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

SCG56-P01 Room:Convention Hall Time:May 27 18:15-19:30

Nuclear power plant and pinpoint earthquake prediction

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1.Preface

Seasonality of the earthquake is reported, but even modern science is considered to be the mystery that cannot be settled. It is a fact December has many giant earthquakes of the Nankai trough, and not to be up from March to July. It is said, it "is scientific basics I hypothesize based on a fact, and to inspect the hypothesis". In other words, it means that a hypothesis is wrong if there is contradiction in an inspection process.

Plate tectonics theory is still a hypothesis. Because it contradicts it in a fact of the seasonality of the earthquake, this hypothesis gets a wrong this hypothesis. However, it thinks whether it is forgotten that a hypothesis is a hypothesis that a hypothesis is not going to be changed.

As a result of returning to scientific basics, and having studied the driving force except the mantle convection, I find a method to foresee an earthquake at the same time to solve this contradiction and have already announced it in Japan Seismological Society of Japan and JPGU. Unfortunately foretelling an earthquake itself has not been yet received including this method by the earthquake learned society. Therefore, the security of the nuclear power plant is lectured on based on a wrong hypothesis on the premise that earthquake prediction is not possible, besides.

However, there is already this earthquake prediction in the level that there are many results and can predict. The security of the nuclear power plant should be discussed based on it. I explain method of scientific earthquake prediction below.

2. Method of scientific earthquake prediction

As a result of having analyzed many major earthquakes, the strong wind of the downward air current when time and the low pressure which became the extratropical cyclone developed collided in the earth crust, and it was estimated by a typhoon when I had a major earthquake at a collision spot several months later. I can watch the strong wind of this downward air current as a dry slot (domain without the cloud) in a satellite image. And it was estimated that the tip (or the origin) became the epicenter. Width of the tip of the dry slot shows the rough size of the focal region (cf. Fig. 1). In other words, I show the rough volume of earthquake. When there is a remarkable dry slot, more than M 6.5, it is estimated that it is less than M 6.5 when there is not a remarkable dry slot. Certainty is high as a big earthquake. Outbreak time of the earthquakes is three months later on the average seven months later after one week.

3. Reduction of the nuclear power generation risk by the introduction of the pinpoint earthquake prediction

Earthquake vibration, the tsunami beyond the limit damaged a nuclear power plant by the Fukushima first nuclear plant accident, and radioactivity was released outside. Even if it is said that facilities were strengthened as earthquake, tsunami measures, there is uneasiness of the radioactive contamination because I do not know it whether you can tolerate it if you are operating it, and a giant earthquake comes. However, there is not uneasiness of the radioactive contamination if it does not operate. The large reduction of the risk is possible if I stop only an applicable nuclear power plant before major earthquake outbreak by a method to predict an earthquake occurrence place in pinpoint. Of course because it is not yet perfect, the stop that is not necessary is possible as a result mark, but the uneasiness of the radioactive contamination by the re-operation of the nuclear power generation largely disappears.

References

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Keywords: nuclear power plant, peak gust, earthquake prediction, dry slot, satellite image

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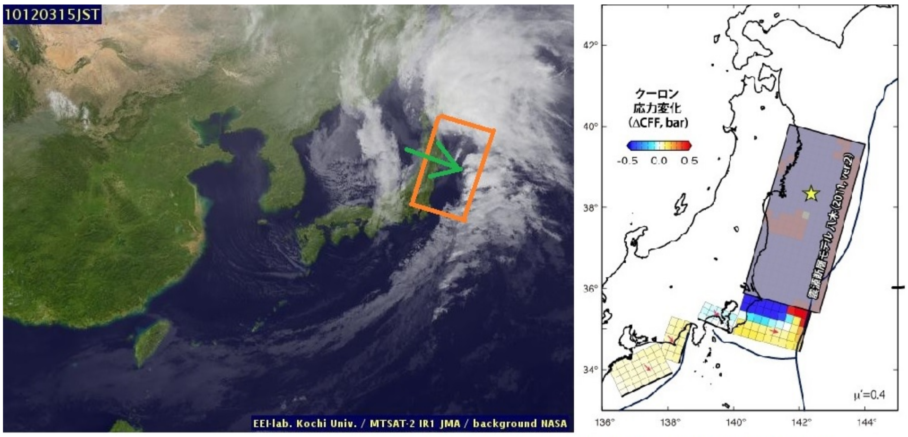

Fig. 1. The satellite image at 15:00 December 3 in 2010 and Focal region in the 2011 Tohoku earthquake

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Uncertainty evaluated from tsunami simulation of Tohoku earthquake around Nuclear Power Stations among Different Tsunami

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After the 2011 Tohoku-Oki Earthquake, evaluating based on tsunami simulation approach becomes very important role for promoting tsunami disaster prevention measures against mega-thrust earthquakes. In considering tsunami disaster prevention measures based on the knowledge from tsunami simulation, it is important to carefully examine what kind of tsunami source model we use. In this presentation, we show the result of tsunami simulation of the 2011 Tohoku-Oki Earthquake around Fukushima Daiichi I Nuclear Power Plant and Fukushima Daini II Nuclear Power Plant in Fukushima Prefecture of Japan by using several tsunami source models, and show how different tsunami response could be in tsunami inundation process. The results show that for incoming tsunami onto inland region there are a fair amount of relative differences in maximum wave height and tsunami wave pressure. This suggests that there could be a false determination of promoting tsunami disaster prevention measures against mega-thrust earthquakes, depending on tsunami source model one choose. On the basis of this topic of tsunami evaluation and its uncertainty, we also suggest our viewpoint on how disaster prevention measure and earth science should be related.

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Keywords: Tohoku-Oki Earthquake, Tsunami wave force, Fukushima Nuclear, 1F, 1F 2F

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Strong ground motions around the Fukushima Daiichi Nuclear Power Plant and the SPGA model

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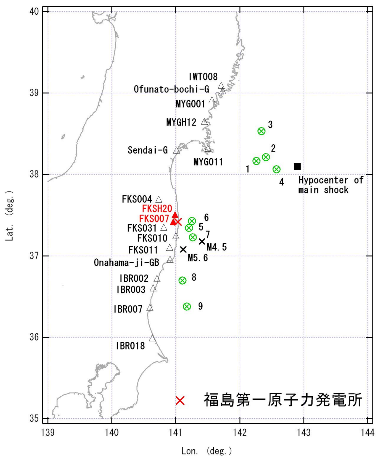
After the severe accident at the Fukushima Daiichi Nuclear Power Plant, it is significantly important to investigate how strong ground motions were generated around the power plant. In this study, the SPGA model (Nozu, 2012; Nozu et al., 2012) was used to explain strong ground motions in the area. According to the results, the strong ground motions around the nuclear power plant were far from a so called 'worst case scenario'. The most prominent SPGA for the 2011 Tohoku earthquake was SPGA4, which was located away from the coast and it was at least 150km off Sendai City. The SPGAs off Fukushima Prefecture were closer to the coast but they were relatively weak and hence did not cause catastrophic ground motions in that area. Such a configuration of the SPGAs was nothing more than a 'manna from heaven', because, there is no necessity for this configuration from the view point of modern seismology. In the assessment of such important facilities as the nuclear power plants, a true 'worst case scenario' should be considered, where a strong SPGA is close to the nuclear power plant.
Acknowledgement: Strong motion data used in this study were kindly provided by the NIED.

Keywords: nuclear power plant, strong ground motion, SPGA



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Review of studies on estimates of the maximum magnitude of earthquakes

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The estimate of the maximum magnitude of earthquakes that occur in a specified seismic region is critically important from the viewpoints of disposal of radioactive waste. Recently I studied literatures on estimates of the largest magnitude of earthquake and consider that its brief summary may contribute to the discussion of this session.

In Japan, this kind of researches has been done mainly from the viewpoints of geomorphology and geology such as Kakimi et al. (2003). However, there are a wide variety of studies with different approaches from geomorphology and geology. In this review, I introduce some of them.

In fact, many studies have been conducted since at least 1980s in the world mainly base on engineering demands (probably construction of nuclear power plants). According the Wheeler (2009), more than 10 approaches have been proposed, but they have merits and demerits. They are categorized into (1) use of the maximum magnitude of earthquake previously observed, (2) statistical method such as estimate using seismicity or extrapolation of G-R law, (3) estimate based on tectonics, (4) estimate based on physical principles, and (5) estimate based on coda Q of Lg wave. Statistical studies are predominant recently. McCaffrey (2008) estimated maximum magnitude of subduction zone earthquakes assuming whole segment of a specified subduction zone ruptures simultaneously. His estimate for the Japan trench was Mw 9.0. Studies by Kagan, Jackson and Bird, and Zöller et al. fit tapered or truncated G-R law to seismic catalog. Both groups concluded that corner magnitude or truncate magnitude should be Mw 9 - 10. All of them insisted that the length of data is critical for good estimate and longer datasets may give larger maximum magnitude.

According to the above studies, we are forced to conclude that there is no scientific validity on the estimate of maximum magnitude in the earthquake science community. Therefore we should sincerely discuss what and how to disseminate this difficulty to society under the pressure of demand of the maximum magnitude of earthquake.

Keywords: maximum sized earthquake, tetonics, Gutenberg-Richter's law, seismotectonic province

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Seismology, volcanology as ”academic clinical”

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In an earthquake/volcano prone country like Japan, the role of related sciences, such as seismology and volcanology, might be different from that of other countries where related sciences are mainly driven by curiosity. Such intellectual activities might be called ”academic clinical”, a term borrowed from medical science. I hope to discuss the role of Earth sciences as ”academic clinical” in the problems related to the nuclear power plant in Japan.

Keywords: seismology, volcanology, academic clinical