

INTERVIEW

A Talker on Trembling Earth

Hong Tae-kyung, seismologist



This past January, a monster tore down a huge number of houses. In a brief instant, he killed more than 200,000 innocent people, from just-born babies to whole families. Electricity went out. Food and water was cut off. Today, the survivors live in despair in the destroyed city where all kinds of violence sweep in and occupy. The monster's name is "earthquake," his initial blow in Haiti measuring 7.0 on the Richter Scale. Not long after, he struck again in Chile, China, and Indonesia, respectively. Frequent earthquakes fan the flames of already existing anxieties that the earth will end by 2012. The Sogang Herald met the renowned seismologist Hong Tae-kyung who received his degree in Seismology from Seoul National University and is now an associate professor in department of Earth System Sciences at Yonsei University. With his easy and concrete explanations, Hong Tae-kyung has effectively divided myths from realities.

Q: More and more people are recently worried about earthquakes because a series of catastrophic earthquakes occurred particularly in 2010. Are these serious phenomena or just run of the mill natural disasters?

A: First of all, I want to correct a myth that many people subscribe to. People often think big earthquakes have occurred only in 2010, and it's some kind of punishment from God to human beings. In reality, there have been a number of gigantic earthquakes over the ages. However, people didn't notice them because most occurred deep in the water. The reason why people feel a disproportionate number of earthquakes have occurred in recent years is that these are shallow earthquakes, which occur within five kilometers of the earth's surface. Thus, it is not true that the number of earthquakes is on the rise.

Nevertheless, we have to take these earthquakes as a serious phenomenon and pay attention to current earthquakes, because most of them are shallow and sometimes they even occur in a totally new area previously untouched by earthquakes. And these aspects are reasons why the Haiti earthquake in 2010 killed so many people. Haiti had not been hit by earthquakes, even small ones, for the last 240 years. It made this earthquake cause such heavy casualties, more than 200,000. People were just not aware of the fact that an earthquake could hit their houses.

Moreover, scientists predict that these disastrous earthquakes will continue to hit all over the world over the next 20 years. Extra-large earthquakes tend to be concentrated in certain periods of time, recognizing that seven huge earthquakes among 15 during the last 110 years occurred in 1950's and 60's. Therefore, this phenomenon will continue until the earth regains the balance of forces which have been upset these days by huge earthquakes.

Q: You said that these huge earthquakes would hit the earth continuously in the coming decades. Then, do you mean earthquakes could also hit Korea?

A: Absolutely. Within 30 years, Korea has been hit by only five earthquakes of a magnitude higher than 5.0. However, we have only started to record earthquakes since 1978 so it is not enough to feel reassured that Korea is a safe-zone. By reading ancient books such as *the Annals of the Joseon Dynasty*, we can see that earthquakes of a magnitude greater than 6.0 have occurred in Korea several times. Furthermore, geologically Korea has a huge possibility of a gigantic earthquake. A huge earthquake occurs after accumulating an enormous amount of forces in the stratum, and forces from frequent earthquakes in Japan have been piling up in Korea. Thus, we should prepare for earthquakes.

Q: Are there any specific regions that are weak to earthquakes in Korea?

A: Earthquakes tend to happen in the same places as they have hit previously. Thus, looking at past records, we can locate some areas that are weak. In Korea, these areas are *Uljin*, *Mt. Sokli*, *Hong-seong* and *Baengnyeong* Island. *Uljin* and *Hong-seong* are the most dangerous areas, because *Uljin* has a nuclear power plant, and many people live in *Hong-seong*.

Q: How does Korea prepare for earthquakes now? And what do you think is the first-priority project to prevent earthquakes?

A: Our country made sure some of the buildings such as factories and atomic power stations be built earthquake-proof. These could endure earthquakes under a magnitude of 6.0. On the other hand, few apartments and schools are earthquake-proof. As a matter of fact, it's hard to ensure that all buildings be earthquake-proof, especially in Korea where earthquakes rarely occur. To make a building bear earthquakes requires tons of additional concrete, so a builder is reluctant to do it,



▲ This past January, Haiti was hit by earthquakes, and more than 200,000 people were killed.

being afraid of increasing construction costs by huge proportions. Even so, we should fully prepare for potential disasters. With this in mind, last year a new law for preparing earthquakes was enacted.

I believe the most essential means to prepare for earthquakes is to expand investment in Seismology. Seismologists study earthquakes by governmental support, but they have difficulties due to lack of researchers and equipment. Thus, I try to educate as many students as possible to become competent seismologists.

Q: How many experts in Seismology exist in Korea and how is Korea's research on earthquakes going?

A: There are two national institutions in Korea: Korea Meteorological Administration and Korea Institute of Geoscience and Mineral Resources. Several universities in major cities have Seismology departments, three of which are located in Seoul—Seoul National University, Yonsei University and Sejong University. On a national scale, only 50 doctors of Seismology are now working to manage problems on earthquakes. Compared to other countries, Korea's level in the earthquake research is low. The first generation of earthquake research focused only on building seismological observatories, paving the way for the current second generation. Nonetheless, the second generation has a long road ahead. Korea has no infrastructure yet to research the outer and inner core of the earth. However, I see our future in researching earthquakes as promising because the speed of development is really fast. In ten years, our nation will rank with other highly developed countries in the field of Seismology.

Q: It seems that Korea needs a lot of brilliant students in Seismology. However, many students are apt to avoid this field because they assume it is far from earning money. Instead, they choose to go to medical schools. What message do you want to send to them?

A: I feel sorry whenever I recognize that so few students choose to study earth science and Seismology. I don't understand why students think the range of application of Seismology is small. It is not only researching earthquakes, but also exploring natural resources, analyzing soil, monitoring nuclear tests, and so on. Moreover, as few seismologists exist in Korea

there are a lot of work in informing the public. So, I would like to advise students to study Seismology without worrying about their future.

Q: Are there any common misunderstandings about earthquakes that you want to correct?

A: First, people think that the larger scale of the earthquake is, the greater the damages. But it's not true. The aspect that determines damages is the earthquake's location. Shallow earthquakes and earthquakes occurring in cities cause tremendous loss, even though their scales are not that huge. Moreover, people have confused "scale" with "seismic intensity." The former indicates the degree of damages to people and the latter is a measurement of the earthquake's energy. I wish people distinguish between these words and use them correctly.

Q: What is your target as a seismologist?

A: My goal is to expand the sphere of Seismology. As I said before, Seismology can be applied to many fields. For example, we could have figured out the cause of the sinking of the *Cheonan* much earlier if we had used a seismological observatory. Among possible causes of the incident, there was an explosion in the water, wreck by a rock, and a breakdown due to being old. We can find an answer by simply checking out seismic waves. P and S seismic waves appear on the land, and only P waves appear in the water. So if the ship was attacked by a bomb in the water, the equipment would record P waves. If the ship was destroyed by a rock, it would record both P and S waves, because a rock is attached to the land. Lastly, if the ship broke down by itself, it would not record any waves. Therefore, if the government had checked the seismological observatory installed in *Baengnyeong* Island, the cause would have clearly been revealed. I want to make people aware that Seismology is closely connected to our real lives. Besides, it seems that people do not know much about earthquakes. I'd like to change this by doing various activities—writing books or appearing on television. **Sh**

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