Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

MIS32-P01 Room:Convention Hall Time:May 21 18:15-19:30

Framework for implementing ESD in Geopark

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I developed the theme of education of Geopark in relation to sustainability. In Geoparks many educational implementations seems widely separated from one to one. However some commonality and tendency are found among them in their contents and means like science communication and local area study. After revised Guidelines for the Course of Study, school education is recently shifting towards learning sustainability: ESD. Learning local social sustainability through area study provide students attachment and awareness to their local area. Such understandings support teachers and educators to consider the way how to implement ESD-based Geopark activities. This paper shows a framework for ESD in Geopark after analyzing of GGN Guidelines, MEXT's framework for ESD and some learning examples.

Keywords: Education in Geopark, ESD, Framework, Local area study, Networking

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

MIS32-P02 Room:Convention Hall Time:May 21 18:15-19:30

Let’s making the only my rock specimens -Promoting in SCIENCEAGORA-

Tomohiko Sekiya[1*]

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Intro

It’s reported that Unzen Volcanic Area Global Geopark and Shimonita Geoprk promoted each area in SCIENCEAGORA 2012, November,2012 at National Museum of Emerging Science and Innovation. In this report , I announce the SCIENCEAGORA and promotion activities in that days and proposed that the event is more flourishing more Geopark Area promote in SCIENCEAGORA 2013.

Why then, I am deeply grateful to Dr. Ohno (Unzen Volcanic Area Global Geopark) , Mr. Tokunaga(Mt.Unzen Disaster Memorial Hall) ,Mr. Tagami who plan and arrange this promoting activities, and gives Shimonita Geoprk to promoting chance.

SCIENCEAGORA 2012-Let’s find the relationships with science-

SCIENCEAGORA is composite evnet prcticing field for science communication held by Japan Science and Technology Agency. The SCIENCEAGORA 2012 was held in the following purposes.(1) Convey understanding and pleasure to science and contribute to the making of rich society (2) Interchange promotion of the scientific communication practitioner and Birth of new cooperation. This event was held National Museum of Emerging Science and Innovation and Neighboring facilities on November 10 and 11, 2012. 191 science communication

Geopark promotion activities in SCIENCEAGORA 2012

This promotion activities is titled ’Let’s making the only my rock specimens-let’s enjoy the Geopark-. We Planed to stick 2cm square rock specimen gathered in each area on an original rock sheet, and to present to a training participant. Fist day, the visitor can make rock specimens of Shimabara area.

The visitor was able to choose to make that of Shimabara area or Shimonita area the next day. It took approximately 30 minutes for one rock seat making. While making it ,the visitor receives using slide explanation about the rock to stick on a seat from each local representative. The guests assumed it approximately five people per once and assumed it a pre-order system. However the reservation was made up by a favorable reception unexpectedly at the beginning of the afternoon.

While we made a rock sheet, audience gathered and distributed a pamphlet. we sold goods of Unzen Volcanic Area Global Geopark in the sale booths. We greatly publicized a Geopark through these activity. Furthermore,We were able to win the SCIENCEAGORA Prize

Let’s join SCIENCEAGORA 2013

According to the count result of the questionnaire of the guest 50% of respondents answer with follow; ’I want to participate in an event again’, ’I am interested in natural science and technology’ .People having high will gather for this event than the above-mentioned result. It has a big pulling in customers effect to target parent and child that do not usually touch it naturally of the inner city.

It made a repeater that it wanted to make both rock specimens that 2 areas participated. As above, Geopark promotion activities in SCIENCEAGORA is very effective. Besides, the entrance fee is free. We are going to participate in SCIENCEAGORA 2013 each other. Because We have had a SCIENCEAGORA prize, the plan making the rock specimen does not intend to change it. An event will become flourishing if other Geoparks participate.

Keywords: geopark, science commmunication, education of Earth Science

Japan Geoscience Union Meeting 2013
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MIS32-P03 Room:Convention Hall Time:May 21 18:15-19:30

Educational activities at Shirataki Geopark: Practice of Shirataki Obsidian Class Learning Obsidian and Volcano

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The main theme of the Shirataki Geopark, northern Hokkaido, is a harmony of earth science and history of people, and we can deeply imagine unique volcanic activity that formed obsidian and prehistoric people that survived the last glacial maximum at the deep forest in the Shirataki Geopark area. The Shirataki Geopark is characterized by the nation's largest obsidian origin, some complete exposures of the compact obsidian layers. The Shirataki obsidian was formed by quenching of aphyric rhyolite magmas at least 10 lava units at about 2.2 Ma.

Shirataki Geopark has been practicing various activities to elementary schools and visitors Geopark for understanding of the unique volcanic activity that formed this obsidian. Volcanic Petrology Laboratory, Hokkaido University of Education at Asahikawa, has developed a learning program of Shirataki obsidian. In this program we have performed vesiculation experiments of obsidian using a portable charcoal stove in addition to general talk of volcano, sample observation of volcanic products, analog experiment of volcanic eruption using a water tank. This foaming experiment is suitable to understand that the role in H_2O in magma is large during eruption. In this experiment, we can imagine how the magma from glowing charcoal stove at high temperature inside. When heated at a high temperature, H_2O remaining in the glass structure continues to foam, dense obsidian bulge as bread. This changes to the substance that is completely different in appearance, must feel the *mystery of science* to school students.

Shirataki elementary school has been consistently integrated learning through *stone education* utilizing the geological heritage of the region. The children are confident in this thing for obsidian. Shirataki Geopark has helped human resource development in the region, to take advantage of the education of children.

Keywords: Shirataki Geopark, obsidian, education, vesiculation experiment

Japan Geoscience Union Meeting 2013
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MIS32-P04 Room:Convention Hall Time:May 21 18:15-19:30

Preliminary geo-tour within the area of the Mikasa Coalfield Geopark Plan, and its questionnaire survey

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Preliminary geo-tour had taken place seven times (total participants are 77 people) within the area of the Mikasa Coalfield Geopark Plan from September to October, 2012. The tour is divided into five course: (1) the Katsurazawa Dam Course, (2) the Open-Air Museum Course, (3) the Pombetsu-Ikushumbetsu Town Course, (4) the Horonai Railway Course, and (5) the Tappu Hill Course.

Moreover, we had carried out a questionnaire survey about the tour. In the presentation, we first (1) introduce the above geo-tour, and (2) report the result of survey. Finally (3) we would like to discuss how the problem could be solved for consulting the better geo-tour.

Keywords: Mikasa Coalfield Geopark Plan, preliminary geo-tour, questionnaire survey

Japan Geoscience Union Meeting 2013
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MIS32-P05 Room:Convention Hall Time:May 21 18:15-19:30

Simplification of geological information for sightseeing and academic support activity on North Ibaraki Geopark

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Recently, sightseeing like greentourism and ecotourism in local areas draws attention. Geopark can provide new-type sightseeing of geotourism. It is difficult for ordinary people to understand scientific information of geology. In order to resolve this problem, we have simplified geological information for geosite of geopark. In 2012, our project team could build relationships with local governments and a company, and support working groups of North Ibaraki Geopark. In 2013, we are active in making explanation board and map of a new geosite and in supporting working groups of North Ibaraki Geopark.

Keywords: geopark, North Ibaraki Geopark

Japan Geoscience Union Meeting 2013
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MIS32-P06 Room:Convention Hall Time:May 21 18:15-19:30

The effects of experience-based geological education on Byobugaura geosite in Choshi Geopark

Takao Ando[1*]

[1]Takao ANDO

Choshi, located at the east end of the Boso peninsula, 100km east of Tokyo, Chiba prefecture, Japan, has many geological heritages that should be preserved and passed on to future generations. Representative geological features in Choshi are as follows.

First, the Bioubugaura coastal cliff, comprising Pliocene and Pleistocene sedimentary rocks, is approximately 9 km in length and 30?50 m in height and faces the Pacific Ocean. This topography, which is also called ”Dover in the East”, consists of sharp cliffs formed by land erosion resulting from sea waves. According to a previous report, the speed of erosion is 5?6 m per year. To prevent erosion, seawall was constructed in 1966. The seawall was a necessity for the residents’ safety even though it negatively affected the geo-heritage. Second, the Cretaceous shallow sea sediments, designated as a government national monument, are exposed in the Inubouzaki coastal area at the east end of the Choshi peninsula. Third, the ”Inuiwa” and ”Sengaiwa” rocks, carried on the tradition of the ”Yoshitune legend” which is a legend concerning a samurai warrior in the medieval period of Japan, are composed of Jurassic greywacke, mud stones, and conglomerates that includes calcareous coarse fragments with fusulina fossils.

The geological and geographical characteristics of Choshi peninsula have brought honor to the region as Japan’s best spring-cabbage-producing area as well as one of the most important fishery bases in the country, and have attracted many of wind turbines, which are considered as leading renewable energy. Choshi geopark project will provide people with understanding of not only the geological formation process of Choshi peninsula but also of the environmental impacts resulting from this land utilization process. That will convince the people of importance of the local environment and prompt their concrete activities toward conservation of the local environment in the future. We define the concept that divides the local environment into three stages - the passed formation process, the present utilization process and the future conservation process - as the ”local life cycle thinking”. By utilizing this concept, we are providing education for sustainable development, or ESD, at elementary, junior-high and high schools in the region.

Keywords: Geopark, Choshi, Life cycle thinking, ESD, Science education

Japan Geoscience Union Meeting 2013
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MIS32-P07 Room:Convention Hall Time:May 21 18:15-19:30

Itoigawa Hisui (jade rock), Japan -Candidate of Global Heritage Stone Resource designation

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Global Heritage Stone Resource (GHSR) designation, that is new international designation of natural stone resources, has been progressing by the International Union of Geological Sciences (IUGS) and the International Association for Engineering Geology and the Environment (IAEG) after the approval at the 34th International Geological Congress (IGC) held in Australia, 2012.

GHSR designation aims to promote the recognition for importance of natural stone resources that have occupied a vital position in their utilization or been highly evaluated in cultural history. This designation is expected to raise public and statesman's concern about the stone resources, promote utilization of natural stone, and keep materials of the resources for maintaining stone heritages as well as constructing new buildings of high quality. This designation can validate the importance of the natural stone resources in the area.

Itoigawa Global Geopark includes a lot of evidence that shows the world's oldest Hisui (jade rock) culture. They are jade localities in mountainous area, jade pebbles on the riverbeds and the beach, ornaments made from jade that have been excavated from historic sites dating from the Jomon Period to the Yayoi Period (6000 to 2000 years ago), etc. Museums and educational programs are provided for students and general public to learn about this jade culture. Research activity has clarified the genesis and exhumation process of jade rock, the history of utilization, and the discovery of jade from the Jomon Period to the modern age.

Abbreviated checklist for GHSR designation is as follows.

Formal Name for this proposed GHSR designation: Itoigawa Hisui (Jade rock) **Stratigraphic (or Geological) Name:** Occurred as tectonic blocks in serpentinite melange.**Other Names:** Nothing. **Commercial Designations:** Itoigawa Hisui (Itoigawa Jade). **Principal Location of Quarry or Quarries:** No quarries in operation. **Geological Age and Geological Setting:** Hisui is a metamorphic rock that was formed in the deep part of the plate convergent zone in front of the Gondwana continent about 500 million years ago. Hisui is included in serpentinite bodies as a tectonic block in Paleozoic and Mesozoic systems. **Petrographic Name:** Jadeitite, omphacite-jadeite rock and omphacite rock. **Primary Colour(s) and Aesthetics of Stone:** Chemically pure jadeitite has a white color, omphacite rock shows green, Titan-bearing jadeitite shows purple, Titan-bearing omphacite rock shows blue and graphite bearing jadeitite shows black respectively. **Natural Variability:** None. **Composition (optional):** $NaAlSi_2O_6$ (jadeite), (Na, Ca)(Al, Mg, Fe) Si_2O_6 (omphacite). **Geotechnical Properties:** Hisui has a high toughness because it consists of clusters of jadeite and omphacite microcrystals, however minor fractures and faults are common in the rock. Density (kg/m^3) 3.0-3.4 **Suitability:** Hammer stone, ornament, sculpture, jewelry. **Vulnerability and Maintenance of Supply:** Its conservation is obligatory because natural Hisui stone shows minor production from the river and seashore. The Kotakigawa Hisuikyo and Omigawa Hisuikyo are protected as natural monument of the nation. Use of Hisui should be permitted only in sustainable collecting. **Historic Use and Geographic Area of Utilization:** Hisui was first used for hammer stone in the early Jomon Period (7000 years ago). In the middle Jomon Period (6000 years ago) it had been used for stone ornaments such as Taishu(Hisui pendant) and then from the late Jomon Period through Yayoi Period to Kofun Period (4000 to 1700 years ago) for Magatama(drop-shaped Hisui bead), respectively. They have been excavated from archeological sites in Japan (Hokkaido, Honshu, Shikoku, Kyushu and Okinawa islands). In addition, golden crown with Magatama made in 6th century was found in the Korean Peninsula. In the modern age it is used for sculpture and jewelry.

Keywords: Global Heritage Stone Resource, Jade rock, Itoigawa, subduction zone, world's oldest jade culture

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MIS32-P08 Room:Convention Hall Time:May 21 18:15-19:30

Some boundaries in the Itoigawa Global Geopark, Central Japan

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[1]Fossa Magna Museum

The feature of Itoigawa global geopark

The Itoigawa Global Geopark (IGGP) located in most western park of Niigata Prefecture is one of the first global Geopark authorized by GGN in 2009.

The feature of IGGP is rich in diversity.

Even if compared not only with domestic but with a foreign geopark as a feature of the Itoigawa global geopark (IGGP) located in western Niigata which is one of the first global geopark authorization places in Japan, it is mentioned that it is rich in diversity.

It is as follows when the main thing is listed.

(1) Vertical drop: it has a 2766 m big vertical drop from the seashore in the Sea of Japan to Mt. Korenge-san of the Hida mountain range.

If Toyama bay submarine channel of the seabed off Itoigawa is included, a still more geographic vertical interval will become large.

(2) Geological boundary: it is roughly divided into two part by Itoigawa-Shizuoka Tectonic Line at the Hida outer edge belt of an east Fossa Magna area and Nishi.

(3) The difference of age of rocks: it has a difference as long as 500 million years to the Mt. Yake-yama volcano which started activity at Cenozoic era Quaternary (about 3000 years before) from jadeitite generated to the Paleozoic Cambrian period (about 500 million years before).

(4) Various geographical features: coastal plain, sea cliff, sand hill, hill, river terrace and lava flow geographical feature, lava dome and erosional feature (a landslide and large-scale collapse), an asymmetrical mountain ridge, twin ridges (line depression contour), curl, etc.

(5) Various rocks: various rocks such as a sedimentary rock, an igneous rock (plutonic rock, hypabyssal rock, and volcanic rock), and a metamorphic rock, are distributed.

(6) Various minerals: six species of new minerals and 13 species of minerals from new [Japanese] are discovered.

(7) Various fossils: new four genera and a new 26 species of fossils are discribed.

(8) Biodiversity: various creatures are distributed over an area with various altitude, geology, and geographical features.

Some boundaries in the IGGP

Dialect, Food, Electric frequency, Electricity of a railroad, Classification of JR, Seasoning of instant noodles

boundary mechanism of production

It is thought that the cause of the ”boundary” of the dialect accepted in Itoigawa and its neighborhood or manners and customs has the large existence of steep geographical feature (the Hida mountain range, the cliff of Oyashirazu) and steep streams (Himekawa, Kurobe river) which restricts the traffic of a physiographic factor, i.e., a human being.

Keywords: Itoigawa, boundary, language, manners and customs, distribution of creatures, tectonic line

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MIS32-P09 Room:Convention Hall Time:May 21 18:15-19:30

Sound water cycle with a focus on agricultural water -In the case of Hakusan Tedorigawa Geopark-

Masashi Yoshida[1*], Yukiya Minami[1]

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Originates in Mt.Hakusan, flowing north to join the River dozens of Tedori River leads to Tsurugi in Hakusan City, Ishikawa Prefecture. Turn to the west, where it flows down the plains Kanazawa City, Tedori River is the largest river poured into the Sea of Japan in Mikawa Hakusan City,Ishikawa Prefecture is a first-class river basin area of 809 km2, the flow path line 27km . In addition, the mountainous area accounts for about 90 percent of the basin, the average slope of the river to the mouth is one of the most rapid in Japan about 1/27 from the source. Tedori River typical alluvial fan is formed in the downstream river channel is committed to the Sea of Japan and the southern part of this fan. Hakusan Tedorigawa Geopark, this basin has been certified to Japan Geopark. In addition, the fan is paddy field has developed through the ages, is responsible for the leading role of the food supply of Ishikawa prefecture. Backbone canal extends 240 km, the water is over Tedori River go to every corner of the alluvial fan. In addition, because it is composed of a relatively steep gravel quality, fan is also active in the basement of use groundwater aquifers develop well.

In addition, the precipitation in the region has a peculiar distribution of the Japan Sea side and the Pacific Ocean side is different. Compared to the area of the Pacific Ocean, precipitation from April to October does not change significantly, the amount of precipitation from November to March the overwhelming majority. Most of this is snow in the mountainous area, snow melt water has been used as irrigation water.

Ishikawa Prefectural University is located in the central fan, such as a watershed area of Hakusan Tedorigawa Geopark is an important research university. To conduct research to address regional issues for the university community, rooted in the development of the region, is also important in terms of contributing to the region and to originate the results is one of the important role of the university community. In addition, because it is one of the purposes of science popularization, as well as a place of research results originating in the Geopark .University can work with Geopark.

At the university, in cooperation Ishikawa prefecture, Hakusan city, and local stakeholders, and other carried out over six years, ”A Study on Sound water cycle with a focus on agricultural water” as the theme of the water cycle is a keyword of the Hakusan Tedorigawa Geopark .

Focus on environmental changes and natural (such as urbanization, aging and depopulation) (such as climate change caused by global warming) social environment, research project, the current situation in the region for the blessing of the water cycle a variety of this area It is intended to make predictions for the future from that, get closer recognize the impact of global warming on local residents, were studied from various angles.

We have done research on the subject of roughly 10. 1)Changes in precipitation and snowfall from the progress of global warming prediction ,investigation of changes in sea level rise predictions 2)studies on changes in social conditions, such as urbanization and aging 3) the amount of sediment runoff from the mountains Investigation of forecast changes in river flow 4)the elucidation of the mechanism of hydrological cycle of paddy 5)the elucidation of the structure underground fan 6)the elucidation of the mechanism of groundwater flow 7)survey of forecast impact of rice due to global warming 8)damage prediction due to the increase in wildlife due to the decrease of snow cover 9) increase research impact on biodiversity 10) feasibility study of water use as a natural energy .We investigated the changes of the environment and the current situation surrounding water.

Keywords: Mt.Hakusan, Tedori River, Geopark, Water cycle, Agrecultural water

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MIS32-P10 Room:Convention Hall Time:May 21 18:15-19:30

Selecting potential geosites in the eastern Kii peninsula, Southwest Japan

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The aim of this presentation is to describe the geotouristic potential of the study area based on the presence of the Median Tectonic Line (MTL) in the region and set the basis for establishing geosites in the future.

Geologically important geosites has been picked up together with the sites of unique history and culture. The valorization of selected objects is ground on field studies and detailed petrographic analyses by using samples from rock exposures on the surface and boring cores.

The petrographic researches provides information about more precise surface trace of the MTL in the eastern Kii peninsula, which can be used as the most attractive point of geological trips in this region, including Ise Grand Shrine (Geku).

This work also focuses on the lack of geotouristic infrastructure that could make available all their advantages for educational purposes. Protecting and using geosites offers various important opportunities for communities including local economy development and providing employment.

In addition, establishing a tentative geotouristic course in the region could increase public awareness of geoscience education, protection and conservation important landscapes for future generations and help tourists to understand particular processes that shape our Earth.

Keywords: geosite, geopark, MTL, Kii Peninsula

Japan Geoscience Union Meeting 2013
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MIS32-P11 Room:Convention Hall Time:May 21 18:15-19:30

Review of the history of lagoons and iron production in San'in Kaigan Geopark

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Geoparks should introduce sacred spot (e.g.,waterfall,spring,megalith,tree), archaeological sites(e.g.,ancient tomb, ancient port), legend of minerals(e.g.,gold,silver,iron) and traditions of disaster(e.g.,earthquake, tsunami,flood, debris flow) for people with the background of "Geo", because people visiting a geopark are interested in not only geology and geography but also ecology, history and culture related to them. In this presentation, the relationship between lagoons and ancient iron productions in Kyotango City, San'in Kaigan Geopark is mainly reviewed from historical and archeological viewpoints.

In the coastal area of the Sea of Japan, Lake Koyama, Kumihama Bay, Asamogawa-gata and Takeno-gata Lagoon had been used as ports for domestic and forigen trade (with China and Korea) in ancient times. Sinmeiyama-kofun Tumulus and the Aminochousiyama-Kofun Tumulus in the area the largest Zenpokoenfun(large keyhole-chaped tomb) in the coastal area of the Sea of Japan, suggesting society and culture in the area probably played an important role in ancient Japan. These lagoons were utilized as trading ports under the geographical features. The establishment and extinguishment of these ports must be deeply linked the transition of natural environments with the history of the area.

The archeological site of Enjo Site, located the center of the largest iron production area along the Takeno RIver, might be related to the largest tumulus and the ancient lagoon ports. The iron production in this area probably played an important part in ancient Japanese society in the age of the beginning of the domestic iron production. Iron sands from Miyazu Granite are widely deposited in the coastal area and the ground surface of the mountainous area. The investigation of the mining history of the iron sand in the granites distribution area is important for understanding the relationship of the ancient iron-making culture between Japan and Korea. San'in Kaigan Geopark can introduce geology especially the granites in the area with introduction of the ancient iron production.

In ancient map in 1603, Takeno-gata Lagoon had already disappeared, although that probably had been utilized as port until the 8th century, suggesting the lagoon was buried between the 8th and 16th centuries. According to the legend of the shrine nearby the lagoon, the lagoon was disappeared instantly at a certain time. Considering the location of the shrine and geology of the area, the disappearance was possibly caused by debris flow. After the scientific inspection, this transition will be able to be used as disaster educational material.

As described above, historical and archeological viewpoints will help people to have interest in geology in geoparks. Introduction from different viewpoints about geoparks with scientific inspections enhance its attraction for more people.

Keywords: Geopark, Tango Area, Iron sand, Lagoon, ruins, ancient iron

Japan Geoscience Union Meeting 2013
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MIS32-P12 Room:Convention Hall Time:May 21 18:15-19:30

Reexamination of ”ancient ripple mark” designated as a Hyogo prefectural natural monument, based on facies analysis.

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Sedimentary originated lineament considered to be ”an ancient ripple mark”, which is designated as a Hyogo Prefectural Natural Monument, has been preserved in the base of the Miocene gravel bed of the Hokudan Group in Shimonohama, Kamicho, Hyogo Prefecture. The result of the sedimentary facies analysis shows that the most of the Miocene deposits in the Shimonohama area are mainly due to fluvial, flood plane, debris flow, and pyroclastic flow. As a result of the shaped analysis, the lineament can be considered as a gutter cast, a kind of flute cast formed on the bottom of chanel of gravelly river. It is also clarified that it is not a ripple mark formed by wave movements as assumed previously. This result also contributes to educational activities in that it provides correct information scientifically.

Keywords: San’ in Kaigan Global Geopark, flute cast, ripple mark, facies analysis, miocene

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MIS32-P13 Room:Convention Hall Time:May 21 18:15-19:30

Regional revitalization utilized geo-resource in the Hyogo Prefecture

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[1]Museum of Nature and Human Activities

Hyogo Prefecture faces the Pacific, the Seto Inland Sea and the Sea of Japan, and most of the geological bodies in the inner zone of the Southwest Japan can be seen. Recently, regional development utilized those geological features is pushed forward in each place.

(1) Rokko Mountains

Rokko Mountains was formed by active movement of faults after 1Ma. Active faults caused earthquake, and steep slope and weathered granite often caused debris-avalanche. On the other hands, such geological and topographical features develop the port and urban at the foot of mountains. Many NPO and private organizations develop their activities which are learning on the nature of the Rokko Mountain and guide for the tourists.

(2) Tatsuyama-Ishi

Late Cretaceous pyroclastic rocks are widely distributed in the southwestern part of the Hyogo Prefecture. Pyroclastic rocks quarried from the Takasago City area are called Tatsuyama-Ishi. These quarries are historical heritages continued from Burial Mound age to the present. Exhaustive survey on the use of the Tatsuyama-Ishi and developing the new products are carried out.

(3) Ikuno Mine and Gin No Bashamichi(road of carriage transporting silver ore)

Ikuno Mine is a historical mine closed in 1973. Road for exclusive use of the carriage of extension 49km was build from Ikuno Mine to Himiji Port. It is called Gin no Bashamichi and tours and events to follow the building indicating the trace at the time of the going are developed.

(4) **regional development related to excavation of dinosaur**

Many dinosaur, mammals, reptiles, amphibians fossils are found from the Early Cretaceous Sasayama Group in Tanba City and Sasayama City. After the excavation, the group which promotes local development utilizing the dinosaur was established. They coordinate with the Museum of Nature and Human Activities, Hyogo,

As mentioned previously, there are much activities that is going to connect geo-heritages with community development. The museum takes a role to let the understanding on the geological heritages.

Keywords: Geopark, regional revitalization, geo-resource, San-in Kaigan, Hyogo prefecture

Japan Geoscience Union Meeting 2013
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MIS32-P14 Room:Convention Hall Time:May 21 18:15-19:30

Summer school 2012 in Muroto Geopark - we are rolling stones -

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We held a summer school for elementary, junior high school and high school students at Muroto Geopark on 15th and 16th of July, 2012. Aim of the summer school is to feel and understand dynamic cycles on the Earth.

Keywords: event, education, overnight

Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

MIS32-P15 Room:Convention Hall Time:May 21 18:15-19:30

Aso Caldera- Influence of huge eruptions and relation with living of people

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Aso volcano was born approximately 270,000 years ago and repeated four times of huge eruption afterward. The large-scale caldera which we can see was formed by the huge eruption approximately 90,000 years ago.

The theme of Aso geopark is mainly the topography around the caldera,

volcanic activity of Mt. Naka-dake, the living of people coexisting with a volcano.Above all, even if the caldera looks world-wide scale,and the huge eruption with the caldera formation brings big environment change in the whole not only the Japanese Islands but also earth, and affected the big thing that imagined to the then animals and plants.The times 90,000 years ago are the Old Stone Age worldwide, and the existence of the human after 40,000 years ago is almost confirmed in Japan, but is uncertain before it. Therefore it is not sure whether Aso-4 eruption affected the human being living in then Japan. However, various matters including the influence on animals and plants by sunlight being cut off as for the drop of the temperature on the earth scale from the start are thought about when the influence of the eruption watches examples such as the Toba eruption approximately 74,000 years ago, the Krakatou eruption of 536, the Tambora eruption of 1815.On the other hand, approximately 70,000 people live around the caldera formed by Aso-4 eruption that I had an influence on worldwide and the outskirts.The association with the people and the caldera,the flowing wind connected by the wind to come from the unique collapse feature bringing about a large quantity of precipitation and cause rich springs. However, it’s related to natural disaster such as the steep slope collapse of the caldera wall, the flooding of the river in the flatland in the caldera.In this way, global remarkable influence with the formation of the Aso caldera is thought about in the Aso Geopark, and the existence of the caldera brings the relation that is strong in the present generation unconsciously with it. This is one of the big characteristics as the Aso Geopark and thinks that you should strongly appeal. We think that it is necessary for us to carry a central role enlightening for the huge eruption that will happen somewhere of the Earth.

Keywords: Geopark, Aso, Caldera

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MIS32-P16 Room:Convention Hall Time:May 21 18:15-19:30

Conservation strategies for ecosystem and strata outcrops in Amakusa Goshoura Geopark

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A variety of flora and fauna fossils including those of several species of dinosaur are contained within strata in the Goshoura area of Amakusa, Kumamoto Prefecture. Goshoura town constructed a fossil-hunting place, a fossil park and ”Ammonite House”(a structure built to protect and preserve a rare ammonite fossil) among others creating a field museum according to the ”Whole Goshoura Museum Plan”. There are more than 30 geosites in Amakusa Goshoura Geopark which are maintained in thriving conditions. We would like to show some examples for conservation of strata and ecosystems from these geosites.

”The Sphenoceramus Wall” is an example of one geosite conservation strategy for strata and fossils. There are many bivalve fossils of Sphenoceramus accompanied by many trace fossils on a bedding plane of shale stratum of the Himenoura Group of the upper Cretaceous period in Makishima. The outcrop was initially covered by wire netting to prevent erosion of this outcrop, but the netting eventually corroded and deteriorated leaving the outcrop and its fossil content exposed and immediately visible. Safe, public access to the site is made possible by a series of steps descending to the outcrop where ongoing scientific research can be observed. It is proposed that this site should be categorized as a geosite once research has finished in order to conserve its present condition and promote public interest.

Another example of conservation strategy of a geosite in Goshoura Geopark is the Ammonite House, which is a structure built at the request of local citizens to protect the largest ammonite fossil found in Kyushu (approx. 60cm in diameter) from being destroyed during the construction of a new road along the coast.

Around the Ammonite House, black shale of the upper Cretaceous Himenoura Group crops out and is visible. Tsumerenge (Orostachya japonica); a near threatened species (NT) grows naturally on debris sediments from the outcrop walls under sunny and less humid conditions. Kurotsubame-shijimi (Tongeia fischeri shojii); a near threatened species (NT) of butterfly, thrives on the tsumerenge leaves as a food source.

Ammonite House and its surrounding area are general geosites belonging to the Makishima course of Goshoura Geopark. Conservation and protection of many geo-significant aspects of the area including outcrops, flora and fauna is undertaken by the museum staffs and Goshoura tourism guides. These steps include the removal of grass and shrubs that naturally grow in the outcrop areas as well as the observation spots for Tsumerenge and Kurotsubame-shijimi.

Without careful implementation of conservation strategies at Amakusa Goshoura Geopark, the richness found within the surrounding ecosystem would be lost to future generations.

Keywords: Amakusa Goshoura Geopark, conservation strategies for ecosystem and strata outcrops