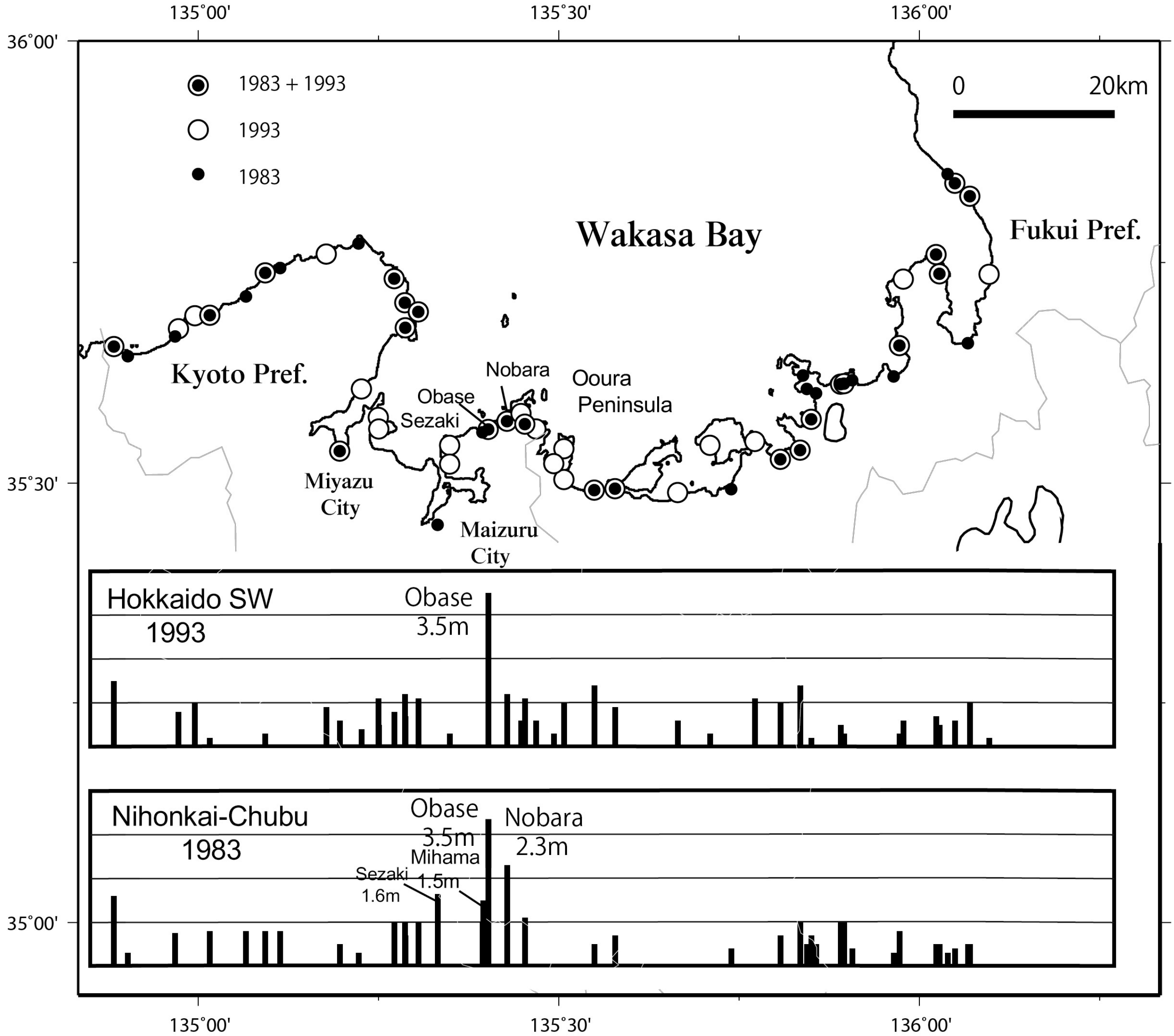
1. Tsunami peculiar points
On a coast in a district where large tsunamis hit several times in its history, if there appears such a point that tsunami height locally larger than its adjacent areas for almost all tsunamis, we want to propose to call the point as "tsunami peculiar point". We can point out such examples as; (A) Akamae area which located at the innermost coast of Miyako Bay, (B) Iioka area, Asahi city on the coast of Boso Peninsula, Wajima city on the tip coast of Noto peninsula, and Oki archipelago, (C) Aonae area at the southern tip of Okushiri Island, Hokkaido, and cape Hajiki at the north tip of Sado Island, (D) Shimoda Port on Izu peninsula, (E) Kata area in Owase city, Mie prefecture, and Osaka (F) Hawaii island and Nautoputapu Island, Tonga. The reasons why such peculiar points appear are;
Points (A) are situated at an innermost point of V-shaped bays, (B) are points situated at the roots of sea sea bottom ridges, (C), (D) are the same reason as (B), (E) is an anti-node of the fundamental mode of the eigenvalue oscillation of a inner bay, and (F) is due to concentration of the incoming energy of a tsunami. We recently found such peculiar points at two places; one is on the coast of Ooura peninsula, and the other is at the coast of Gobo city, Wakayama.
Fig.1 shows the distribution of the heights of three tsunamis in Wakasa Bay - for the 1983 Nihonkai Chubu earthquake tsunami and the 1993 SW Hokkaido earthquake tsunami. We should notice that peaks of tsunami height distribution appear at the same place; on the coast of Ooura Peninsula, Maizuru city, Kyoto prefecture. This peculiar point is considered due to the reason of the category (C). This particularity is not considered for disaster prevention measure by the local government. No sea wall was constructed between shore line and the residential areas of Nobara and Obase.
In the front sea region of the coast of Gobo city, Wakayama prefecture, there is a submarine spur, and the tsunami energy are apt to concentrate towards the front coastof Gobo city, and the result of a numerical calculation of the tsunami of the 1854 Ansei Nankai Earthquake shows that the tsunami height reach 9 meters there. But old documents shows that the damage of the Ansei Nankai Earthquake was slight, and seawater rose up to the height of only 2.5 meters above mean sea level. To tell the truth, there had been a sand dune existed in front of the central part of Gobo city up to the end of 19th century. This dune had blockaded the incident tsunami waves and had protected the city. But in the beginning of 20th century, the course of the river was made straight line at the river mouse, at that time the dune was removed. Now there is no sand dune in front of the central part of Gobo city. Effective counter measurement should be made in considering this fact.

Keywords: tsunami peculiar point, the 1983 Nihonkai-Chubu earthquake-tsunami, the 1993 Hokkaido SW earthquake-tsunami, the 1854 Ansei Nankai earthquake, Wakasa Bay, Gobo city



135°00'
135°30'
136°00'
36°00'
35°30'
35°00'
1983 + 1993
1993
1983
0
20km
Wakasa Bay
Fukui Pref.
Kyoto Pref.
Nobara
Oura Peninsula
Obase
Sezaki
Miyazu City
Maizuru City
Hokkaido SW 1993
Obase 3.5m
Nihonkai-Chubu 1983
Obase 3.5m
Nobara 2.3m
Mihama 1.5m
Sezaki 1.6m

Active Fault Research during the last 30 years and the social problem

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Suzuki(2013) reviewed the history of active fault research in Japan during the last 30 years. According to this paper the year of 1980 was recognized as the remarkable year when “Active faults in Japan” was published. The 30 years after 1980 is divided into periods of 1980 to 1994, 1995 to 2005, and after 2006. And the general trend and main research targets are summarized as bellow. The purpose of this presentation is to review the social problems following the active fault research history of the recent 30 years.
1. Introduction: The remarkable year of 1980
2. 1980-1994: The matured period of active fault studies during seismic calm
2.1. Excavation study of active faults
2.2. Analytical study of tectonic landform evolution based on dislocation models
2.3. Chronological studies supported by the development of dating techniques
2.4. Quantifying the rate of crustal deformation
2.5. Applied study to disaster reduction problem
3. 1995-2005: The decade after the great Kobe earthquake
3.1. Intensive investigation of active faults
3.2. Detailed large-scale mapping of active faults
3.3. Seismic reflection profiling of active fault
3.4. Long-term forecast of earthquake occurrence by active faults
3.5 Detailed study of flexural deformation and the 2004 Mid-Niigata earthquake
3.6. Overseas research on big earthquakes and active faults
4. 2006-2012: The period of rediscovery of active faults
4.1. Evaluating varieties of relation between earthquakes and active faults
4.2. Reexamination of active fault distribution
4.3. Relations between active faulting and geodetical movement
4.4. Considering interplate earthquake from the view point of submarine active fault
4.5. Question posed by the 2011 East Japan huge earthquake
5. Conclusions

Suzuki(2013): Active Fault Studies in Japan after 1980. Geographical Review of Japan Series B, 86, 6–21.

Keywords: Active fault, Research history, Social problem

Active tectonics in Shakotan peninsula, Hokkaido, Northern Japan: inappropriate inspections for nuclear safety by Nuclear Regulation Authority

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Tectonic geomorphic investigations clarify that submarine active fault to the west of Shakotan peninsula play an important role in the uplift of the peninsula, Hokkaido, Northern Japan. The bedding fault underneath the Tomari Nuclear Power Plant, in the hanging wall of the submarine active fault, may be capable faults which will be rejuvenated in the near future. It is essentially important to investigate carefully characteristics of tectonic landforms indicative of active faults. However, the safety inspections by the Nuclear Regulation Authority (NRA) ware clearly mistaken. Although NRA should break with the past wrong safety review that were slipshod and unscientific, the stance on safety inspection has changed back to that prior to the severe Fukushima accident.

Keywords: tectonic landform, submarine active fault, Shakotan peninsula, Tomari nuclear power plant, Nuclear Regulation Authority, safety inspection

Discussion about earthquake hazard map from point of collaboration of science and engineering

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In this presentation, the author discuss about earthquake hazard map from point of collaboration of science and engineering. Especially, he discuss about earthquake motion hazard map, liquefaction hazard map and active fault hazard map.

Keywords: earthqaeke hazard map, lequfaction, active fault

