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

G04-01 Room:202 Time:May 20 09:00-09:15

The report of the International Earth Science Olympiad (IESO) in 2012 and the schedule to the 2016 Japan IESO at Mie.

Yutaka Takigami[1*], Ken-ichiro Hisada[2]

[1]Kanto Gakuen University, [2]University of Tsukuba

We will report the outlines of the International Earth Science Olympiad (IESO) in 2012 and next 4 years to 2016.
1) From 2007 to 2012
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
IESO 2011 (Italy) 26 countries and 104 students, 1 gold , 2 silver and 1 bronze
IESO 2012 (Argentina) 17 countries and 66 students, 1 gold and 3 silver
2)IESO 2012(Argentina)
Application from Sep.1 to Nov.15,2011
1st Selection at Dec.18, 2011 (924 students. 52 places)
2nd Selection from March 25 to 27, 2011, at Tsukuba City.
(From 29 students, 4 special excellent and 4 excellent students were selected.)
Training 8 students,June-Sep.(correspondence course)
4 students,Aug. (3 days)
6th International Earth Science Olympiad from Oct.8 to 12,2012.
Results, 1 gold medal and 3 silver medals
Formal visit to the Ministry of Education, Culture, Sports, Science and Technology at Oct.15, 2012.
3) IESO 2013 (India)
Application from Sep.1 to Nov.15, 2012.
1st Selection at Dec.16, 2012 (1011 students. 59 places)
2nd Selection from March 24 to 26, 2012, at Tsukuba City.
(From 60 students, 10 excellent students were selected.)
Final selection for IESO at May 11-12 at Tsukuba City.
(From 10 students, 4 students were selected for IESO 2013.)
7th International Earth Science Olympiad from Sept.11 to 19, 2013, at Mysore, India.
4) IESO 2014 (U.S.A.)
IESO 2015 (Russia)
IESO 2016 (Japan) at Mie prefecture

Keywords: International Earth Science Olympiad

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G04-02 Room:202 Time:May 20 09:15-09:30

A poster ”Minerals for every home” (Ikka-ni-1-mai-koubutsu): Application, acceptance and construction work by Japan Asso

Yasuko Okuyama[1*], Satoshi Miyajima[2], Jun Aizawa[3], Junji Akai[4], Shin-ichi Kawate[5], Yasuo Kiji[6], Masanori Kurosawa[7], Ryoji Tanaka[8], Akira Tsuchiyama[9], Toshiro Nagase[10], Hiroshi Miyajima[11], Ritsuro Miyawaki[12], Takashi Yamada[13]

[1]Institute for Geo-Resources and Environment, [2]Saitama Prefectural Fikaya Dia–ichi High School, [3]Fukuoka University, [4]Niigata University, [5]Musashi High School and Junior High School, [6]Osaka Prefectural Minoo-higashi High School, [7]University of Tsukuba, [8]Sagami Central Cemical Laboratory, [9]Kyoto University, [10]Tohoku University, [11]Itoigawa Fossa Maguna museum, [12]National Science Museum, [13]Japan Medical University

A poster ”Minerals for every home” (Ikka-ni-1-mai-koubutsu): Application, acceptance and construction work by Japan Association of Mineralogical Sciences

Keywords: Science and Technology Week, Ikkani-1-mai poster, Japan Association of mineralogical Sciences, Mineral, Earth and planetary science

Japan Geoscience Union Meeting 2013
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G04-03 Room:202 Time:May 20 09:30-09:45

Establishment of a new department of natural sciences in a university

Hiroshi Hagiya[1*]

[1]Tokyo City University

Most of Japanese private universities has no department of earth sciences. It is difficult to make a new department of earth sciences in a university as employment opportunities so restricted in earth science field that most of university hesitate to establish.

Tokyo City University(TCU), changed from Musashi Institute of Technology, has the Department of Natural Sciences in Faculty of Knowledge Engineering from 2009, the department contains 3 courses of molecular science, biological science, and earth science. First students of the department graduate in March 2013, includes 10 students of earth science course graduated.

The author will explain how to make a new department of natural sciences in a traditional engineering oriented university, and importance of getting a big picture of nature, with training of fieldworks and studying fundamental sciences. It will be a hint to make earth science more familiar to our society, to make school teachers and curators who trained fieldworks, the essence of earth science, and analytical methods, multi-media literacy.

Keywords: natural history, natural science, university, education, fieldwork

Japan Geoscience Union Meeting 2013
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G04-04 Room:202 Time:May 20 09:45-10:00

MAGDAS capacity building activities at ICSWSE

Maria Gracita Cardinal[1*], Akimasa Yoshikawa[1], Hideaki Kawano[1], Huixin Liu[1], Masakazu Watanabe[1], Shuji Abe[1], Teiji Uozumi[1], George Maeda[1], Tohru Hada[1], Kiyohumi Yumoto[1]

[1]International Center for Space Weather Science and Education, Kyushu University

The International Center for Space Weather Science and Education (ICSWSE) of Kyushu University, formerly known as the Space Environment Research Center (SERC), has an extensive array of real-time MAGnetic Data Acquisition System (MAGDAS) all over the world. In order to develop the basic space and geoscience awareness in developing countries, we conduct trainings at ICSWSE for our MAGDAS hosts from Asia and Africa with the support of JSPS Core-to-Core Program. Details of the program and activities will be discussed in this paper.

Keywords: MAGDAS, training, ICSWSE

Japan Geoscience Union Meeting 2013
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G04-05 Room:202 Time:May 20 10:00-10:15

The report of Science and Environmental Education Project, introduction of geological materials and programs.

Tsuda Kazuhide[1*], YAMAKAWA Yuichiro[1], YAMAZKI Hiroshi[1]

[1]NPO Whole Earth Institute

[Introduction]
Science and Environmental Education Project is a project originating from Shizuoka its appeal widely to the public with such as school teachers, nature guide, researchers work together with the theme of natural science development of educational content.

[Objective]
Researchers , interpreter (nature guide), and school teachers, principals different work together to consider ways of better education, both in terms of methodology, content, quality of environmental education I improved. Results are summarized as teaching materials and teaching models, implementation and development of teaching materials for leaders such as teaching in a high school in Shizuoka Prefecture, to implement such materials rental. We will send out the information widely to leverage local and websites such as television. Through these, it is to develop the human resources of the next generation environment that combines the knowledge of natural science, to contribute to the creation of a sustainable society drives out.

[Results]
We developed 12 types of hands-on materials and three models, we have carried out for a total of 23 times in 924 students in high school. According to data, we heard opinions that more fun from students and improving understanding of the origins of Shizuoka which was formed. Improvement of 20% was observed in the student’s own interest in the region, also interest in outdoor activities.
Are conducted, and other awareness-raising workshops for the general public in Ru-Ku-Ru Science Museum, conduct training sessions for teachers and workshops for social education leaders such as Geopark Guide Izu Peninsula.
This project was carried out under the Cooperation Fund grant of Mitsui & Co., Ltd. Environment Fund and regional development MiyaShin. I would appreciate it.

Keywords: Geological education materials, Educatinal programes, Interpreter

Japan Geoscience Union Meeting 2013
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G04-06 Room:202 Time:May 20 10:15-10:30

River School: The Report of Environmental Education Program on Elementary School using Aquatic Insects

Naoyuki Ohara[1*], Shouta Takeda[1], Junjiro Negishi[2], Yusuke Sato[2], Yasuhiro Yamanaka[2]

[1]Hokkaido University Graduate School of Environmental Science, [2]Faculty of Environmental Earth Science

In mountainous areas, river is one of the most approachable natural environments nearby. Community structure of aquatic insects such as mayfly (*Ephemeroptera*) and caddisfly (*Trichoptera*) provides useful information when understanding the current environment conditions of surrounding areas. This paper reports the environmental education program ”River School” using these aquatic insects, carried out at a river in Hoshino Resort Tomamu located in Shimukkapu Village (Hokkaido, Japan). The aim of this program was to broaden the perspective of schoolchildren on aquatic life and build a better understanding of regional environment. Using scientific explanation with plain language, we practiced to show schoolchildren about the relationship between aquatic insects and river. This program consisted of two parts: hands-on experience on insect-collecting and acrylic plastomount production (Part1), and an interactive classroom lecture with a short quiz session to remember part1 and presentation of completed specimen to schoolchildren (Part2).

Part1
On July 12th, we hosted 42 schoolchildren (Simmukappu chuo elementary school and Tomamu elementary school) , and provided them opportunity to collect aquatic life in the field and to produce acrylic-resin-based plastomount of aquatic insects. The plastomount was aimed to serve as remembrance of the program so that students would keep in mind about the experience. The mounting session was conducted with the guidance of graduate students. We kept them and later present them to students because acrylic resin needed over 24 hours to harden

Part2
Three months later, we brought the plastomounts to schoolchildren in both schools. An interactive short quiz session was provided to remember the first part as well as to check the level of learning from the first part. In the quiz, two graduate students played the role as Doctor Aquatic Insect and facilitator. Including live video images of stonefly (*Plecoptera*), we further expanded their interests in aquatic insects. When presenting the plastomounts, we also sent them the cards explaining the identification keys to distinguish each species of aquatic insects.

Later on, we received impression essays from schoolchildren. The essay shows that they were impressed with the wonders of aquatic insects, and be willing to better manage the rivers in Shimukkapu. Overall the program was successful achieving our aims. To improve ”River School”, the further modifications of this program are needed.

We are grateful to the supports from the town officers in Shimukkapu, Hoshino Resort Tomamu, and Hokkaido University.

Keywords: aquatic insects, environmental education

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G04-07 Room:202 Time:May 20 10:30-10:45

Investigation on mechanism of ”sea of clouds generation” and introduction of the results to tourists

Yuta Furukawa[1*], Yasuhiro Yamanaka[2], Kazuki Nakamura[2], Daisuke Tanaka[3]

[1]Graduate School of Environmental Science, Hokkaido University, [2]Faclty of Environmental Earth Science, Hokkaido University, [3]Hoshino Resort Tomamu

Hoshino Resort Tomamu (located in Shimukappu, Hokkaido) is known as the spot to look sea of clouds (*Unkai* in Japanese). The Unkai terrace staring in 2005, and nowadays about 100,000 tourists come from all over the country to visit the terrace in summer. With gondola, the tourists go up there (1,088m above

sea level) and can enjoy sea of clouds easily. However, the tool for introduction of sea of clouds as scientific knowledge has not been put until now. Using the results from scientific research on the mechanism of sea of clouds, we created the place for tourists to learn. This report introduces the following two points. (1) Preparations for investigations for sea of clouds outbreak mechanism, (2) Creating the place for tourists to learn.

(1) Preparations for investigations for sea of clouds outbreak mechanism

Recently, Hokkaido University installed Meteorological observatory equipment in neighborhood of the top around 1,088m and foot of Mt. Tomamu around 580m, including weather observation every ten minutes. Furthermore, we have been photographed the cloud images with observation cameras every one minutes. However, in Tomamu district, the temperature distribution in the whole foot of a mountain at the time of the sea of clouds outbreak with the radiation fog is still uncertain. After weather observation in the Miyoshi basin of Hiroshima, it is pointed out that the temperature decreases rapidly until the foggy sea creation, and the temperature drop becomes small once the foggy sea occurs (Tanaka et al. 2000) . Therefore, to understand the outbreak extinction mechanism of sea of clouds, it is important to make temperature observation in the whole foot of a mountain of the Tomamu district. We installed temperature meters in 13 spots of the Tomamu district according to altitude. In the future, further analyzing weather observation data and the camera images data in Mt. Tomamu are needed. With these data, we are going to investigate sea of clouds outbreak mechanism.

(2) Creating the place for tourists to learn

We made ”Unkai card” that is educational tool for tourists to learn constitution of the scenery, not only beautiful scenery. For tourists to know about knowledge of sea of clouds, ”Cards deeply related to sea of clouds”, ”Cards related to weather”, ”Cards to enjoy” were made and installed on tables in Unkai terrace. Figure shows a state of the tourists to see Unkai card. In addition to these cards, we also made the cards of nature around Tomamu. It takes 13 minutes to climb up with gondola in one way, that is the reason the card was settled inside the gondola. Furthermore, to confirm the effects of the card and also for its modification, the interview at tourists in Unkai terrace was practiced in the summer on 2012. According to the interview, we received opinions such as ”there should be Unkai cards” and ”interesting”. It also has difference according to generation and the construction of the groups. For example, ”I can know about sea of clouds, and enjoyed to see the card”, ”the card which could learn kanji of the rain crown is interesting”.

Through these activities in 2012, it supports the effective aspects of Unkai card. Therefore, we are going to continue the interview of Unkai card and repeat its modification.

We are grateful to Hoshino Resort Tomamu, Ministry of Education, Culture, Sports, Science and Technology climate change adaptation study promotion program (RECCA) Hokkaido team, the Hokkaido University IFES-GCOE person for support.

Keywords: cloud sea, sightseeing, environmental education

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G04-08 Room:202 Time:May 20 11:00-11:15

As Environmental Education by Snow As a Natural Resource in Hokkaido

Chunying Yin[1*], Yuta Furukawa[1], Kazuki Nakamura[2], Yasuhiro Yamanaka[2], Daisuke Tanaka[3]

[1]Graduate School of Environmental Science, Hokkaido University, [2]Faclty of Environmental Earth Science, Hokkaido University, [3]Hoshino Resort Tomamu

Hokkaido University and Hoshino Resort Tomamu operates the laboratory for snow and ice, named Ice Lab, in Ice Village built in Winter. Shimukappu Village where Tomamu is in has the domestic lowest temperature record in this century, -35.8 oC, in Japan, and he Ice Village can be built under its cold condition. We report the following three practices in Ice Lab from December, 2011: (1) tourists‘ learning snow and cold in Tomamu, (2) the local children‘s learning through rediscovering the charming of snow and the cold, (3) our graduate students‘ practical learning though touching of the operation of Ice Lab.

(1) Tourists‘ learning snow and cold in Tomamu

We provide the experience of making a snow crystal strap shown in Photography. This strap is made by photopolymer wrapping the snow crystal and fixing it by lighting under the cold condition where no crystal melting occurs. This method is well known among the scientists, but is the first trial in the world for public people. Through the processes of handling the snow crystal by tourists, they really feel various forms and sizes of snow crystals, changes in the form of crystal falling just during thin snow cloud passing in several minutes, worst day when no good snow crystal obtained, and so forth. The experience is free charged, but a snow crystal strap that tourist can be brought back is charged, because the strap is the evidence of disappeared snow crystal that you observed by your eyes and moved by your hands as the only one in the world. The panels of snow crystal photos taken by the emeritus professor Katuhiro Kikuti from Hokkaido University, that continue the concept of Pro. Ukichiro Nakaya, who is famous for the words of Snowflakes are ”the letters from heaven”, and the professors‘ talks (Science ice-cafe) from Hokkaido University is held almost every week.

(2) Children‘s learning though rediscovering the charming of snow and the cold

As the students in Primary school and Junior high school learn the worth of local snow and the cold, we hold the activity named ”Snow School” in 2012 and 2013. Using the facilities of Ice Village that is not open in the daytime, though the activities of ”searching treasure in the snow”, ”measuring the depth of the snow””observing the snow crystal”, and ”making the snow crystal replica” , we hope the children can enjoy observing the snowfall and the snow cover and learning the property of snow. Besides, we hope that they can get to know that the snow in Shimukappu Village is connecting with the local living, and it is an important resource for water and the tourism. Then they can get proud of the local resource such as snow and the cold.

(3) For graduate students learning though internship

The students from the Course in Practical Science for Environment (PractiSE), Graduate School of Environmental Science, Hokkaido University get to learn how to discover social projects and to solve various difficulties in projects though their practical research and developing the environmental education program, based on the researches themselves. For example, as the a practical activity and research, in order to make the tourists from overseas understand snow and the cold, besides the panels in Japanese, we prepared the ones in Chinese and English in Ice Lab. As introducing to the tourists, the graduate students do the hearing investigation and then improve the display and the explanation. The interesting of the ice and snow gets to be known and the natural environment of the place with low temperature and heavy snow get to be understand during the tourism though this program. Based on the experience, we are looking forward to improve this in the near future.

We are grateful to Hoshino Resort Tomamu, Shimukappu Village and the Hokkaido University person for support.

Keywords: snow, sightseeing, environmental education, practical learning

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G04-09 Room:202 Time:May 20 11:15-11:30

Study on the information to promote the adaptation action for the climate change

Motohiro Honma[1*], Yasushi SUZUKI[1], Yoshinobu SATO[1]

[1]Disaster Prevention Research Institute, Kyoto University

1. Introduction

The climate change measures are classified into ”mitigation” that is to reduce discharge of the greenhouse gas causing the global warming and prevent its progress, and ”adaptation” that is to reduce influence by regulating a system of person, society and economy against a rise in temperature and sea level and a change of precipitation with the climate change. The enlightenment activity for mitigation is carried out actively as measures of climate change targeting citizens. Although the investigation of adaptation is made by predominantly government, the enlightenment activity for adaptation targeting citizens is not so enough. The probable reason is that they cannot imagine the influence of the climate change concretely in the area that themselves inhabit.

It is necessary to utilize the prediction of the change in the future with climate model and evaluate risk in order to understand the influence in the area by climate change concretely. Some institutes recalculate the result of global climate models (GCMs) including mainly CMIP3 into mesh data in Japan, then database is constructed and published (ex. http://hes.dpri.kyoto-u.ac.jp/database/), the usage of these data is promoted.

On the other hand, because the prediction result of climate change is not only one, the users have no idea how to utilize these data. It is important to show the climate change prediction data that is the result of research to the users intelligibly, so that local residents promote the adaptation for the risk of climate change.

The purpose of this study is to grasp the general user’s image of the climate change and to investigate how the provision of prediction information changes the user’s recognition and adaptation behavior.

2. Viewpoint of the general user for a climate change and the prediction

The problems about the use promotion of climate change prediction data for the general user are thought following points.

-They don’t know which element and index of prediction data they should watch.

-It cannot be understood what kind of influence comes out only by having paid its attention to the meteorological data (temperature and precipitation) and index (precipitation of warm season).

-They don’t know how reliable the prediction data is.

-They don’t know how to interpret an uncertainty of prediction data.

In addition, it is thought that the adaptation of climate change for several decades is preferred to that for larger change 100 years later, which is pointed out by the recent research for the field of behavior economics. In that case, it is possible that an adaptation increasing a medium- and long-term risk is carried out as a result of regarding immediate actions as important. It is important to investigate the provision method of climate change prediction information to lead to an appreciate adaptation behavior from such a point of view.

3. Questionnaire survey

Based on these viewpoints, we carry out the questionnaire through the Internet investigation for citizens of Toyama where it is thought that the influence on farm products and tourist attractions by a rise in temperature with the climate change is large.

According to the recent meteorological observation data, snowfall between the winter seasons tends to decrease with a rise in temperature on the plains of Toyama. On the other hand, snowfall does not decrease even if temperature rises in the high altitude area. However, when a rise in temperature continues for the future, a decrease in snowfall in the high altitude area and a forward snow-melting are bought, and then various influences such as the review of the business period of the skiing area and the change of relation between water supply and demand in the rice-transplanting time could become apparent. It is vital to investigate the action of measures for the influence that is familiar to living environment not only an extreme phenomenon in order to promote the citizen’s behavior.

Keywords: climate change, adaptation, prediction information, providing information, adaptive behavior

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G04-10 Room:202 Time:May 20 11:30-11:45

Geologic history of sedimentary plains in Japan

Masaki Takahashi[1*]

[1]Geological Survey of Japan, AIST

The geologic history of the Kanto Plain, central Japan, is briefly introduced for the purpose of educational promotion of the geology and earthquake disaster prevention. Thick sediments were accumulated between Northeast and Southwest Japan during the Japan Sea opening (20-15 m.y. ago). The grabens and half-grabens were developed under extensional stress field during this stage. The topographic up-and-down structure in basement rocks was then covered by marine sediments widely from 15 m.y. until ca. 10 m.y. ago in the Kanto district. The tectonic deformation had been slight between 15 and 3 m.y. ago. However E-W contractive deformation has suddenly begun at 3 m.y. ago, and reverse-faulting and folding were started in the Japanese islands. The thick sediments below the Kanto Plain were then deformed and active faults, such as the Tachikawa Fault, were finally cut the surface. The scenario of this history is useful for interpretation of subsurface structure deduced from geophysical exploration. ?

Keywords: outreach, earth science, geology, educational promotion

Japan Geoscience Union Meeting 2013
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G04-11 Room:202 Time:May 20 11:45-12:00

See-through experiments of explosive eruption for outreach program

Akira Takada[1*], Ryuta FURUKAWA[1], Teruki OIKAWA[1], Kuniaki NISHIKI[1], Seiko YAMASAKI[1], Akinari HIROTA[1]

[1]Geological Survey of Japan, AIST

Analog experiments are useful for outreach program. We cannot see the inside of a volcano directly, though an eruption is caused by underground magma. We develop the see-through experiments of explosive eruption to observe a process from magma system to eruption. After eruption, audience can learn hazard areas for various eruption types, and the time sequence of typical eruption. (1) The first experiment is to observe the effect of bubble. This experiment has an advantage to prepare an experiment easily. A plastic transparent sheet is covered on a plastic transparent bottle to build an artificial volcano. Bicarbonate and citric acid with detergent for kitchen (BCD liquid) are put in the bottom of the bottle. Next, just after the bottle is filled up to the middle level with colored juice (or water), the cap with a hole drilled is closed. Eruption will occur with a 1m high explosive column, and change into effusive flow. We observe the process of eruption and the hazard area controlled by the topography.(2) The second is to see the effect of both buoyancy and bubble. The system is installed in a plastic bag, and put in water container. If the liquid in the bag such as a colored juice is denser than water, the liquid mixed with bubble is easy to erupt. However, only a juice-filled plastic bag without bubble sinks in the container. (3) The third is the mixed effect among bubble, buoyancy, and stress of the host material. The liquid with bubble such as BSD liquid or carbonate drink is injected into gelatin as the host material. We can cause an explosive eruption to form a funnel-shaped crater like diatreme. If the liquid injection is slow, the liquid accumulate bubble in it upper part. After bubble escapes like de-gassing, the liquid injects laterally like dike injection.(1), (2) and (3) were carried out at elementary schools, junior high schools, children, science museums, the open house in AIST (Yamazaki et al., 2013), training course for school teachers in YIES (Takada, 2012), and lectures of Tsukuba University. Questionnaire from audience after each experiment are introduced.

Keywords: outreach, analog experiment, see-through experiment, explosive eruption, effusive eruption, kitchen volcanology

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G04-12 Room:202 Time:May 20 12:00-12:15

The trial which devises how to teach geomorphology and gives interest to a geographical lesson

Kunihiro Aoki[1*]

[1]Nihon Univ.Buzan junior high school & high school

In our school, the eleventh grade student's Geography B is 4 times per week. Therefore, if a lesson is performed for one year, a lesson will finish with systematic geography. Students say study of systematic geography "is not interesting since it is rare to see the local special feature and spread by the lesson in theoretical." Moreover, there are some students who say, " It is hot that the contents of natural geography follow a term."

As a result of inquiring based on this, syllabus planning will not be formed as the item of the government guidelines for teaching or a textbook, but "The syllabus planning in the form where systematic geography and regional geography are mixed is desirable" will be said. Then, the turn learned from the last fiscal year was changed. Then, the turn learned from the last fiscal year was changed. I changed the study back of geographical feature into the item of "mining and manufacturing in the world." This way of advancing is mixing the resources and the industry, and the regional geography of system regional geography. Moreover, the contents were lightly treated about the contents of agriculture and stockraising or the city geography in the form relevant to this, and all the contents had a class in the form where the target to relate each other mutually is held up.

As a result, change was looked at by a student's thinking in study of geographical feature. The student who was performing only former "memorization of a geographical feature term" came to be able to do geographical thinking by "why that geographical feature is formed", "what kind of human activities to be seen in the place where this geographical feature is seen", etc. little by little. Moreover, it came to get interested about an earth science phenomenon, and dealt with the contents of the earth science 1 (earth science foundation). Furthermore, distribution of geographical feature was able to understand to some extent by this. Therefore, it can be considered that the local special feature carries out the lesson of distribution of mineral product resources or industrial distribution of each area. It seems that it got interested since the difference from Japan and new discovery were carried out.

One of the examples is introduced. When teaching the major landform in the world, the textbook is treating only three classification and distribution of the Craton, the old orogenic belt, and the new t orogenic belt. It is made to learn in my lesson to the reason the origin of three ground object structures, the name of resources produced, and resources are produced. Then, in order to tell how the learned knowledge is useful, an outline is described about the situation of the steel industry of U.S.'s northeast part, and the situation of the oil area of the Middle East area. At this time, only an outline is described and details are treated in the item entitled the industrial area in the world after study of geomorphology in practice. It seems that a burden becomes light since a possibility of forgetting having learned becomes low and study of new contents can be performed using the acquired knowledge shortly after seeing a student's appearance.

That is, I would like to say handling of geomorphology, and that influence good for a student's study comes out by what is treated after that in Geography B. I would like to receive an opinion at the same time it will say that the increase in geographical completion persons is also expectable, if it says exaggeratedly.

Keywords: textbook, geomorphology, regional geography