Analog model of the Alluvium incised-valley topography under central Tokyo, Japan

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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 central Tokyo. The horizontal scale of model is 1/10,000 and vertical scale is emphasized as 1/500. The model was painted by gradations in color from yellow (Shallow) to dark blue (deep), so that it can be easily recognized the contrast between subsurface steep precipice and gentle slope of basement structure. The analog model of basement structure below central Tokyo would be helpful to understand the topography of Tokyo midtown.

Keywords: outreach, earth science, geology, educational promotion

Understanding landforms in 3D by hand-crafted cardboard model using high-definition 3D point cloud data

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Acquisition of three-dimensional high-definition topographic data by advanced techniques, including terrestrial laser scanning (TLS) and structure-from-motion multi-view stereo (SfM-MVS) photogrammetry using low-altitude aerial photographs from a small unmanned aerial vehicle (UAS), has recently been attracting attention in the field of earth and planetary science. Among these, UAS has become widely known in general through various news such as industrial applications and accidents in various places, and laser scanning and photogrammetry have also become socially well known as a core technology in the automatic driving of automobiles. However, as the present situation, the utilization of these technologies in the earth and planetary sciences has not fully been known in general. This is probably due to the fact that advanced research on earth and planetary sciences using high-definition topographical data is being promoted, but more general utilization of such the data as educational or learning materials has been limited so far.
Along with the development of three-dimensional printers, virtual reality (VR), and augmented reality (AR) technologies, it is expected that three-dimensional information based on the natural landscapes will also be effectively utilized. However, these latest 3D technologies have not been sufficiently used to reproduce complex natural landscapes, and further optimization and price reduction is required for easy, widespread utilizations. In this research, therefore, we present the methodology to reproduce three-dimensional high-definition topographic data of an actual natural landscape using more familiar materials. Based on the 3D point cloud data of a small island (Suzume-jima), located in the southernmost part of the Kujukuri Coast in Chiba, eastern Japan, we printed several slices of the point cloud data in the height direction (like contour lines) and pasted them on cardboard, which were cut out using scissors. The pieces of the sliced point cloud prints were stacked up to create a three-dimensional cardboard model. Through this process, the concepts of contour lines, signs of bedrock erosion, the processes of formation of overhanging cliffs and sea caves, and the morphological features of the entire island can be experienced and well understood. Such understandings of fully three-dimensional, complex landforms have hardly been achieved by the traditional topographic maps, and further applications are expected for various kinds of complex landforms including rockwalls, waterfalls, and caves.

Keywords: high-definition topographic data, terrestrial laser scanning (TLS), unmanned aerial system (UAS), SfM-MVS photogrammetry, three-dimensional point cloud, outreach

Small rock sampling by hot-melt type fast curing adhesive

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In general, adhesive is the chosen material by a relation between glue and surface peeling of outcrops. Various adhesive are in the market, and the choices are increasing. In these adhesive, a specific adhesive can bring new work to surface peel of outcrop. Because of, surface peel of outcrop need to spend certain degree of time, fast curing adhesive expected to something new performance. In this study, hot melt adhesive (HMA) was chosen as fast curing adhesive. HMA is usually stick shape and uses applicator called glue-gun. HMA could not apply large area peeling of outcrop. Therefore, the small area got easily (11 mm of diameter of HMA stick heated by directly turbo type gas lighter, without applicator, presses on outcrop) was chosen. It seemed something like sampling (called HMA sampling) rather than surface peeling, but HMA performed strong adhesion force on a dried outcrop and teared off easily to until the Neogene sedimentary rock. It was also possible to stick HMA samples on a text easily. HMA sampling has many advantages especially in the educational field and is expected becoming the 3rd sampling in lieu of the sickle and the hammer

Keywords: fast curing adhesive, hot melt adhesive, rock sampling

A role of the Geological Museum, GSJ, AIST for elementary, junior-high and high school students on off-campus learning.

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The Geological Museum GSJ, AIST in Tsukuba opened on 1980, to exhibit the valuable collections and introduce the research activity of GSJ to the general public. About 40,000 people visit here in a year. The admission of the museum has been free. The guide tour is available for weekday group visitors staying over one hour, in which the scientist staffs explain some exhibits and their backgrounds. Recently, many students, including high schools designated as SSH, visit here as a part of off-campus learning. Through the guide tour, we would like to let them, especially young students, know that earth sciences are interesting. This is because most of them do not have a chance to learn earth sciences at high school, although Japan is a tectonically active country. However, 40% of schools visited here see the exhibits without commentary. Half of them visit here on weekends as school trip and the others visit on weekdays but stay only for 30 minutes like restroom break. We have a program named “Chisou no hanashi” for 6th grade pupils of elementary school. This program consists of a lecture on topography and geology around the school, flume experiments of sedimentation and visiting the exhibits. About 600 pupils join the program in a year. Last year, we constructed a new explanation system using QR codes on a mobile device. It is helpful for visitors on weekend and foreigners although the system is still under developing.

Keywords: Off-campus learning, Geological Museum, number of visitors

Trial edition of the card game for disaster prevention education

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In this study, we worked out the card game that could think about disaster prevention while playing. At first, we surveyed it about an existing "game for disaster prevention education" and considered a characteristic and problems. Those main problems were difficult for a child and were the point that was lacking in fun. We made a sample version of the card game while considering the problems of the existing it. Our game like Shogi has some cards with the several functions, the two players use them. There are used three kinds of cards of ‘Human cards’, ‘Disaster cards’ and ‘Tool cards’. It becomes the victory if I can move all the Human cards from a home ground to a refuge earlier than a partner.
In this study, we proposed the card game that could create opportunities to think about disaster prevention experimentally using the break times of the school. However, we have to discuss the some problems in this game.

Keywords: disaster prevention education, card game

Analysis of science question of children in the summer radio program

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In this report, we checked what kind of scientific interested in children are by broadcasted the summer radio program in 2015 and 2016. And we have an interesting not only the questions of children but also the ways of the correspondence of a teacher replying. The total of the questions are 583. The field for the children’ s questions was "animal", "insect" and "science" astronomy space". It was mainly the field of biology. On the other hand, it was 24 cases (4 %) about "the earth, the weather", and only 4 cases (0.7 %) about "the earthquake and tsunami". In these surveys, we are going to get the ideas to save from science phobia.

Keywords: science question of children

Utilization of Geospatial Information Authority of Japan(GSI) Website in Geoscience Education

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The activities of GSI consist of maintenance of domestic topographic maps and various thematic maps, determination of geometry and geoid by geodetic survey, observation of crustal deformation by GNSS Earth Observation Network System(GEONET) and interference SAR, actual measurement of plate movement by VLBI, global map , maps maintenance of the Antarctic region, and even the topography of the moon. The results of such work are published on the website of GSI on a timely basis.
These results are closely related to earth science education. While referring to high school geology textbooks ("Earth Science Foundation" and "Earth Science") etc., I reviewed website of GSI and tried making a guide on the utilization of the website in the geoscience education field.
In order to make this prototype guide widely available in geoscience education, I would like to enhance this prototype guide by listening to the opinions of educators.

Keywords: Geoscience education, Website of GSI, Guide of utilization

Secrets of natural landscapes in Nanki Kumano -the 17th report of chldren's summer school on earthquakes and volcanoes

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"The children's Summer School on Earthquakes and Volcanos" is the event of on the job training for elementary, junior high school and high school students. The Seismological Society of Japan (SSJ), the Volcanological Society of Japan (VSJ) and the Geological Society of Japan (GSJ) have been managing this event since 1999 in the summer season. The 17th children's Summer School on Earthquakes and Volcanos was held in Nanki Kumano Geopark, Wakayama on October 20th and 21st. 38 children were divided into eight groups and looked for "the secrets of sea and mountain in Nanki-Kumano". In this program, children learned about scenery and landform, discussed earthquakes, magma activities and landslide-tsunami disaster. Additionally, children summarized "Secrets of sea and mountain in Nanki Kumano" and made a presentation. We will report the secrets of sea and mountain in Nanki Kumano which were discovered by children, and achievements of the children's summer school on earthquakes and volcanoes in the presentation.

Keywords: Education for disaster-prevention, Geopark, Kii-peninsula, Nanki Kumano

An implementation report about the Geotour around Notsuke Peninsular, eastern Hokkaido, northern Japan.

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An active Holocene barrier system is also admitted at present around the Hokkaido east and Notsuke bay. It's called Notsukezaki barrier spit.
The authors set five survey lines crossing the beach ridge at NBS and are conducting geological surveys.As a result of the survey, five Holocene tephras were found from the top and we could decipher the topography development history of NBS with the order as an aspect in these for approximately 1,000 years at time.
We conducted a field survey for 7 days about historical development of landform in Notsuke peninsula on October 4th-the 11th, 2016. Report on the situation of the Notsuke peninsula Geo Tour which was done as an outreach during the investigation period.

Keywords: GeoTour, recurved sand spit, Notsuke Peninsular, Betsukai-cho, Hokkaido, Shibetsu-cho

野付半島ジオツアー

別海町郷土資料館ふるさと講座特別版

日本最大の砂嘴「野付半島」、トドワラ・ナラワラの特異な景観や水と緑と野生鳥獣に象徴される風景は多くの人々を魅了しています。

しかし、この半島も年々浸食され、存在自体も危惧されています。本ツアーは現在「野付半島の成り立ち」について調査されている研究者をお招きし、野付半島がどのようにして形成されたのかお話いただき、ジオツアーなどの巡見により、知られざる半島の姿を見ることができます。ぜひ、ご参加ください。

●日時：平成２８年１０月８日（土）１０：００～１５：００
●場所：野付半島ネイチャーセンター
●主催：別海町郷土資料館　協力：野付半島ネイチャーセンター

●午前の講話（会場：野付半島ネイチャーセンター２階）

10：00-11：00「野付半島の成り立ちを探る！」七山　太氏・渡辺和明氏（国立研究開発法人産業技術総合研究所）
11：00-12：00「北海道のジオサイト地質百選」重野聖之氏（明治コンサルタント株式会社）

12：00-12：40　昼食・休憩

●午後のジオツアー（小雨の場合は実施予定）

野付半島の特徴的な地形について現地を移動しながら説明いただきます。
案内者：渡辺和明氏・重野聖之氏・七山 太氏
12：40-15：00　野付半島ネイチャーセンター出発・解散

■参加申込　１０月７日（金）までに電話・FAX・メールにて名前・電話番号と午前・午後の参加の有無をお知らせください。
■募集人員　講話、ジオツアーともに人数制限はありませんが、ジオツアー時の移動の車については、13 名分（先着）は、当館で用意いたします。その他、自家用車で乗り合わせいただく場合もあります。
■参加料　２００円（保険代）
■その他　昼食は各自ご用意願います。服装は防寒着や長靴を用意ください。
■申し込み先　〒086-0201　北海道野付郡別海町別海宮舞町３０番地
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