Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

G02-P01 Room:Convention Hall Time:May 21 16:40-17:15

A Melody of the 2005 Fukuoka Earthquake using the many ground motion records

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In this study, the melody was made from many ground motion records to understand about the shake of an earthquake. Although the trials which carry out to make from ground motion record to sound are Hirai and Fukuwa (2011) and Sakajiri (2011) for example, a making of melody trials from the records are only our previous studies.

This report is differ from Yamada (2010), it can try to make the one melody from one earthquake using the many motion records obtained at the observations, and can express a spread of the ground motion in sensuously.

Keywords: groud motion records, melody, science education

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G02-P02 Room:Convention Hall Time:May 21 16:40-17:15

Gravity measurements in Antarctica with pendulums and ticker-tape timers

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In high school physics classes, the value of gravitational acceleration (or gravity) is taught as about 9.8 m/sˆ2, which is often observed with simple experiments using pendulums and ticker-tape timers. In reality, however, the gravity value differs depending on place and time; for example, the gravity difference becomes about 0.5 % between equator and pole on the Earth. Although geodesists measure the minute gravity differences with high-accuracy gravity meters such as absolute gravimeters, it must be important for high school students to measure the gravity difference with the simple equipment such as pendulums and ticker-tape timers, in order to get students interested in gravity and physics.

We were thus motivated to measure the gravity value with a pendulum at Syowa Station in Antarctica, where we visited as the 53rd Japan Antarctic Research Expedition (JARE-53). We chose Syowa Station as the location to measure the gravity, because [1] Syowa Station is located at 69 degrees south latitude, close to the South Pole, and [2] an absolute gravimeter, installed at the gravimeter room in Syowa Station by JARE-53, observed the gravity value to an accuracy of more than eight orders. We first put a cylindrical brass (weight: about 750 g) to the lower end of a stainless steel wire (length: about 3 m), which was hanging from the ceiling of the gravimeter room. We then oscillated the brass with the amplitude of about 15 cm, and recorded the brass oscillation on video. And finally, we estimated the average oscillation period with movie analyses, and calculated the gravity value using a formula for the oscillation period of a single pendulum.

As a result, the gravity value with the above pendulum experiment at Syowa Station was estimated as 9.8462 m/sˆ2, which deviated by about 0.2 % from the gravity value observed with the absolute gravimeter (9.8252432 m/sˆ2). The causes of the gravity deviation possibly lie in [1] the measurement error of the oscillation period, [2] the measurement error of the pendulum length, and/or [3] the effect of air resistance and supporting point’s friction. We will evaluate the accuracy of the gravity value estimated by the pendulum experiment, with quantitatively discussing the causes of the gravity deviation.

In addition, we will regularly measure the gravity values with ticker-tape timers on the ice-breaker ship Shirase on the way back to Japan from Antarctica, although we are still at Syowa Station on February 10th 2012. Furthermore, we will measure the gravity value with the same pendulum as we measured the gravity in Antarctica, to discuss the difference of the gravity value between Japan and Antarctica.

Keywords: Gravitational acceleration, Antarctica, Pendulum, Ticker-tape timer, Absolute gravimeter, Syowa Station

Japan Geoscience Union Meeting 2012
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G02-P03 Room:Convention Hall Time:May 21 16:40-17:15

3-D display of subducting plates and earthquakes - Subducting two oceanic plates and unique seismicity beneath Kanto

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Recent dense seismic network data have contributed to deepen our understanding of 3-D inhomogeneous structure within the earth and of seismic activity occurring there. For example, investigations based on seismic tomography, hypocenter determinations and focal mechanism analyses have revealed precise configurations of the Pacific (PAC) and Philippine Sea (PHS) plates subducting beneath the Tokyo metropolitan area. Estimated geometry shows a broad contact area between the two plates located directly beneath the Kanto plain. The overlap with the PHS plate subducting above it hinders the PAC plate from being heated by the hot mantle wedge. Moreover, the fore-arc portion of the PHS plate, before its subduction beneath Kanto, had been cooled by the subduction of the PAC plate from the Izu-Bonin trench. These tectonic settings cause lower-temperature conditions within the two oceanic plates and the upper continental plates beneath the Tokyo metropolitan area. As a result, depth limits of seismic activities within the plates and along their boundaries are anomalously deep. Seismic tomography studies show that the eastern-most portion of the PHS slab mantle is serpentinized. The PHS slab may have been torn into two along the western boundary of this serpentinized mantle, with the eastern portion being left behind relative to the subduction of the western portion. This is accompanied by generation of large intraslab earthquakes along the boundary.

3-D display of obtained results, such as detailed configuration of subducting plates, seismic velocity structure and their relations to earthquake activity, is essential to be properly understood by other people or even for ourselves to more deeply understand. It also helps to spread scientific knowledge. Based on this idea, we are trying to develop a method of 3-D display of those images. Here we tried to visualize a three dimensional subducting plates and earthquake hypocenters by using one of the 3-D visualization softwares (Voxler 2; Golden Software), which we will report in this presentation.

Keywords: 3-D display, plate subduction, seismic activity, Tokyo metropolitan area

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G02-P04 Room:Convention Hall Time:May 21 16:40-17:15

Reaction of junior and senior high-school teachers to an earthquake rumor -Investigation in Yamagata prefecture-

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We examine reaction of the junior and senior high-school teachers to the rumor of 2008 earthquake in Yamagata prefecture. Reactions are classified by some parameters such as school grades and teachers generation. The science teachers investigated scientific evidence of the rumor with an internet. In addition, only a few percentages of the teachers mentioned that information literacy for the students and information sharing among teachers were required. Therefore, this implies that they should be improved for the teachers.

Keywords: rumor of earthquake, teachers, information literacy

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G02-P05 Room:Convention Hall Time:May 21 16:40-17:15

An implementation report of the 2011 Geology Day event entitled :The secret of the giant tsunami traces and Oyster reef

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During middle August 2011, we carried out large trench survey in order to evaluate unusual tsunami impacts to the past oyster reef fossils reported by Matsushima (1984) in the lakeside swamp of Lake Pashukuru between Kushiro City and Shiranuka Town in eastern Hokkaido. Related this survey, we planed the dissemination activities as the event ”Geology Day in 2011” on August 11 and 12 due to recognize local geology and geomorphology for residents and teachers in this area. In this poster presentation, we want to report of planning and implementation about our event entitled :The secret of the giant tsunami traces and Jomon Oyster-reef around Lake Pashukuru.

Keywords: Geo-tour, Geology Day, Lake Pashukuru, Kushiro City, Shiranuka Town, 100 Geosites in Hokkaido

Japan Geoscience Union Meeting 2012
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G02-P06 Room:Convention Hall Time:May 21 16:40-17:15

A simple simulator, Licky, for liquefaction in the Great East Japan Earthquake

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In this paper we introduce a liquefaction simulator using the sand collected from the points of liquefaction damage by the Great East Japan Earthquake for science education.

Keywords: liquefaction, Licky, great east Japan earthquake

Japan Geoscience Union Meeting 2012
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G02-P07 Room:Convention Hall Time:May 21 16:40-17:15

Exhibition and education of a museum activity using paleoarts and advertising characters

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The Mizunami Fossil Museum opened in 1974 is a fossil-specific museum in Japan. Although its fossil collections are variable to study and educate, The Mizunami Fossil Museum opened in 1974 is a fossil-specific museum in Japan. Although its fossil collections are variable to study and educate, most information with the fossils have not been changed for 30 years. For example, a reconstructed model of the skeletons of *Desmostylus* that are the main exhibit was made when this museum opened, but now it is not supported by recent studies. In addition, the educational activities of the museum have been older-fashioned than those of others, which causes a problem such that many visitors mistake the *Desmostylus* for a dinosaur and lose interest in the same exhibition every year.

Recently, we have been performing the visual effects and PR activities to visitors by using paleontological arts (paleoarts) and advertising characters. We aim for these contents at conveying scientific knowledge to visitors correctly and intelligibly, and making a traffic line to our museum. Here, we explain the work process of these contents with reporting the effect that the museum acquired from them.

1.Paleoarts

We used reconstructed illustrations and a model based on the newest scientific knowledge at the 74th (2010) and 75th (2011) special exhibitions. Five illustrations of extinct animals including *Gomphotherium annectens* (Mammalia, Proboscidea) from the early Miocene Mizunami Group and illustrations and a model of Plotopteridae (Aves, Pelecaniformes) from the Oligocene Ashiya Group were made in the 74th and 75th, respectively. These illustrations and model were made on the basis of scientific data from paleontological journals, information of recent materials, and private communications to each specialist. During the process of making them, paleontologists provided paleoartists with variable comments and information from literatures, and the paleoartists kept making logs.

Over 90% of visitors and scientists regarded these activities as good, surveying by questionnaires about the exhibition in 2010. Therefore, we have been realized cooperating between scientists and artists, and educating for citizen, which are pointed by Tokugawa *et al*., (2010).

2.Advertising characters and animation to explains exhibition

We made the advertising girl character, Mio Mizunami, illustrated by cartoonist, Shota Kawamura (P. N. ringo), for the museum. We used the character for PR activities such as explanation of fossils and deployment of movie. Because she is the character of a paleontological museum, we gave her accessories carrying out the motif of the fossils from the Mizunami Group. The main purposes of making her are to rise the name recognition of the museum and educate paleontology to young visitors.

The animation she appears in was released in 2011 by our paleontologist and artist team. The contents of the animation are explaining the exhibition of the museum and collection method of fossils. This animation was made for schoolchildren but contains the newest information about Desmostylus (Inuzuka, 1984, Inuzuka *et al*., 1994), which adults can also enjoy. We employed a voice actress for Mio and adopted two local junior high school students for Desmo that is another character in the animation for the purpose of relation with social education.

As a result of using paleoarts and advertising characters, the concern about the museum of visitors and mass media became high. Especially the number of media coverage is 26 affairs in 2011. This is four times more against 2010 works. Therefore, we conclude that these contents are useful for the cognition and spread of a museum, fossils, and paleontology, and they are the effective means for gaining visitors.

Referrences Inuzuka, 1984, *Mono. Assoc. Geol. coll. Japan*, 28, 101-118. Inuzuka, *et al*., 1994, *The Island Arc*, 3, 522-537. Tokugawa *et al*., 2010, *Abst. Prog. 159th regul. meet. Palaeo.Soc. Japan*, p. 46.

Keywords: museum, paleontology, paleoart, advertising character, education

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Report for Science Cafe focused in Earth and Planetary Sciences

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The area of study covered by Earth and planetary science includes Geology, Seismology, Climatology, Astrobiology and so on. Therefore, Earth and planetary science is one of the most famous academic disciplines in general.

However, it is difficult to say that the attractions, essences and familiar examples of earth and planetary science have become widespread into public well. In addition, there are only a few opportunities for general people to meet and talk with scientists directly. We propose that science communication is a better way to know and understand about earth and planetary sciences for public. Science communication is a means for communications between academic communities and public on an equal basis. Many activities of science communication are run today, but almost all of the activity aims to enlighten people who are usually not interested in science about the interest of science. That is very important, but not enough because the interests for sciences or scientific knowledge are different from understanding science and being able to contribute to society.

We established the concept presented in last JpGU (Chiba et al., 2011) and have been pursuing it in last year. Science cafe focused in earth and planetary sciences were held in three times at Jiyu-gaoka and Odaiba. The themes were seismology, planetary science and cosmoclimatology. In this presentation, we provide the characteristics and problems with the comparison of three science cafes and suggest how outreach activity for earth and planetary sciences be promoted from the viewpoint of science cafe.

Keywords: Earth and Planetary Sciences, Science Communication, Science Cafe, Science Bar

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Cross sections of stratovolcanoes drawned by sixth grader

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Experiment on Polygenetic stratovolcano using waste food oils and colored sands was demonstrated to sixth grader in country school at Yohohama. The cross sections of stratovolcano were drawn by children, before experiment and after experiment. These pictures were divided into 4 types by inner stratigraphy. Textbook type was consisted by piled similar triangles. Parallel type was consisted by horizontal lines. Revers type was consisted by V shaped lines. Experiment type was consisted by gradual change from lower horizontal lines to upper triangle, that was found in this experimental stratovolcanoes. Before experiment, imagination sectional views were divided into 3 types; text type (42%), parallel type (50%) and reverse type (8%). After experiment, the greatest change was that simple liner lines were reduced and complicated curves were increased in the cross sections (84%). But drawing details of real cross sections was thought to be difficult for sixth grader, experimental type was 21%. Parallel type was still 56%, but text type was reduced to 23%. The reason why parallel type was still remained was thought to be that almost of the example pictures of stratum were parallel in textbook of grade-school. Therefore school-graders tended to catch the image of the parallel layers in the lower part of the experimental storatovolcano.

Keywords: sixth grader, strata, stratovolcano

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Technical problems related with the educational promotion of the geology

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It is commonly discussed the difficulties on promoting the geologic results for the students as well as citizens. The one of the most serious problems in the outreach of geology is that no one can understand the geological map except for the expert on geology, that is, the geologists. It is probably regarded that the two-dimension geological map is the horizontal section of the three-dimension geological body. But in reality, the geological map also includes the information of time, such as geologic age. Therefore, the geological map is a two-dimension expression of four-dimensional information. Moreover, the boundary line between geological units will often show much complicated curve, because boundary line on the geological map is an intersection between plane or curved geological boundary and curved surface of the topography. These difficulties should be solved in the geological outreach more readily.

Keywords: outreach, earth science, geology, educational promotion

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The report of the International Earth Science Olympiad (IESO), past and future.

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We will report the outlines of the International Earth Science Olympiad (IESO).from 2007 and next 5 years to 2016.
1) From 2007 to 2010
IESO 2007 (Korea) 7 countries and 24 students, Japan was observer
IESO 2008 (Philippine) 6 countries and 24 students, 3 silver and 1 bronze
IESO 2009 (Taiwan) 14 countries and 50 students, 4 silver
IESO 2010 (Indonesia) 17 countries and 63 students, 1 gold and 3 silver
2) IESO 2011 (Italy)
Application Sep.1 to Nov.15, 2010
1st Selection Dec.19, 2010 (869 students. 50 places)
2nd Selection March 24-26, 2010 at Tsukuba City. (cancelled by 3.11)
2nd Selection June 4-5, 2010 at Tokyo Univ.
(From 27 students, 4 special excellent and 4 excellent students were selected.)
Training 8 students ; June -Aug. (correspondence course) 4 students; Aug. (4 days)
5th International Earth Science Olympiad Sep.5-14, 2011
Results ; 1 gold medal and 3 silver medals
Formal visit to the Ministry of Education, Culture, Sports, Science and Technology.
3) IESO 2012 (Argentina)
Application Sep.1 to Nov.15, 2011
1st Selection Dec.18, 2011 (924 students. 52 places)
2nd Selection March 25-27, 2012
(From 30 students, 4 special excellent and 4 excellent students will be selected.)
6th International Earth Science Olympiad Oct.8-18, 2012
4) IESO 2013 (India)
IESO 2014 (U.S.A.)
IESO 2015 (Russia)
IESO 2016 (Japan)?

Keywords: IESO, International Earth Science Olympiad