

G03-01

Room:106

Time:May 24 09:00-09:15

Miss terminology in astro-space science

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There are some inadequate spellings of foreign names in Japanese. "hare-susei" and "korian-no-chikara" are wrong examples in science, and "harii-susei" and "korianu-no-chikara" are correct.

The law was changed last year to charge for the wrong expression of names in all kinds of items and services. In order to keep compliance, academic communities should pay attention to terminology.

Keywords: terminology, astronomy

G03-02

Room:106

Time:May 24 09:15-09:30

A suggestion to revise high-school geography in Japan to introduce essence of geosciences

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This talk briefly introduces some misunderstanding of geology and geomorphology by high school teachers of geography in Japan. Then, revised explanations of some keywords are discussed from the viewpoint of geosciences.

Keywords: textbook on geography for high schools, plate tectonics, orogeny, large-scale landforms, geological resources, Scientific literacy

Customizing Disaster Education Material to the Local Risks

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After the Great East Japan Earthquake, the importance of education on disaster prevention at schools is widely recognized, but most of the schools remain the ineffective earthquake drills without improving or reorganizing their disaster prevention classes. We therefore conducted questionnaire survey to schoolteachers on what causes difficulties in disaster education, and made an education material based on the survey result. We then investigated another survey to see if students show any change before and after the class for confirming the material.

Teachers are asked to evaluate the difficulties of disaster classes in the following 13 items on a five-point scale from "strongly yes" to "no, not at all". The items are; 1) don't know how to teach, 2) don't have worksheets, 3) don't have enough time, 4) don't have enough budget, 5) don't know the risks of the location, 6) don't have the reality to get damaged, 7) have trouble in preparation, 8) don't feel the necessity, 9) don't get colleagues' understanding, 10) don't get parents' understanding, 11) don't get community's understanding, 12) have problem in students' awareness, 13) current drill is enough effective, 14) others. Above the 13 items, 1), 3), 4), 5), 6), 7) and 12) shows high rates while 8) and 13) rarely counts. This implies that schoolteachers do understand the importance of disaster education but they feel difficulties in the above 7 items to carry out the class.

The education material we made based on the survey covers the local risk and designed for students to positively join in the class, yet can be carried out in 50 minutes. We referred to the earthquake scenario released by the local government and asked students to have group discussion on how to distribute aid supplies if there are more evacuees at the site.

In the class, students had active discussion and each group gave a unique suggestion on the topic. The interview after the class shows how they are motivated by their own such as "We need to imagine various situation and be prepared in many ways. I would keep what we learned in my mind and make this class of use" or "I had ever thought of what to do at the moment of an earthquake but never for the afterwards. It was a good opportunity to think of the role of myself at the evacuation site". Students seem to had reality that a disaster may occur at their place and also they can be of important help at the evacuation site.

We investigated another questionnaire survey to students two months later if they discussed disaster situation with their families or friends. In the presentation, we refer to the follow-up investigation and propose an effective disaster class that can be easily carried out by schoolteachers.

Keywords: earthquake, disaster prevention, middle school, education, disaster

ASEAN-Japan BUILD-UP Cooperative Education Program for Global Human Resources Development in Earth Resources Engineering

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This report introduces the project of ASEAN-Japan BUILD-UP Cooperative Education Program for Global Human Resources Development in Earth Resources Engineering (Adopted year was 2012 by Kyushu Univ. Project leader is Prof. Koichiro Watanabe).

The project aims to create global human resources combining (i) proactive spirit, (ii) deep insight and expertise, as well as (iii) practical communication skills and mutual cross-cultural understanding. The BUILD-UP Cooperative Education Program is jointly developed and run under the quality assurance of Kyushu University and Waseda University in cooperation with ASEAN universities.

Three stepwise programs with assured quality are provided for undergraduates and graduates as future global human resources: (i) "International Internship" to obtain practical experiences, (ii) "School on the Move (SOM)" to promote students exchange, and (iii) "Double Degree" to train highly experienced- and leading-researchers and engineers.

In particular, about SOM, Master's course students domestic and abroad are exchanged 3 times in a year. Each subject has 10 days program and three other countries. The cooperation universities will be a host, and everything plans a lecture and a field, and is performed in the English society. Students are separated into Mining/Mineral Processing, Geology/Geophysics, Geothermal and Petroleum, and a field is also divisible into the majors, and performed specialty.

After attendance at the SOM 2014 Thailand and the SOM 2015 Cambodia, The educational effect of this program and a problem of each scenes are introduced in this report.

Participating Universities:

Kyushu University

Waseda University

Chulalongkorn University (Thailand)

Institute of Technology, Bandung (Indonesia)

Gadjah Mada University (Indonesia)

University of the Philippines (Philippines)

University Sains Malaysia (Malaysia)

Ho Chi Minh City University of Technology (Vietnam)

Institute of Technology of Cambodia (Cambodia)

Hokkaido University (Cooperation University for this program)

Keywords: Education Program in Earth Resources Engineering, Global Human Resources Development, International Master's Course Students Exchange, ASEAN-Japan

Planning and Development of Science Communication Tool on Astrobiology

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In August 2013, during the summer school we opened a workshop named "Let's make playing cards on astrobiology" for graduate students and specialists on the origin of life and astrobiology. There are two main goals for this workshop.

Number 1, strengthening interaction between summer school participants.

Number 2, as a part of science communication training, astrobiology specialists can practice communication skills using simple science terms and illustrations while making the astrobiology cards. The players were presumed to be high school students that they would like to encourage interest in astrobiology while they are visiting university campus opening day. Twenty eight participants, students and specialists were divided into four groups. Then each group made reading cards, face cards and gave short explanations on cards which included at least one key word about astrobiology. After this step was completed, each group introduced the contents of playing cards and discussed how to utilize the cards.

Later on, the cards were improved by the production team, a group of volunteers refinishing the playing cards on origin of life. The main target was for children, but we also included intermediate contents for high school students and professionals, so they could also enjoy playing. Each card contains one key word. A simple question is under the picture to tie with the key words. More information and explanations are offered on the reverse side of the card. Illustrations and diagrams are added to keep the information easy.

The card set "Playing Cards on Origin of Life" was completed in April 2014, and an event for elementary school students was held in May. Later in 2014, additional events were held for graduate students and specialists in the field of astrobiology and life sciences. Both children and adults registered high satisfaction.

This playing cards set idea is originated from summer workshop's 26 participant's draft on evolution, life sciences and astrobiology. The cards were later revised and improved. Special thanks to all participants.

Keywords: Astrobiology, Science Communication, Origins of Life, Educational Tool, Karuta; Traditional Japanese playing cards

Outreach Activities with the use of KARUTA on UZUME Project (Unprecedented Zipangu Underworld of the Moon Exploration)

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¹Miraikan, ²Mukainooka Technical High School, ³Illustrator, ⁴JAXA, ⁵Knospear

In 2009, the science team of Japanese Lunar explore SELENE (SELenological and Engineering Explore) called KAGUYA, discovered three big holes on the Moon; never before discovered. The diameter of these holes range from 50 to 100 m in scale.

These are assumed to be spreading laterally at the bottom of these holes.

These holes are considered to be left over lava tubes similar to those seen around Mt. Fuji, Seju island and Hawaii.

Currently planned exploration of lunar and planetary subsurface caverns, UZUME project (Unprecedented Zipangu Underworld of the Moon Exploration) is to explore planetary holes and subsurface caverns on Moon and Mars.

In particular, we are thinking to bring exploration for life signs, as well as geological survey, geomorphic investigation and environmental survey as might be necessary for a future lunar base.

We are working towards using Japanese advanced robotic technology to move quickly ahead of other countries.

Then we, UZUME's team considered that outreach is an important method to accomplish the exploration. In order to encourage support from the general public and to make them understand significance of exploration.

It is important to offer a simple exploration and to get them interested enough for the general public to actively participate.

Looking for opportunities and chances to motivate the public to support this research project, the team determined that a majority of the public would not pay much attention at the beginning because people are busy, there's no effect on their affairs or their daily life, and many people would find science interesting

We thought it is necessary to include elements of excitement intentionally, for example, interesting parts of exploration, exciting things, and motivation for wanting to help.

So, we developed a set of playing cards (Japanese Karuta games) on UZUME as a tool to introduce our exploration projects. We considered that playing cards could be one of the most effective tool for the children and adults who have no knowledge about space developments as well as UZUME projects.

We consider Japanese karuta games as an ultimate science communication tool which has short and compressed topics about features of research. And it also has a functional role in base science illustration using simple pictures or photos/figures suitable for the reading cards (cards with words).

The prototype UZUME karuta was completed in October 2014. Then we exhibited it and used it for play during children's science festival in Kanagawa prefecture in 2014 and 2015. According to the questionnaire results, users' satisfaction was high and many people showed interest for underworld exploration of the Moon.

We felt that our goal was largely achieved.

Including the future promotion and dissemination of karuta, we would like to continue to develop a new outreach program together with the use of UZUME Karuta.

In the future, our plan will be to popularize not only karuta, but also developing new outreach program.

Keywords: Lunar and Planetary Subsurface Caverns, UZUME, Citizen Participation, Science Communication, Outreach, KARUTA

Public Outreach Activities on the Earth and Planetary Sciences using Dagik Earth

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¹Kyoto University, ²NICT

Public outreach activities on the Earth and Planetary sciences using Dagik Earth, a digital globe project, will be introduced. The 3-dimensional presentation of the Earth and planets is the best way to show phenomena and data of the Earth and planets in the global scale with exact shape. There are several projects of the 3-D digital globe to show the Earth and Planetary science data, such as Geo-Cosmos of Miraikan, Japan (2001), and Science On a Sphere of NOAA, USA (2002). These presentations are large in size and cost, and difficult to use in classrooms and public outreach programs. Dagik Earth is a simple, portable and affordable 3-D presentation system of digital globe. It has been developed since 2007 by a group led by Kyoto University. The software is available with free of charge for the scientific and educational usage. It uses a spherical or hemispherical screen to project data using normal PC and PC projector. The minimum size is 8cm and the largest size is 16m in diameter. In the presentation, the public outreach activities on the Earth and Planetary Sciences using Dagik Earth will be introduced.

Keywords: Digital Globe, 3D, Public Outreach, Classroom, Exhibition, Open campus

Music Improvization with Aurora

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Some music has been adopted natural phenomena as sources of inspiration since the dawn time of the civilization; "The Planets" by G. Holst is a famous piece of example based on astronomical phenomena. This type of music is composed by a human being after all, and not directly based on physical data from the space.

On the other hand, attempts have been made to translate astronomical phenomena into music. Johannes Kepler invented a series of tunes titled "music of the spheres"; each tune corresponds to the orbit of each planet. In the past few decades, there come a number of projects that transforms astronomical data into musical sounds, thanks to the development of computer technology. However, these music tunes are prone to end up with some mechanical abstractions because they were made automatically from some transform rules, and no or little human factor play a role there.

In our project, we try to provide music by human improvisation in response to physical data of aurora, such as magnetic field or visible light. A skilled jazz musician can play high artistic music instantly in response to outer stimulation, which may be based on auroral data. The outline of the coming project will be presented at the meeting.

Keywords: aurora, music, improvisation

G03-09

Room:106

Time:May 24 11:15-11:30

Concert with stone-made musical instruments: college contribution to local community

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Contribution to local community has worked as more important role of university in recent years. Chiba Institute of Science is a small-scaled private college located in rural area, central Japan. The institute focuses strongly on cooperation to local community, providing a large variety of educational and industrial activities. However, less outreach program on earth and planetary science has been done for senior adults.

Professional percussionist performed a concert with stone-made musical instruments, in January 2014. This concert aimed to be intimate to geomorphology and geology for senior adults. Questionnaire research showed good authentication by totally 55 participants, while a need for improved advertisement. We report practical results and participant's evaluation of two concerts held in January 2014 and March 2015.

Keywords: contribution to local community, lifelong learning, outreach, Sanukite, concert

Cross-Cutting Comparisons (C3) - web service for making interactive quick look charts -

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¹Japan Aerospace Exploration Agency, ²Research Institute for Sustainable Humanosphere, Kyoto University

Although various observations to fully understand phenomena on the Earth have been carried out from ground based facilities or satellites, there is as yet no archive system to deal with entire geoscience datasets. Therefore we have started the establishment of a new web service for this purpose (Cross-Cutting Comparisons; C3). C3 provides a simple means to make interactive charts of various geoscience data, a part of which has already been publicly released from the Data Archives and Transmission System (DARTS) at ISAS/JAXA (<https://darts.isas.jaxa.jp/C3/>). C3 is not only intended for promoting the cross-cutting research but also for education purposes. In this presentation we discuss the developmental status and future plans for C3.

Keywords: Education, Web service, Observation data, Cross-cutting comparisons, Solar-terrestrial environment, Earth system science

Customizable Educational Materials on Disaster Prevention -Differences between Cross-road and four-frame Cartoon

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After the Great East Japan Earthquake, a need for "BOSAI" education as a part of curriculum has been widely recognized. BOSAI can be translated as disaster prevention based on individual awareness of disaster risks and leading to personal empowerment to take preventive action. Contents of BOSAI class should vary depending on the location of each school as it has difference in disaster risks. Under present circumstances, however, it may be hard for schoolteachers to make suitable materials by their own.

At the time of disaster, people have to make the best decision as quick as possible with insufficient information, and most of the time there is no formulaic answer. This makes BOSAI class more difficult for schoolteachers. We therefor developed an educational material of "four-frame cartoon" suitable for pre-training the dilemma problems.

There already released "Crossroad" and "TOSSANO HITOKOTO" as BOSAI education materials to let people experience the severe situation of disaster in advance. In the presentation, we will refer to these three materials' features, difference and common points. We will also show how to choose a suitable material above the three depending on the disaster situations. For instance, these educational materials are similar in sharing the risks in advance of a disaster and let people simulate the severe situation, but they differ from each others in how to express players' answers or in customizability of target people or risks. Our compiling these materials will enable schoolteachers to choose the appropriate educational materials without worries or confusion and to think about the risks of their school situation together with their students.

Particularly, Crossroad and four-frame Cartoon are closely similar in dealing with dilemma problems, while they differs in the players' expression of final decisions such that Crossroad is an alternative judgment game of Yes or No and four-frame Cartoon requires explanation of the decision to fill the balloon of the cartoon. We therefore tried to make four-frame Cartoons by applying the stories of Crossroad assuming that their differences concentrate in the form of description such as in "text" or "cartoon". We, after all, found that not all stories of Crossroad could be remade into four-frame Cartoon. This is because the main point of Crossroad is to make a decision and that of four-frame Cartoon is to share the reason for the decision or to convince others of your decision.

Each feature of the two materials covers a sequence of situation people face at the time of disaster; first to make decisions and then to convince others. For example, you would have to think about how to distribute aid supplies that is not enough for all refugees at an evacuation site. This part is corresponding to decision. Then you would have to explain the background or reason of your decision to the refugees, corresponding to convincing others. By using both Crossroad and four-frame Cartoon, players can experience a sequence of dilemma situations to make decision and to convince others.

In the presentation, we will refer to the necessity for schoolteachers and students of dealing with dilemma problems and how we could approach such situation as a BOSAI education. We will also show how to make four-frame Cartoons by using the contents of "Disaster Management" produced by Cabinet Office as examples.

Keywords: earthquake, disaster prevention, education, disaster, education material

G03-12

Room:106

Time:May 24 12:00-12:15

What are the methods to outreach of geography for general readers

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We want to research the best travel guidebooks with geographical perspective for general readers.

Analog model of basement structure below the Nobi Plain

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¹National Institute of Advanced Industrial Science and Technology

It is commonly discussed the difficulties on promoting the geologic results for the students as well as citizens. To solve this problem, I made three-dimensional analog model of basement structure below the Nobi Plain. The horizontal scale of model is 1/200,000 but vertical scale is emphasized as 400%. Because the model was painted by gradations in color from yellow (Shallow) to dark blue (deep), it can be easily recognized the contrast between subsurface steep precipice and gentle slope of basement structure. Among them, some active faults are characterized by sharp drop of basement depth below the Nobi Plain. Thus the analog model of basement structure below sedimentary basin would be helpful to understand why long-period ground motion is amplified in the sedimentary plain.

Keywords: outreach, earth science, geology, educational promotion

Fieldwork training for Environmental Literacy using Geo-tours at the right bank of Arakawa River

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The right bank of Arakawa River remains exuberant natural environment. We regard the right bank of Arakawa River around Kumagaya campus of Rissho University as a natural experimental laboratory. For purpose of fieldwork training Environmental Literacy, we prepared five Geo-tour courses on area of the right bank of Arakawa River.

As a result, we obtained affirmative educational effect from student questionnaire survey about five Geo-tour courses.

Keywords: Familiar Natural Environment, Environmental Literacy, Geo-tour, Fieldwork

Report of the 15-th children's summer school on earthquakes and volcanoes

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¹Japan Meteorological Agency, ²Geological Survey of Japan, AIST, ³Seismological Society of Japan

The children's summer school on earthquakes and volcanoes (<http://www.kodomoss.jp/>) started in 1999. It is managed by the Seismological Society of Japan(SSJ), the Volcanological Society of Japan(SSJ) and the Geological Society of Japan(GSJ) as one of the important outreach activities. All of the past activities of the children's summer school are reported on "Naifuru", which is the public relations magazine of SSJ (http://www.zisin.jp/modules/pico/index.php?content_id=2666). The detailed purpose of the school is written in Sato et al.(2014).

The 15-th children's summer school on earthquakes and volcanoes was held in the Unzen volcanic area global geopark in Nagasaki Prefecture from August 2nd to August 3rd in 2014. Unfortunately, the weather was not good at that time because a typhoon came close to the area. But 21 children, who are from elementary schools, junior high schools and high schools, joined the school and tried to solve "the secret of Kyushu hidden in the Shimabara Peninsula", which was a theme of the 15-th children's summer school. We will report this activity in the presentation.

Keywords: earthquake, volcano, child, summer school, outreach activity

G03-P04

Room:Convention Hall

Time:May 24 18:15-19:30

Outreach programs using several groups of meteorites

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¹Okayama University

We introduce outreach programs using several groups of meteorites at Okayama university.

Keywords: meteorites, outreach

G03-P05

Room:Convention Hall

Time:May 24 18:15-19:30

Development of simple seismometer made with materials of 100 Yen Shop

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We developed simple seismometer made with materials of "100 Yen hop" for outreach. Recently, neodymium magnets can be purchased from the 100 Yen shop. It is difficult to purchase nichrome or copper wires to make a coil, but one option could be to use the coil in an alarm clock. We used PC or smartphone for monitoring the wave signal. With an application for oscilloscope (e.g., "Sound Oscilloscope"), we can see the wave signal to the microphone input of the smartphone. We report the details of procedure for making the simple seismometer.

Keywords: seismometer, educational material, 100 Yen Shop, smartphone, outreach

Investigation of damage trace of the 2005 Fukuoka Earthquake -Part 3-

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After the disaster of 2011, the existence such as the monuments which ticked away the teaching of the ancestor who conveyed a disaster was performed a close-up of in each place. The history of the past valuable teaching and disasters such as monuments might be forgotten with time. Therefore, it is an opportunity to raise disaster prevention awareness to convey history of disaster and a disaster sign.

We investigated the damage trace of the earthquake of the Fukuoka northwest offing in 2005. In this study, we surveyed in twenty-one sites, we was able to confirm the damage trace of the earthquake concerned in ten sites. And we made the map which could take a walk through these damage traces.

Keywords: the 2005 Fukuoka Earthquake, damage trace

Difference between "recognition" and "discussion-promotiv" type science cafes for the earth science and its significance

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Earth and planetary science cover various fields of science and technology so that it is clear that earth and planetary science is one of the most important fields of academic area for the our society. However, public have few opportunities to be consciously exposed to the field. Therefore, it is important that we make the chance can make the public feel interested in the field. Some outreach activities and science events have been performed and held to solve this problem in this decade. As a result, interactive communication of this field between scientists and the public has been considered to be important way. Of course, it certainly doesn't apply only to the field, and interactive communication events about various science area is increasing from its interest. The communication which is mediated with scientific knowledge and perspectives is called as "science communication".

The science event using science communication facilitates participation and communication of participants by lowering the entry levels and talking about technical terms as familiar information for public. We established "Universal Earth" as science communication group in the earth and planetary sciences field and have performed science events so far. As a result, the issues which have the aspects of scientific and social topics have come to light through. And also we have considered that the science communication is consisted of three phases at least and the necessity of capturing the communication for each stage. The first is "recognition of the topic", the second is "discussion in the topic", and the third is "combination of the scientists and the public mediated by the two-way communications". We have focused and practiced for the second and the third ones noted above with holding science cafes and symposiums, but not for the first one.

In this presentation, we will report the results of two "discussion-promotive type" science cafes held in 2014. In addition, we consider and infer about the suitable way(s) of the science cafes and science communication for the earth and planetary sciences.

Keywords: science cafe, interactive communication, earth and planetary science, outreach, discussion