Analyzing the “Sekiguchi diary

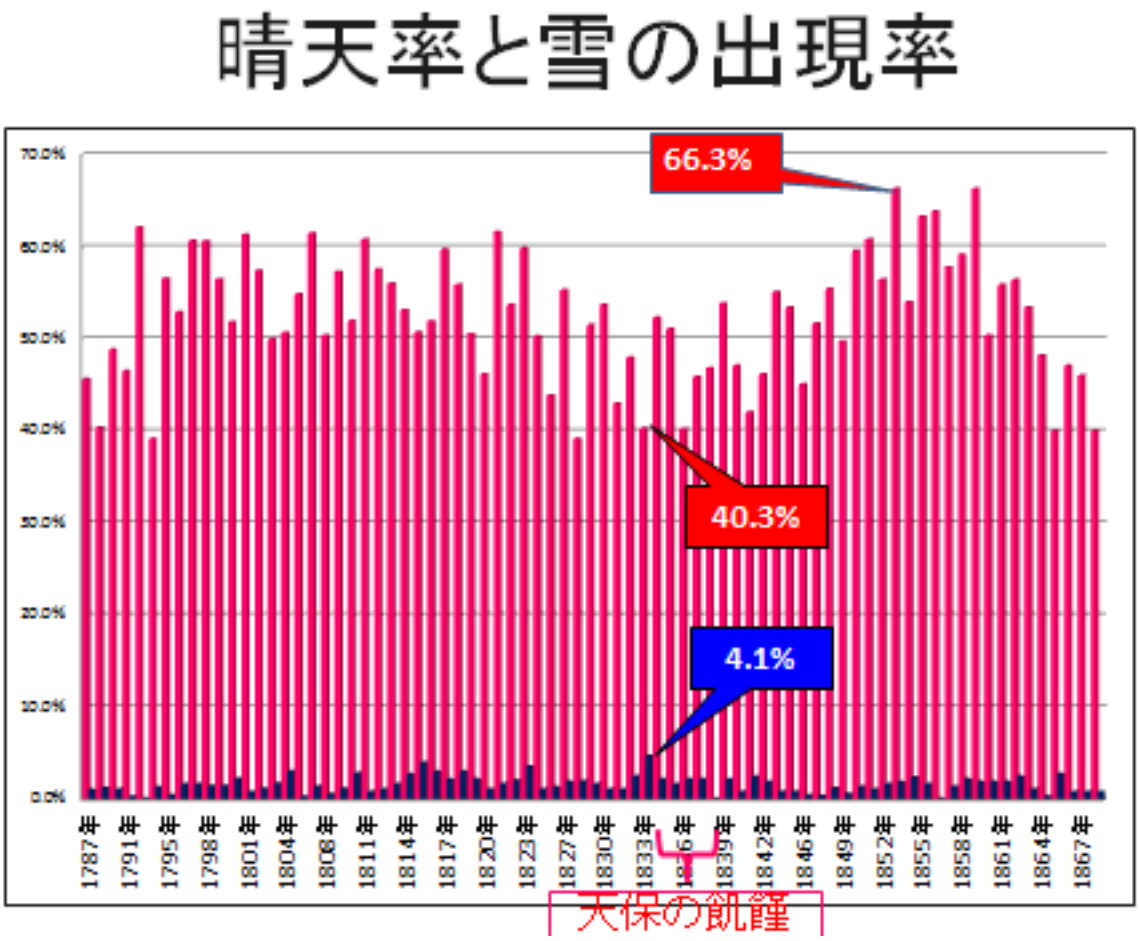
*Runa Higashi[1], *Mai Nara[1]

1.Ikeda Senior High School

Based on an old diary called the Sekiguchi diary which was written in the Edo period, we did a restoration and analysis of the weather of that period.
We digitalized the descriptions in the Sekiguchi diary and these descriptions were found to agree with historical facts so that the high-level of reliability of the diary could be proved.

The fine weather percentage in the latter period of the Edo period, which has been called a small glacial age, is not so different to the patterns found today but the percentage of rain was low at 17.8 to 18.6, compared with 27.2 % today.
The percentage of the appearance of snow, too, at 1.2% to 1.6%, was lower than today’s rate of 2.6 %.

Keywords: Sekiguchi diary



Earthquake prediction by Very High Frequency Electromagnetic Wave

*tomohiro ura[1], wataru kitano[1]

1.Tokyo Metropolitan Tama High School of Science and Technology

I observe atmospherics before an earthquake of Very High Frequency Electromagnetic Wave,detect the relation with the earthquake occurring in observational data, make atmospherics before earthquake occurring a pattern and foresee a short term of earthquake occurring.

Keywords: Very High Frequency Electromagnetic Wave, atmospherics

The Study on Adsorbent Made from Dredged Peat

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1.Tokyo Metropolitan Tama High School of Science and Technology

Peat is an under utilised natural resource in Hokkaido, Japan. Peat is extracted during dredging but is currently a waste product, so we would like to develop a plan for utilising peat. We focused on humin, the main ingredient in peat. Because of its high cation exchange capacity, there is the possibility it can be used as an adsorbent for heavy metals such as lead. Samples of peat, humic acid and sulfonated humic acid, both extracted from peat, and activated charcoal, a known adsorbent, were prepared. Batch experiments were carried out including investigations into the effect of pH on the adsorbtion process. As a result, it was found that sulfonated humic acid adsorbed lead from aqueous solutions with a higher efficiency than the other samples under acid conditions. This result suggests that sulfonated humic acid can be used as a lead adsorbent without neutralization treatment of acid waste liquid containing lead.

Keywords: Peat, Humic acid, Sulfonation, Heavy metals, Adsorption

Fossil Bryozoans from the Itakura core, Gunma Prefecture

*Arisa Matukura[1], Haruhi Imahashi[1], Yhuka Sato[1], Hitomi Saito[1], Yoshimi Honda[1]

1.Gunma Prefectural Ota girls' high school

The Itakura core was drilled at Itakura Town, Gunma Prefecture. Fossil bryozoans were contained in the Jizodo Formation (about 0.4Ma) and the Yabu Formation (about 0.3Ma) in the Itakura core. On research of the Itakura core, the paleoenvironment of Paleo-Tokyo Bay was estimated by using fossils of ostracoda and foraminifer. So we want to presume it too from different viewpoint by using bryozoan fossils. In total, 6 species belonging to 6 genera of bryozoans were identified. Most dominant species was *Acanthodesia savartii.* As a result, we found out that the paleoenvironment had warm weather, the bay was shallower than 30m and having seaweed bed. These results match with research by using fossils of ostracoda and foraminifera. By examining the fossils of bryozoans more details, we can detect about the paleoenvironment further.

Keywords: Bryozoa, Paleo-Tokyo Bay, Itakura core, Jizodo Formation, Yabu Formation

The pyritization of microfossils

*Yuka Sato[1], Haruhi Imahashi[1], Arisa Matukura[1], Hitomi Saito[1], Yoshimi Honda[1]

1.Gunma Prefectural Ota girls' high school

Foraminifera, diatoms, and micro-shellfish filled with or substituted by pyrite were found during sample preparations in the study of microfossils. The aggregations of minute raspberry-formed structure of pyrite were observed by the electron microscopy. A raspberry-formed pyrite, known as a framboidal pyrite, consists of a number of microcrystals. Diameters and average major axes of framboid and microcrystal respectively were measured and the results show the positive correlations. The results indicate that framboidal pyrite grows with growths of microcrystals. A pilot study about the formation of pyrite in the natural reductive environment was performed in the rice paddy filed. This study confirmed that pyrite is formed within nine months. The result indicates that fossils filled with or substituted by pyrite could be formed in the reductive environment where sulfate-reducing bacteria inhabit.

Keywords: microfossils, framboidal pyrite , sulfate-reducing bacteria

Microfossils from the Nihon University Mutsuai Campus core, Fujisawa City, Kanagawa Prefecture

*Haruhi Imahashi[1], Yuka Sato[1], Arisa Matukura[1], Hitomi Saito[1], Yoshimi Honda[1]

1.Gunma Prefectural Ota girls' high school

Four sediment samples were collected from the Fujisawa Mudstone in the Nihon University Mutsuai Campus core, Fujisawa City, Kanagawa Prefecture, central Japan. This core was situated the middle part of Paleo-Sagami Bay developed during the interglacial period (MIS 5). In total, 26 ostracode species and 47 foraminiferal species were identified in four samples. The dominant ostracode species were *Bicornucythere bisanensis*, *Neomonoceratina delicata* and *Trachyleberis ishizakii*. The dominant foraminiferal species were *Elphidium subgranulosum*, *Pseudorotalia gaimardii*, *Buccella frigida*, *Elphidium advenum* and *Murrayinella minuta*. These species are living in middle to outer bays. These data indicate that the depositional environment of the Fujisawa Mudstone at the study site was middle to outer bay area. In addition, the dominant four foraminiferal species were examined the ratio of dextral individuals and sinistral individuals. In the foraminiferal species of *Ammonia japonica*, *M. minuta* and *P. gaimardii*, there are more sinistral individuals than dextral individuals. On the other hand, the foraminiferal species of *B. frigida*, dextral individuals and sinistral individuals are almost the same number.

Keywords: ostracode, foraminifera, Fujisawa Mudstone, Paleo-Sagami Bay

Research about the total eclipse of the moon~Mystery of the turquoise fringe~

Kenichiro Nishi[1], *Aoi Yonemori[1], *Airi Shimohigoshi[1]

1.Kagoshimagyokuryu High School

We compared a picture of the turquoise fringe (TF) from a total lunar eclipse which was taken on October 8,2014 with another picture from April 4,2015 in terms of difference between color and width.
We thought the reason for different was appearance because of the location of the earth's shadow which passed the moon.aerosol which occur when sunlight passed the ozone layer.
We measured the maximum and the minimum width of TF.Then we did image processing .As a result,we discovered the difference in width.
Comparing them numericall,the value fell drastically after the end of the eclipse repeating similar movements.
We think that the cause of the discovery of the TF is the switchover from a film camera to a digital camera.
Also we calculated the distance to the moon.Making use of a picture of the moon and Uranus which we took on October 8 the year before last.

Research about the moon creaters~Impact experiment~

Kenichiro Nishi[1], *Aoi Yonemori[1], *Daisuke Irimura[1]

1.Kagoshimagyokuryu High School

We have performed the impact experiment by using an air-gun. First we collected “volcanic ash of Sakurajima”, “olivine sand” and “Ito pyroclastic flow deposits” (Shirasu). Then we classify them according to their size, and compared them for size and pressure. All materials that are smaller than 106μm could make holes that look like moon craters. The value of the ratio of depth and diameter of moon is 0.2 but the holes that we made had a minimum value 0.69. Therefore, we can’t reproduce moon craters. In addition, we checked the relation the holes of roundness. The values were 0.5(ash), 0.5(olivine sand), 0.4(Shirasu). There were no significant difference among the three materials. We will inspect the relation of the holes to density from now on.

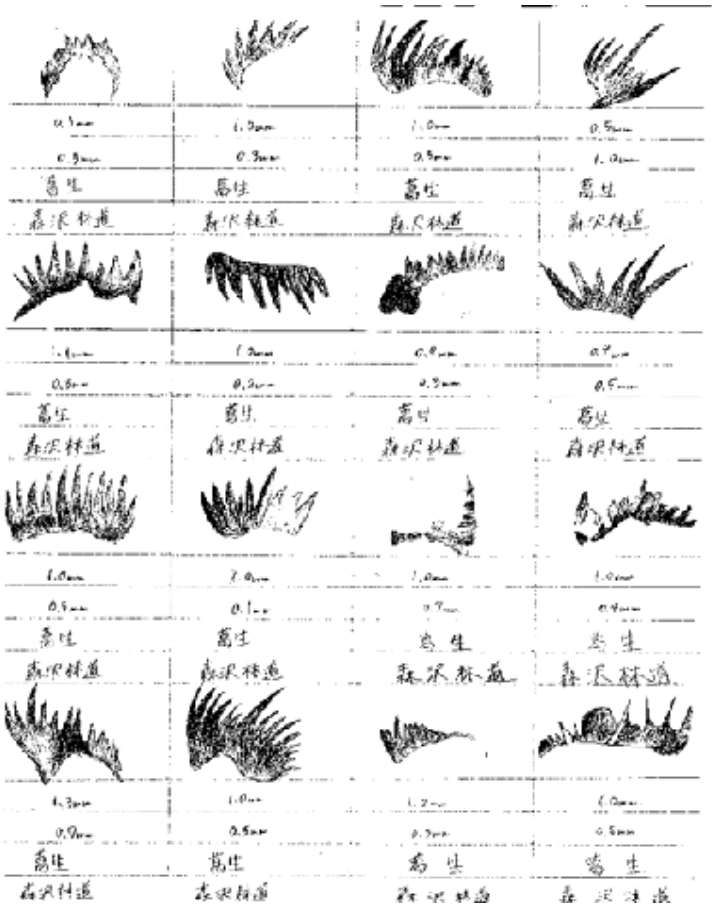
Structural and Functional design of kuzuu's microfossil

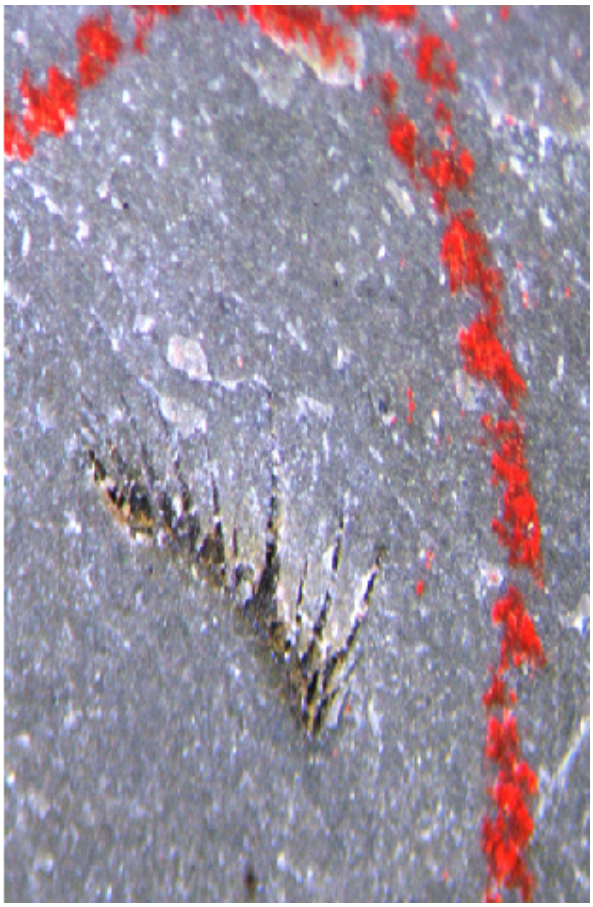
*Norihiro Sasagawa[1], *Ken Tsuihiji[1]

1.Sanonihondaigaku senior high school

Our school in Sano is doing a research to study the diverse geological features in Kuzu. The structure of the stratum and the understanding of geoscience is a fundamental foundation for the report.Kuzu stratum has Fusulinida,conodont and radiolaria. Kuzu geology will tell us the origin of the formation the stratum.
For this experiment,we made a moving animation of the digestive organs
of the conodont. we examined the eating habits and how conodonts digst their food .But we were not able to get any date of its past environment.

Keywords: CONODONT, structure, digestion





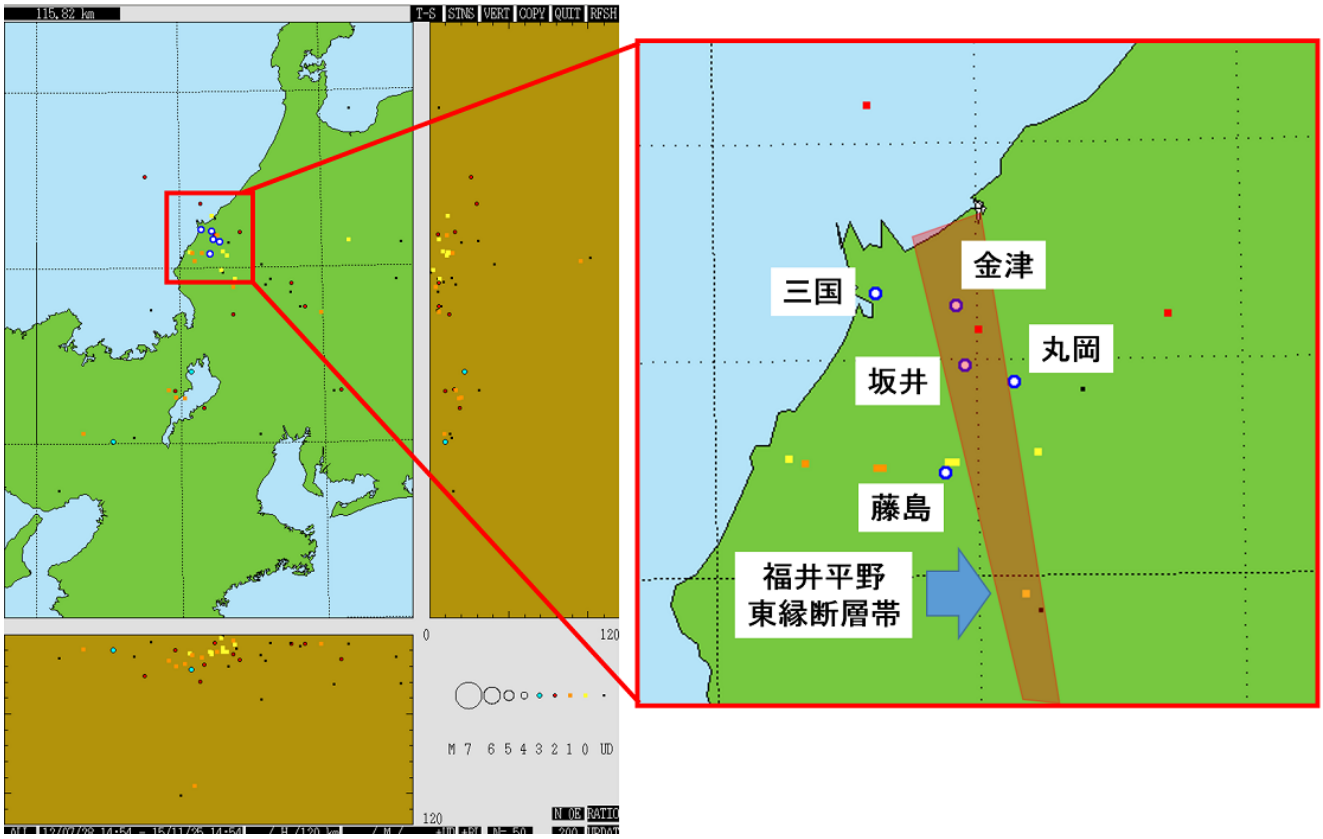
Search of the Fukui Earthquake Faults

*Naruki Ishida[1], *Ryosuke Kokado[1], *Takaki Shimizu[1], *Hirokazu Fujita[1], *Einosuke Honda[1]

1.Fujishima High School

We have studied about the Eastern Margin active fault zone of the Fukui Plain (hereinafter referred to as 'the fault zone.')
First, we measured seismic wave-form by seismometers arranged in 5 high schools (Fujishima, Kanazu, Sakai, Mikuni, Maruoka; especially, Kanazu and Sakai are on the fault zone.) and investigated the arrival time of P and S-wave at the five observation points. We could determine where the hypocenter is through this process.
Then, we analyzed the S-wave splitting using hodographs of the horizontal motions. As a result, we discovered extraordinary S-wave splitting at Kanazu.
Also, we are succeeded in observing earthquakes whose hypocenter are on the northern or southern extension of the fault zone. Analyzing these earthquakes, we found the remarkable subsequent wave after the arrival of the S-wave to Sakai and Kanazu.
From these things we guessed that there are fault fracture zones between the main part of the fault zone and the western part of it, and there are developed cracks in the northern part of the fault zone, too.

Keywords: Hypocenter determination, S wave splitting, crack, Trapped waves



The formation process of the Late Cretaceous of the middle Southern Hyogo Prefecture

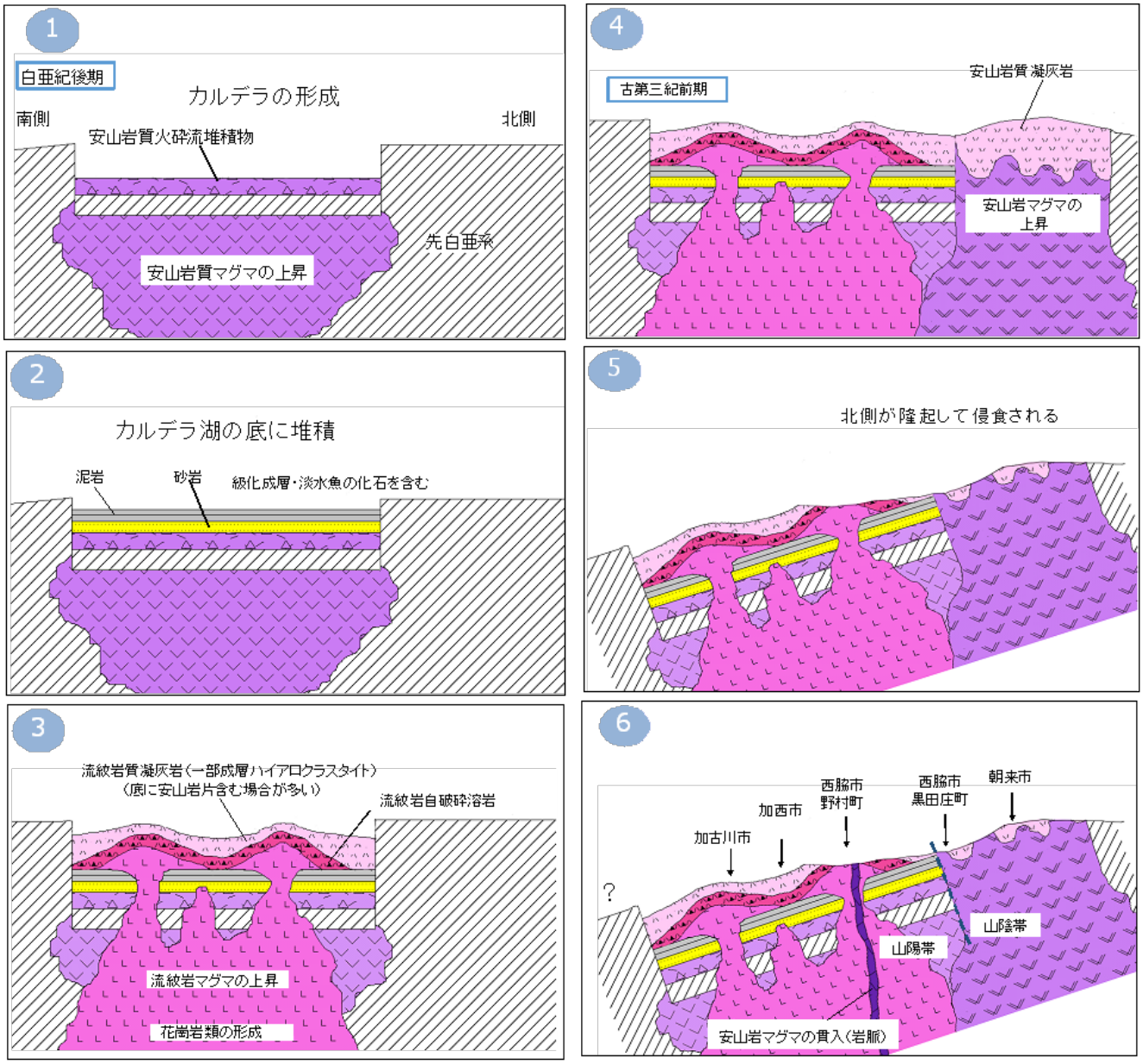
*Kana Fukushima[1], *Sachi Ishii[1], Kohei Usui[1], Amane Takemoto[1], Aiko Tanaka[1], Kenta Hojo[1], Takumi Ookido[1], Koki Okamoto[1], Mana Okuda[1], Hiroto Kubo[1], Ryoga Toda[1], Ryusei Saito[1], Akihiro Sakamoto[1], Mutsuki Shinoda[1], Akane Tanaka[1], Toru Nakahashi[1], Tomo Murakami[1]

1.Hyogo Prefectural Nishiwaki Senior High School, Earth Science Club

1. Motivation and Purpose
Some of the authors were received several flood damages of Kakogawa River in the school area. Last year, in order to clarify the cause of the flood, we conducted a geological survey of Nishiwaki region east and west 20km, over the north and south 18km. We analyzed 85 samples and created a detailed geological map. We elucidated the cause of the flood and formation process of the Southern Hyogo Prefecture (Hyogo Prefectural Nishiwaki Senior High School Earth Science Club, 2014).
We were continued the research, we observed the inclusion of tuff rock fragments. We noticed errors in the discussion which was announced last year. So, we went a geological survey 160km longitudinal north-south direction of Hyogo Prefecture, from the Sea of Japan to the Seto Inland Sea. After observation of 146 samples with the naked eye, we analysed modal composition, magnetic susceptibility, and chemical composition.

2. The formation process of the Late Cretaceous of the Middle-Southern Hyogo Prefecture

Keywords: caldera lake, modal composition, magnetic susceptibility, chemical composition



Temperature and pressure environment of the air in the bubble of ice

*Kohei Usui[1], *Keiichirou Adachi[1], Kenta Hojo[1], Taichi Koshimae[1], Koki Okamoto[1], Mutsuki Shinoda[1], Taku Hatanaka[1], Mina Fujiwara[1], Riku Moriyama[1]

1.Hyogo Prefectural Nishiwaki Senior High School, Biology Club

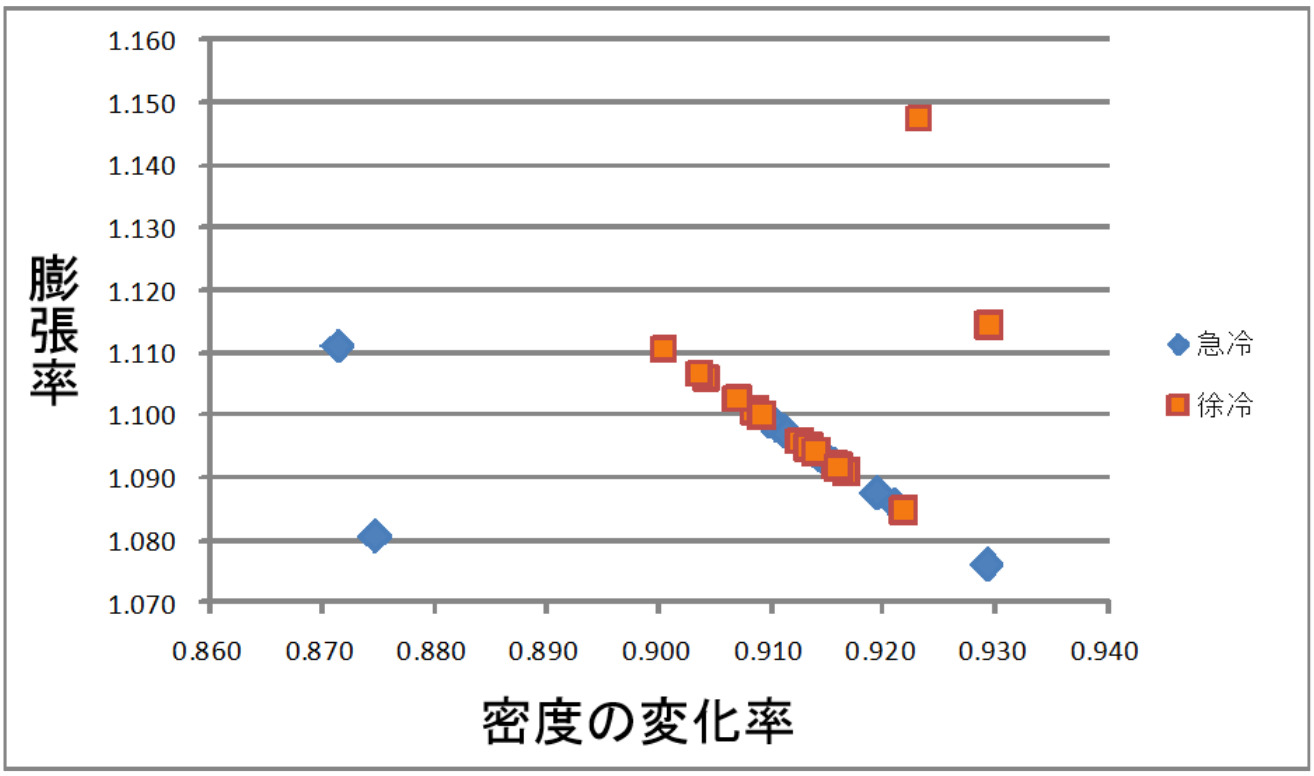
1. Motivation and purpose
Ice does not enter the bubble is a good texture for fine grain. May began the experiment is already severely considerable heat, was trying to make the texture of good ice bubble does not turn on. But we could not make the ice that just do not fit bubbles. One day, the bubble of ice is very similar to the bubble of remaining to defective material of the solidification process of the metal, and the hole of the degassing in the cooling process of magma of northern Hyogo prefecture. Revealing the temperature and pressure environment of bubbles ice, a clue to consider the environment in which the bubble holes of the metal and rock holes are formed. Therefore, we created the ice entered many bubble, and began to study with the aim to clarify the temperature and pressure of the bubbles.

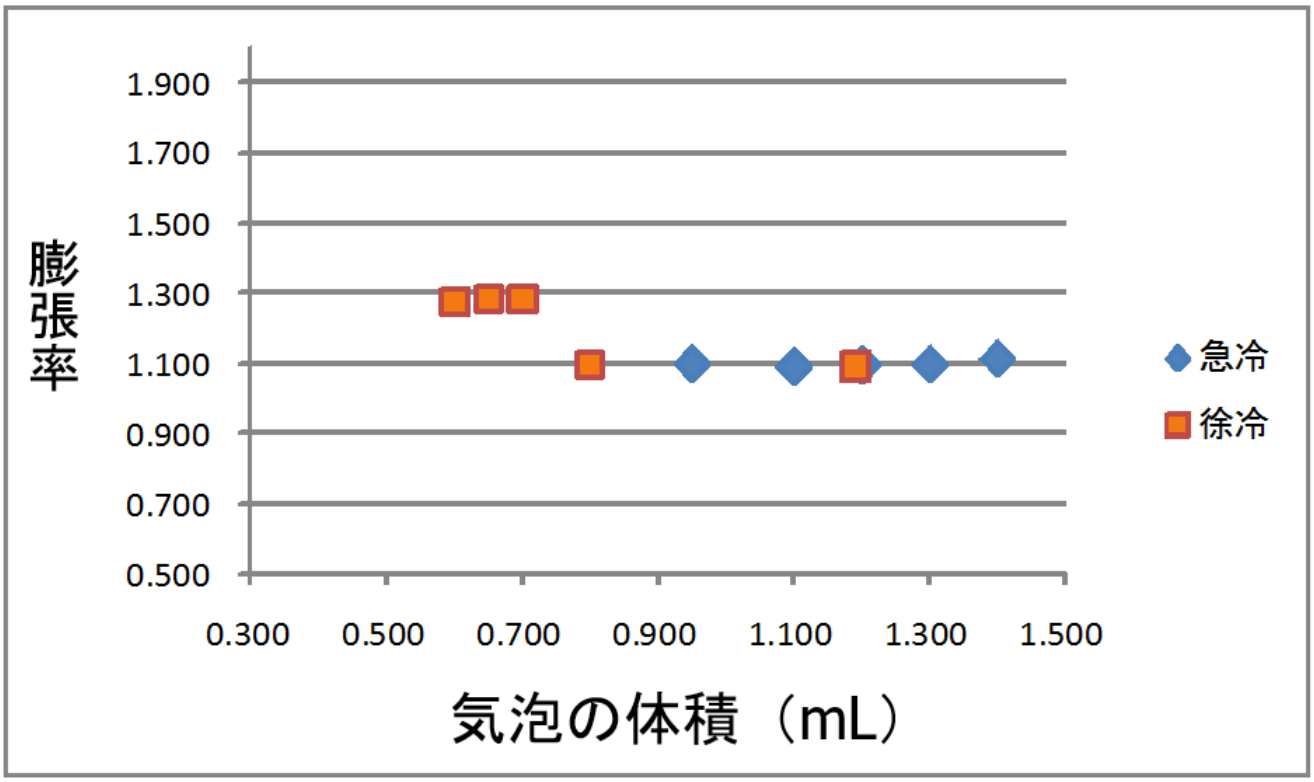
2. Experimental result
Cooling rate variously varied cooling pure water, made the air bubbles are often ice or small ice. It does not inject air into pure water. Moreover, not boiled pure. (1) Change in temperature of the air bubbles trapped in the iceContrary to the hypothesis, the temperature of the air bubbles that could be inside the ice, reached equilibrium at 1 ℃ ~ 3 ℃ about a temperature higher than in the freezer. (2) Density and expansion rate of iceBe different volume of the bubble, significant difference in the density of the entire ice is not observed. Expansion rate of the bubbles is often ice, sometimes slightly smaller than the little ice. (3) The volume of air that has been trapped in the bubble of iceQuenched by crystallized ice is not significantly be differed to a change in the expansion rate and density, it contains many air as bubbles. Despite the large number of air are trapped, who quenched ice the expansion rate is in the rather small trend.

3. The entire Summary and Discussion
Since made ice the same pure water is cooled, the bubble is somewhat not due the amount of air contained in the original pure water, the difference in cooling rate is the cause. And that the amount is often in spite of the entire ice expansion rate of the air it does not change to be encapsulated, from the fact that the bubble is not a significant difference was observed in the change in density in many ice, crystallized ice and quenched the bubbles, it is possible that under high pressure towards the interior of the air.When the bubbles enter in the process of metal is solidified, not a commodity. When the magma deep underground causes the bubble to solidify, in a large felsic magma chamber, the volume cannot be expanded. As of these, the environment caused a large number of bubbles in a state in which the volume cannot be inflated, but such as temperature and pressure there is several orders of magnitude, the environment and the similarities of this experiment many.

4. Future tasks
Fine bubbles invisible to be encapsulated in the ice, which may have affected the temperature in the bubbles of the quenching and slow cooling. Since it is necessary to capture the phase equilibrium relationships dynamically, in the present stage, it is impossible to link immediately with this experiment bubbles environments metals and rocks.

Keywords: air bubble, density, expansion rate





The 1896, the 1933, and the 2011 large Earthquake Tsunamis damaged the Sanriku District.

*Satoshi Abe[1], *Syunpei Shimizu[1], *Tokio Yamamoto[1], *Minami Takanashi[1], *Tatsuhiko Terada[1]

1.Sakae Higashi High School

In 2011, Tohoku area suffered serious damage by the Great East Japan earthquake. We surveyed the damage situation there in the same year. In this study, we performed a field survey in Iwate to investigate these damage again.
These area were caught in damage by earthquake and tsunami many times like 1896 and 1933 . We surveyed memorial stones about 1896 and 1933 Sanriku earthquake tsunami in Taro district at the same time,and we could find 21 stones . We want to pass down the message of these stones to the next generation.

Keywords: the Sanriku District of Iwate Prefecture, the 2011, the 1933 and the 1896 Sanriku Earthquake Tsunamis, the memorial stone

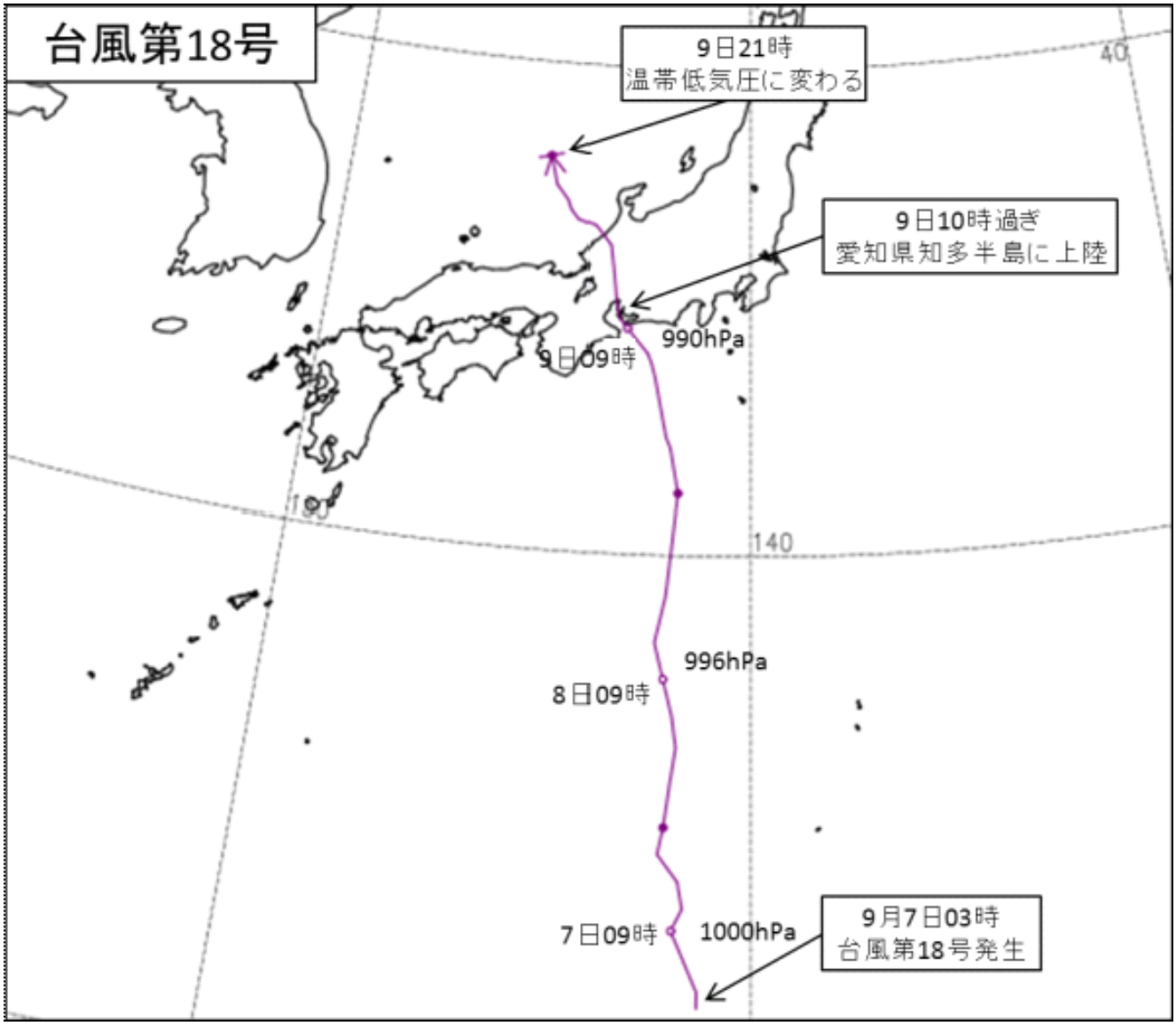
Inspection of the record heavy rain in the Kanto District on September 9, 2015.

*Keita Nagasawa[1]

1.Sakae Higashi High School

In this reseach,I inspect the torrential rain of Sept 9, 2015. The disaster called the heavy rain in Kanto and Touhoku district was caused by the No.18(typhoon). The typhoon occured above south sea off the Pacific Ocean in Sept.7 went to north and made a landing in Tita peninsula of Aichi Prefecture. After landing, it ran to the north-northwest above Japan.It through above Aichi, Gihu, Fukui and Isikawa Prefectures and it changed to Extratropical cyclone in off the Fukui Prefecture of the Japan Sea.
The following, I describe the date of AMeDAS point by JMA.In Sept10,it rained 551.0mm in a hole day and 59.5mm in a hour (3a.m.~4a.m.), respectivelly. in Ikari of Tochigi Prefecture in the north of the Kanto district. As a result,the dick of Kinugawa river collapsed and there were 3 dead people,5 injured people,23 complete destroyed houses,25 partly destroyed houses,76 some damaged houses,2611 inundation above floor level,3376 inundation lower floor level and Tobu Kinugawa line, Tobu Nikko line ,JR Jouban line were suspended .But in this reseach, I darinply paid attention to south of the Kanto district whose damage was less than north part and I compared rainfall distribution and the damage situation with north part.
In Oume of Tokyo(139°.18'7

Keywords: the heavy rain in Kanto and Touhoku district, south of the Kanto district, the condition which the rain crowds' precipitation strength keep strong for a long time



Quantification of Light Pollution

*Ikumasa FURUKAWA[1], Rikuto HONDA[1], Motoya KOBE[1], Yuno FUJII[1], Erika NISHIMURA[1], Taisei HIGASHIMOTO[1], *Haruki IWAMITSU[1], Rika MARUYAMA[1], Ryoga MAEDA[1]

1.Higashichikushi Gakuen High School

We can watch stars clearly in the mountains, but we can't watch them clearly in the urban areas. So we were interested in light pollution, and we have been researching for sky-glow since 2002.
Light pollution is that artificial lights exert bad effects upon environment. From the research by our seniors, we realized sky-glow is had major effects by the weather conditions and the environmental index.
J.Bortle and S.Albers researched for quantifying the dark night sky in 2001, but the "LPI-S" we defined is quantification of the night sky brightened by artificial lights.
We want to enlighten light pollution using LPI-S not only in Japan but also all over the world, we hope to reduce wasteful energy.

Keywords: sky-glow, rate of sky-glow variation by time, light pollution, quantification

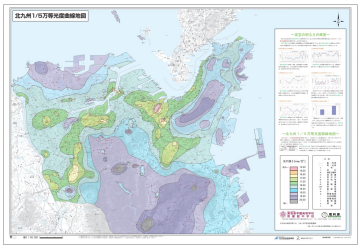


図1. 北九州1／5万等光度曲線地図

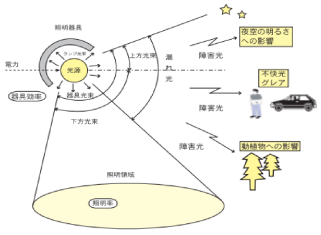


図2. 光害の環境への影響

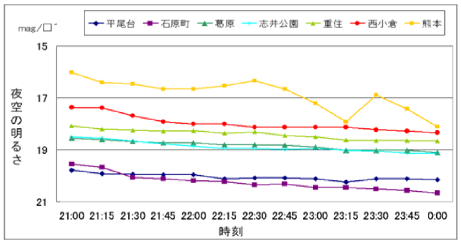


図3. 北九州市各地の経時変化率

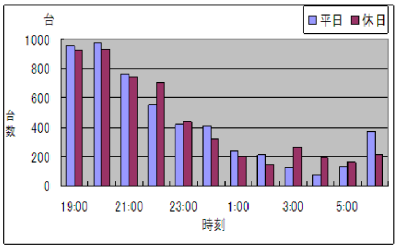


図4. 自動車の交通量の変化

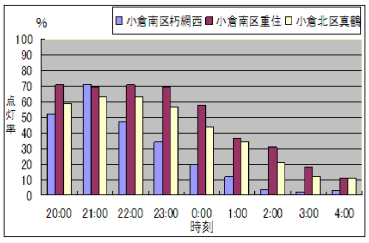


図5. マンションの点灯率の変化

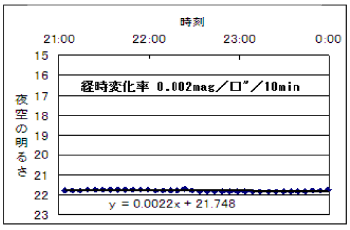


図6. ひろのまきば天文台

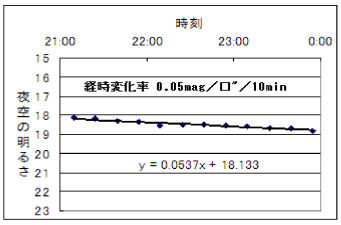


図7. 津高校

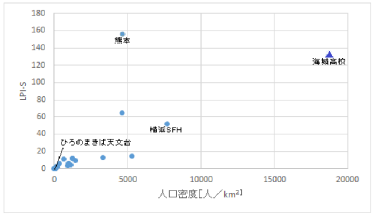


図8. LPI-Sと人口密度(半径2km圏内)の比較

$$LPI\text{-}S = \frac{Pr}{b} \quad [人/(km^2 \cdot h)]$$

(Light Pollution Index of Sky)

LPI-S：光害指数
r：経時変化率(mag/□"/h.)
P：人口密度(人/km²)
b：夜空の明るさ(mag/□")

光害公式

観測地	LPI-S	みられる光害の様子
北九州市熊本（東筑紫学園）	156.4	・ナイター照明点灯時の観測値 → 夜空に与える影響が大きい．．．。
東京都新宿区（海城高校）	132.8	・肉眼で見える星は、１等星が限界 → 仕方がない、東京は新宿だ．．．！
北九州市清水（東筑紫学園）	38.9	・黄砂などが中国から飛来し、夜空を明るくする
愛知県一宮市（一宮高校）	12.8	・北極星（２等星）を見つけることが困難なことがある ・市内のホタルが、都市開発のため．．．。
北海道函館市（遺愛女子高校）	6.4	・見えるときには、４等級程度まで肉眼で見える → さすが函館、夜景が売りなだけある．．．。
香川県東かがわ市（三本松高校）	2.4	・早い時間からでも3.5等星 が肉眼で見える ・夜遅くまでセミが鳴いていたことがあった
富山県富山市（富山市天文台）	0.4	・住宅率 h =3、経時変化率 r =0.06 なので、LPI-S=0.4 → さすが天文台、光害がない！！
岩手県九戸郡（ひろのまきば天文台）	0.003	・住宅率 h =1、経時変化率 r =0.012 なので、LPI-S=0.003 → さすが天文台、光害がない！！

表. 全国ネットワークへのアンケート調査回答

Recent Reducation and Recovery "Hirotani Moor" in HIraodai Karst,Kitakyusyu + The Ramsar Convention

Akio Mizushima[1], Souta Tabu[1], Kentarou Yamamoto[1], Ayane Hurumoto[1], *Seiryu Matuoka[1], Owen Chen Williamson[1], Norihiro Maeda[1], Takumi Kmesaki[1], *Tomohiro Kajihara[1], Nao Komori[1], Yosiaki Matusita[1], Kevin Chen Williamson[1]

1.Higashichikushi Gakuen High School

We have been resarching the origin, decrease and recovery of the "Hirotani Moor"in Hiraodai Karst since 1994.
In origin, why does the moor exist on the Karst without water? We made a proof from "crescent lake"-point of view by the flow observation and river measurement.
In Decrease, we compared our measurement result of studying for seventeen years (in 1994,2001 and 2010), and considered the reason of decrease. We find out that the moor had decreased more than 60% by human. We measured the moor this March. During the measurement, We found many new discoveries and research about the decrease or regeneration of the moor.
In Recovery,We think that to return the time line of the moor is the human duty. So, we start the preservation activity. For one of them, we are doing the Ramsar Convention registration activity.

Keywords: Hiraodai Karst, Hirotani Moor, THe Ramsar Convention, Groundwather recharge

2012～2014年 植生調査

福岡県レッドデータブック
発刊記念シンポジウム

石積み

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自然観察会で解説する理科部員

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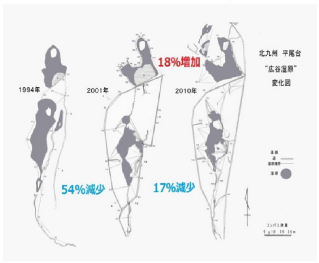

1994年～2010年 面積測量

Starry Night: How Dark Adaptation affects the Visibility of Stars

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This study aims to find the appropriate condition for observers to view the starry sky, focusing on dark adaptation. The results show that all the observers make the same level of progress in dark adaptation, regardless of age. Also, when the observers are in bright urban cities, they can see stars that are about 1-2 magnitudes darker if the observers have 7 minutes of dark adaptation time at the beginning of the observation.

Keywords: dark adaptation, starry sky

Colours in the dark
~Which colours are most visible after dark adaptation~

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First, we had examined how much you come to see light as time goes by in the dark, using LED of red, blue and green color. The results varied widely between each colors. The results surprised us very much. Thereby, we had decided to find out why it became such results.We demonstrated that visibility of lights after dark adaptation was related in the wavelength of the light's color.The shorter wavelength of light is, the more you can see it. We think, that's because the cells of the eye that play central role changed from a cone cells to rod cells.It may be said that the blue star having high temperature looks more brightly in really dark places.

Keywords: dark adaptation, Colours

The visibility of ISS

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We wondered why the visibility of the ISS was changing while we were watching the ISS with our club members after school. In addition, I found that its visibility varies day by day. According to the ISS expectation site by JAXA, we can know the time, the direction, and the angle of elevation to observe the ISS but they don't provide information about the brightness. In the observation of the ISS, we thought it would be brighter when the angle of elevation was bigger. But we also thought other factors might influence the visibility of the ISS, so we decided to study the factors which influence the brightness of the ISS. If we can predict the visibility of the ISS, we can choose suitable days for the observation of the ISS and more people can enjoy it.

Keywords: ISS, visibility

Traditional Tanabata Festival ; Measuring the success of the “lightdown”

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We support "Traditional Tanabata light-down campean". It is an activity where we enjoy watching the woderful starry sky with the lights turned off for 2 hours from 8 o'clock on the night of Tanabata in the Chinese calender,which was August 20th in 2015. Last year, we started a public awareness activity about this event for people living in Gunma Prefecture. Also,we do continuous research on the brightness of the night sky. This time,we measured the degree of brightness by using a camera,SQM-L,-LE and illuminometer. We observed the brightness of the sky from August 17th to 20th and compared the results of these four days. On August 20th, unfortunatery it was cloudy and the sky was bright,but we could examine the brightness of the city exactly with a new way of developing pictures.

Keywords: Traditional Tanabata Festival, lightdown

~ Dark side of the moon : Is the Earthshine really blue? ~

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Yuri Gagarin,who is a Russian astronaut and the first human in space, said "The Earth is blue"when he looked at the earth from the space. We'd also like to say "The Earth is blue " as he did, but it is not easy for us to travel into space to see the Earth as he did. Then, how about staying "The Earth SHINE is blue ,instead? The earth shine is not something we can easily see, so we decided to research it in detail. We assumed that we could say the earth is blue if the percentage of the blue shine is larger than that of the moon. As a result of our observation, the percentage of RGB of the moon is different from that of the earth shine and we have found that the earth shine and is more likely to be tinged with blue.

Keywords: Earthshine, Colour

Spring and Autumn Equinox : Why is the daytime longer than the nighttime ?

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It is said that the length of daytime and nighttime on Vernal equinox day and Autumn equinox day are the same, but actually the daytime is 16 minutes longer than the nighttime. One of the reasons is the detinition of the sunrise and the sunset. The other is the refraction of light that travels in the air. We can't prove the first reason because it is the matter of detinition, so we will prove the second one. We revised the distortion of the photos we took and calculated the angle that the sun moved. But we couldn't get a graph as we had expected. We will make a research on this cause and take the photos of the sun movement on the next Vernal equinox day.

Keywords: Spring and Autumn Equinox , daytime and nighttime

Observation of meteor in the thermosphere-ionosphere

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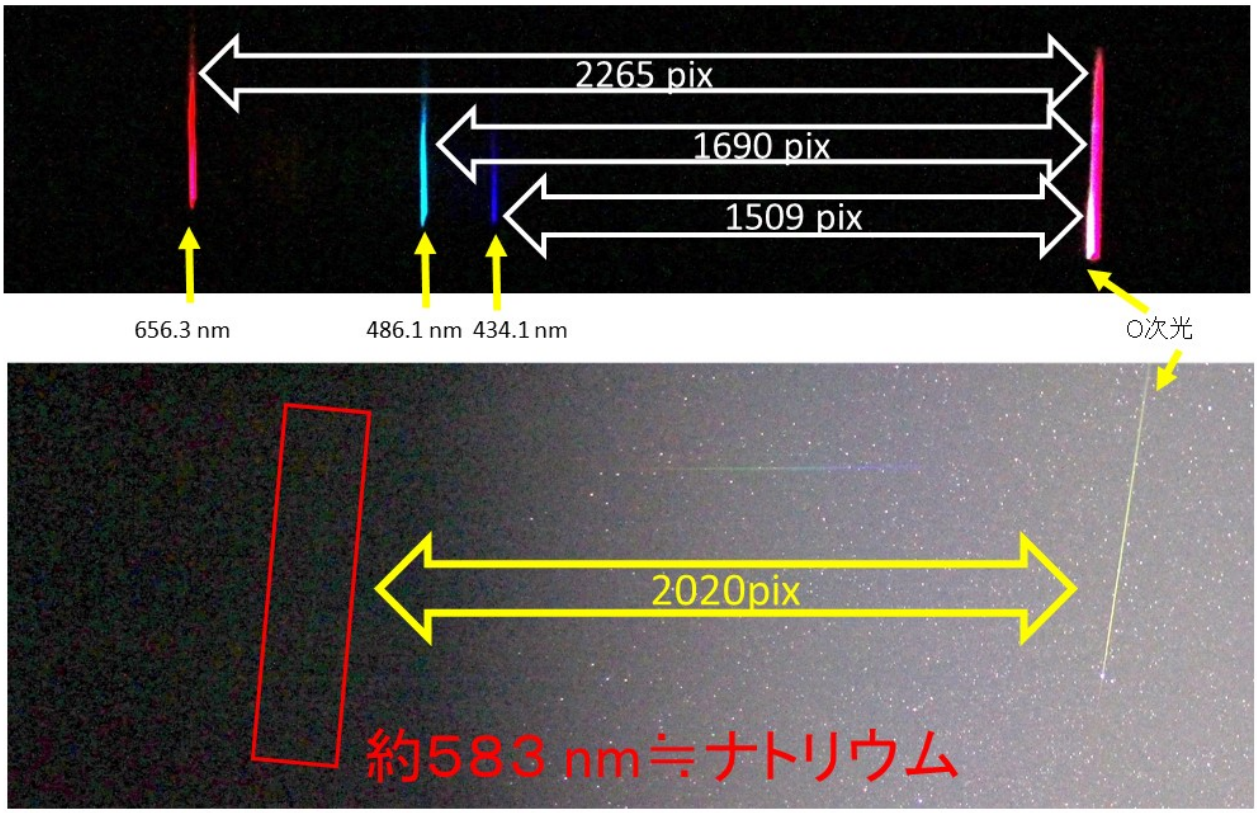
We observed the Perseid Meteor Shower in 2013. It was a chance to capture the colors of the meteor changing in the middle of flashing. We want to research the reason of the change. So we carried out spectroscopic observations. It can identify the element. The data is the Scattered Meteor in 2015. The direction of the meteor became vertically to the dispersed direction. So we could identify the wavelength. It was the wavelength of about 583 nm. Therefore, we thought this spectrum may be sodium (Na/589 nm).

Keywords: meteor, diffraction grating, spectrum



Little ice age during the Edo era in the WAKASA area
~Climate reconstruction using Modern analogues technique~

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It is known that past climates can be reconstructed quantitatively through pollen analysis of sediments. In Wakasa, Fukui, it is recorded that there were three major cold famine periods during the Edo era, but it's not known what the temperatures were like at that time. We tried pollen analysis in order to verify the past climates quantitatively. Based on the results of Carbon-14 dating, we collected 16 sample sediment layers from the first years of the major famines during the Edo era. After pollen extraction, we counted the pollen of the trees, 200 in total per 1 sample and calculated the rate of genus and species included in each sample. Based on the pollen data, we reconstructed the climate of 300 years ago by using the reconstruction software, Polygon. As a result, we could find two low temperature periods.

Keywords: pollen analysis , three major cold famine periods, climate reconstruction, modern analogues technique

Sprite -The Transition of Luminosity, or Energy over Time-

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1.Ichinomiya High School

“Sprite”, which is a luminosity phenomenon that occurs in a brief moment, was discovered in America in 1989. It appears in the upper atmosphere 40 - 90km above the ground after the occurrence of lightning. It is said that the brightest part of Sprite is brighter than the Milky Way. The word “Sprite” means “fairy” in English. Sprite is seen as red or orange to the naked eye, so that it is also called “Red Sprite”. Among them, there are various kinds of sprite such as “Carrot Sprite”, “Column Sprite” and so on.
Since 2004, our research team has observed and researched it using Watec100N, a high sensitivity monochrome video camera, and UFOCapture, a software which always monitors video data on computer memory, and records two seconds, or one second each before and after the occurrence of some changes when it detects them. Moreover, we introduced two lenses with different focal lengths in 2014. One is an 8mm wide angle lens, and the other is a 25mm telephoto lens. This year, we placed an emphasis on the transition of energy over time. Therefore, we are researching luminosity's transition of energy in the time frame of up to 1/12th of a second in one event.
First of all, we thought that we should compare sprite with the magnitude of other heavenly bodies in the same picture in order to measure the energy of sprite. We identified the magnitude of a heavenly body, using a software which can simulate an observation into outer space at any given moment and at any given place on earth. Therefore, we chose εUrsa Minor (4.2mag) which has an unsaturated luminosity value.
In contrast to fixed stars which continuously emit light, sprite can be observed in a very short time. We divided one picture taken from a video clip (30fps) into two pictures, each with a set of frames recorded at different times using GIMP, a free software to process images. This process is called Interlace Withdrawal. It enabled us to view the change in sprite’s luminosity in a high resolution of 60fps.
To set the coordinates (1,1) on the top left and (640,480) on the bottom right of all five pictures, we set the horizontal axis as the x-axis and the vertical axis as the y-axis. We also expressed the luminosity as a scale of 256, in other words 0 to 255.
However, lenses have a property which enlarges the luminosity in the images called limb darkening. So, we did a flat plane correction to divide the luminosity value in the images by that of the picture of vignette components which were taken through the same lens. The back ground value is then subtracted from it. Like so, we found the real luminosity value.
We expressed the unit of sprite’s luminosity as mag/sq-deg by substituting the real value for Pogson’s formula. In consequence, most of the sprite’s magnitude is less than that of the Milky Way. Thus proving that sprite is brighter than the Milky Way.
Thanks to the H-R graph which has B-V as its horizontal axis, we found the absolute magnitude of ε Ursa Minor. We also compared the energy of εUrsa Minor with the energy of sprite in terms of both of their distance ratios, basing it on the solar constant. In conclusion, we were able to successfully find the total amount of energy in one portion of the sprite.

Keywords: sprite, interlace withdrawal, flat plane correction, Pogson's formula, H-R graph, solar constant

Sprite 時間の推移における光度＝エネルギーの変化

Team EXON
愛知県立一宮高等学校地学部

1.概要

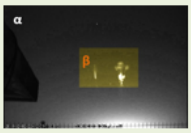
スプライトとは、 1989年にアメリカで発見された『落雷が発生する際にその上空の高度40～90kmの高層大気中で発生する一瞬の発光現象』であり、最も明るい部分は、天の川よりも明るいとされている。
一宮高校では 2004年度から高感度モノクロビデオカメラWatec100Nを使用した観測、研究を継続しており、2014年度から焦点距離の異なる8mmの広角レンズと25mmの望遠レンズの2種類のレンズを用いた観測を行ってきた。今年度は、時間の推移におけるエネルギーの変化に重点を置き、インターレース除去を行うことによって、1イベントで最大1/12秒間の光度変化を研究している。

2.これまでの研究

①広角レンズ・望遠レンズ

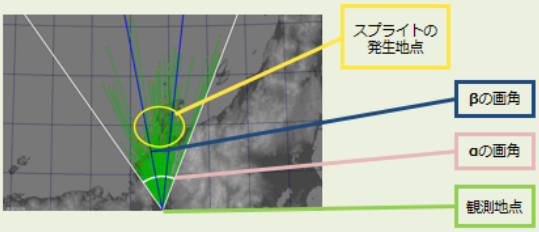
・高感度モノクロビデオカメラWatec100Nを2台用意し、2種類のレンズの焦点距離の違いから撮影できる範囲は右のようになる。

・以前は50mmの望遠レンズを用いていたが、捕捉確率が低かったため、2014年度に25mmレンズの望遠レンズに変更した。



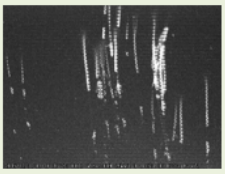
α：8mm F0.8　β：25mm F1.8

②観測方法

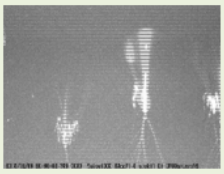


③形状

・スプライトには様々な種類があり、発生する高度や発光形態の違いによって分類される。



カラム状スプライト（高度50~90km）



キャロットスプライト（高度55~80km）

3.研究結果

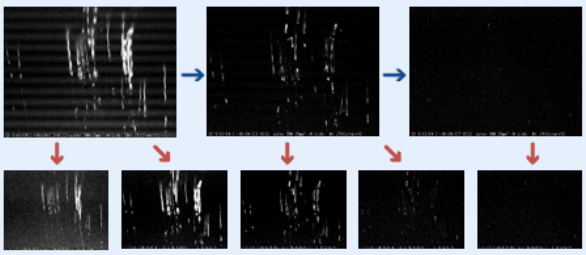
①エネルギー量の算出

・スプライトのエネルギー量を求めるには、画像内の他の天体の等級と比較すればよいと考え、ステラナビゲーターで特定した天体の等級や太陽のエネルギーが地球に届く量に換算した値と比較することにした。

・恒星が光り続けるのに対して、スプライトの発光は一瞬であるので、発光が進展する瞬間の様子を静止画にした。

②インターレース除去

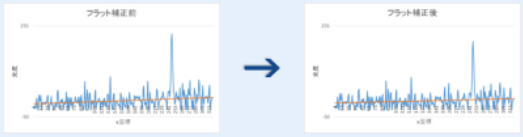
・スプライトを観測できる時間は非常に短いためビデオカメラの30(fps)を、さらにGIMPを用いて奇数列(前半)と偶数列(後半)に分けることによって、スプライトの発生とその変化の様子をより詳細に見ることができる。



③光度の数値化

・インターレース除去を行った画像をすばる画像処理ソフト『マカリ』を用いて、水平方向をx軸、鉛直方向をy軸、光度を0～255の256段階で表した。

・レンズの性質上、画像の中心に近づくにつれて光度が大きくなる傾向があるので、x座標のすべての点において正確な値を求めるために同じレンズで周辺減光成分を撮影した画像で割るフラット補正を行った。

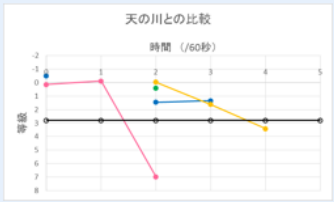


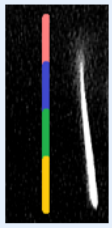
：光度変化　：スプライトを除くx座標の光度の近似直線

・フラット補正の結果、近似直線の傾きが0.0689から0.0458となり、2.3%向上した。

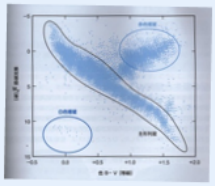
④エネルギー量の比較

・スプライトを右のように4分割して、それぞれの等級をグラフに表した。
グラフよりスプライトは天の川よりも明るいと証明できた。





・また右のH-R図と太陽定数(1.37[kW/m²/s])よりスプライト(上部1/4)と画像内のこぐま座ε星(4.2等級)のエネルギー量を比較したところ、スプライトはこの恒星の約97倍のエネルギーを持つことがわかったので全エネルギー量は2.1×10^{2}[W]という結果になった。



4.展望

・スプライトが持つエネルギー量を求めることはできたが、これはスプライトの一部分であり、それ以外の部分は光度を測定した時に値が振り切れてしまったので、真の値を算出する方法を考えるとともに、これらの研究を様々な形状のスプライトでも行い、比較していきたい。

使用ソフト

- UFOCapture
- UFOAnalyzer
- ステラナビゲーター
- ステライメージ
- GIMP
- すばる画像処理ソフト『マカリ』

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・H-R図－基礎からわかる天文学　半田利弘著（文堂新光社）

謝辞

・SSH　高知コンソーシアム　　・高知工科大学　山本真行先生

Simulation of Light Pollution of the Night Sky
~Use the mesh of population and elevation~

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1.Ichinomiya High School

Light Pollution causes various problems due to the use of excessive light and is one of the pollution problems.
There are two problems in the influence of light pollution.
First, light pollution has some bad effects on the ecological system, such as the effect on growing and breeding of animals and plants.
Second, it causes problems of affecting the brightness of night-sky, which make it hard for us to see stars in the sky when illuminating the night sky brightly by artificial light.
We're doing research about light pollution by actual observations and the simulation using a computer.
Furthermore, we try to improve accuracy of the computer simulation with the use of a procedure called Mesh, which takes the population and earth's elevation in a certain area into account and make maps the brightness of the night sky all over Japan.

Keywords: Light pollution, simulation, Data of Mesh

Consideration of beach erosion in Ibaraki Prefecture Ose coast

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In recent years, in the Ibaraki Prefecture, north coast have been reported to beach erosion. For close Ose coast from school, was examined in the past of aerial photographs, topographic variation seen and beach erosion was observed. This study, and the actual condition of the terrain change in Ose coast, consider the relationship between ocean currents.We are, through March of this year from last July, and terrain surveying Ose coast of beach terrain (50m ×30m square) in about 50 days every, examined the changes in the terrain surface of the sandy coast. As a result, July to 12 months was seen erosion of beach terrain surface is reduced average 52cm. December to three months following the deposition of beach terrain surface is average 26cm rise was observed. Thus, it was the result of beach terrain surface than at the start of the survey is the average 26cm erosion as a whole. As factors that cause of these terrain variation, was discussed focused on the ocean current that flows through the study area coast.We will use the data of the Japan Meteorological Agency, were examined, such as the flow rate of the ocean current that flows through the study area coast. As a result, the center from 8 to October erosion trend continued fast flow rate of ocean currents, ocean currents were many days that flows through the south-facing. In addition, December to March the deposition trend was followed by the slow flow rate of ocean currents, an increase in the number of days that flows northward, also had increased the number of days the ocean current itself does not flow.From the above, Ose coast by ocean currents flow rate of the south-facing is fast (Oyashio origin) is eroded, deposited the flow rate of the north is by slow ocean currents (Kuroshio origin) is considered to have been made.

Keywords: coastal erosion , Ose coast, ocean current

The causes of the noise in meteor radio observations from annual data and countermeasures against them

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1.Keio Shiki Senior High School

We have been making the meteor radio observations for two years. Last year, we reported the causes of the noise in the observations, which was titled “The influence of urban environment on radio meteor observing”. We examined more deeply the causes of the noise, the effects on our observations and the measures against the noise following the advice given for the last two years and our stores of observation data. As a result, we could grasp the time when the noise tends to happen and the frequency of noise in each season from annual data. Besides, we speculated that the noise were made by a sporadic E layer or a power supply device. Also, we recognized that the audio capture device makes the noise decrease.
This time, we are going to report the causes of the noise and the measures against the noise, which wererevealed from our data.

Keywords: meteor, radio observations, measures against the noise

To Calculate the Radius of Exoplanets by Observing Multicolor Transit

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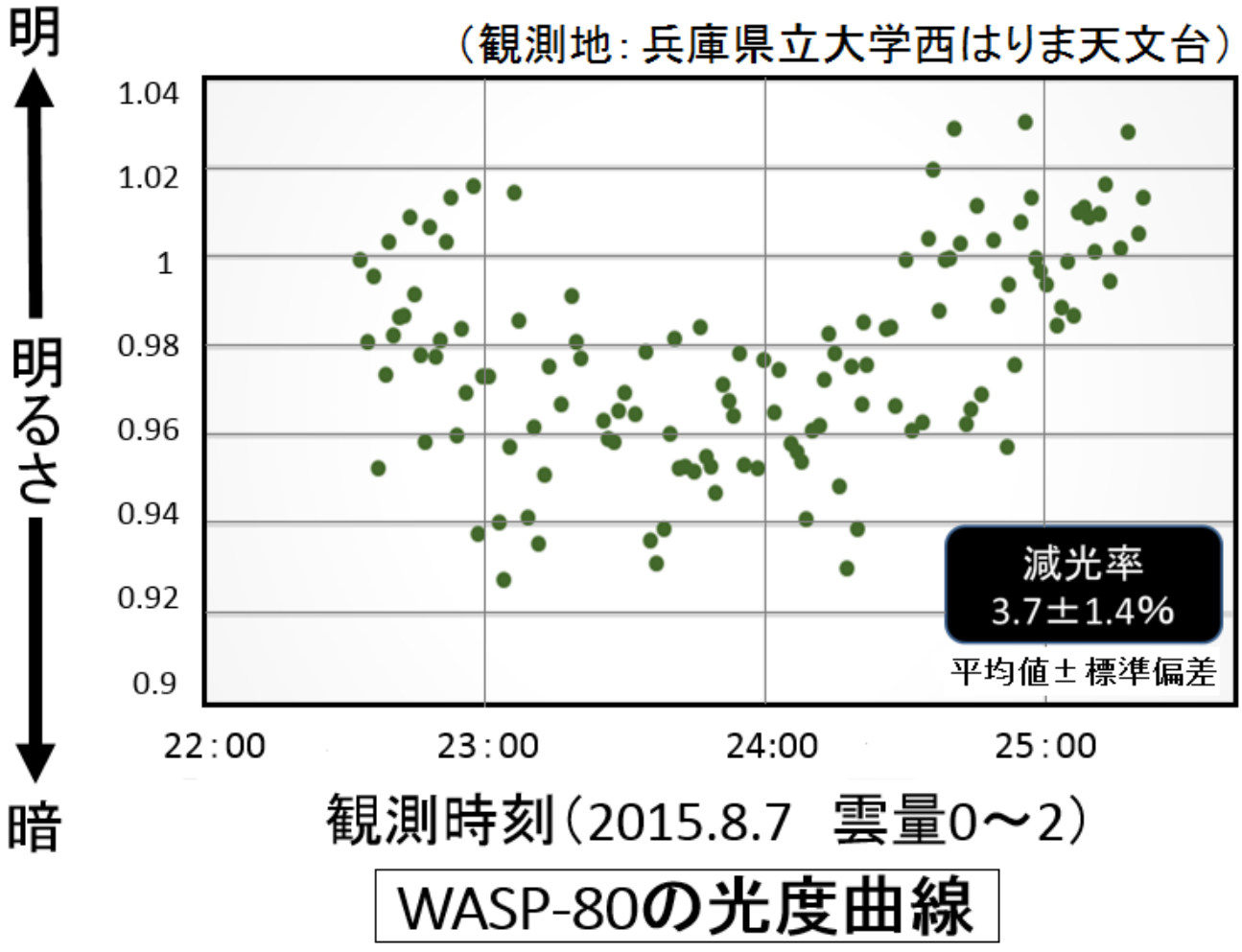
Last school year, the exoplanet research group from this school observed two fixed stars which we predict to have exoplanets using the transit method. Regarding this, the radius that we predicted was 10~20% larger than literature data. We think that the cause is an exoplanet’s atmosphere, so we used four types of filters; B, V, Rc, Ic, and performed multicolor photometry to observe the transits. As a result, using a shorter wavelength filter, the exoplanet's radius was larger than with a filter of long wavelength. This is thought to be by the scattering by the atmosphere of exoplanets.

Keywords: Exoplanet, Transit, Multicolor photometry observation



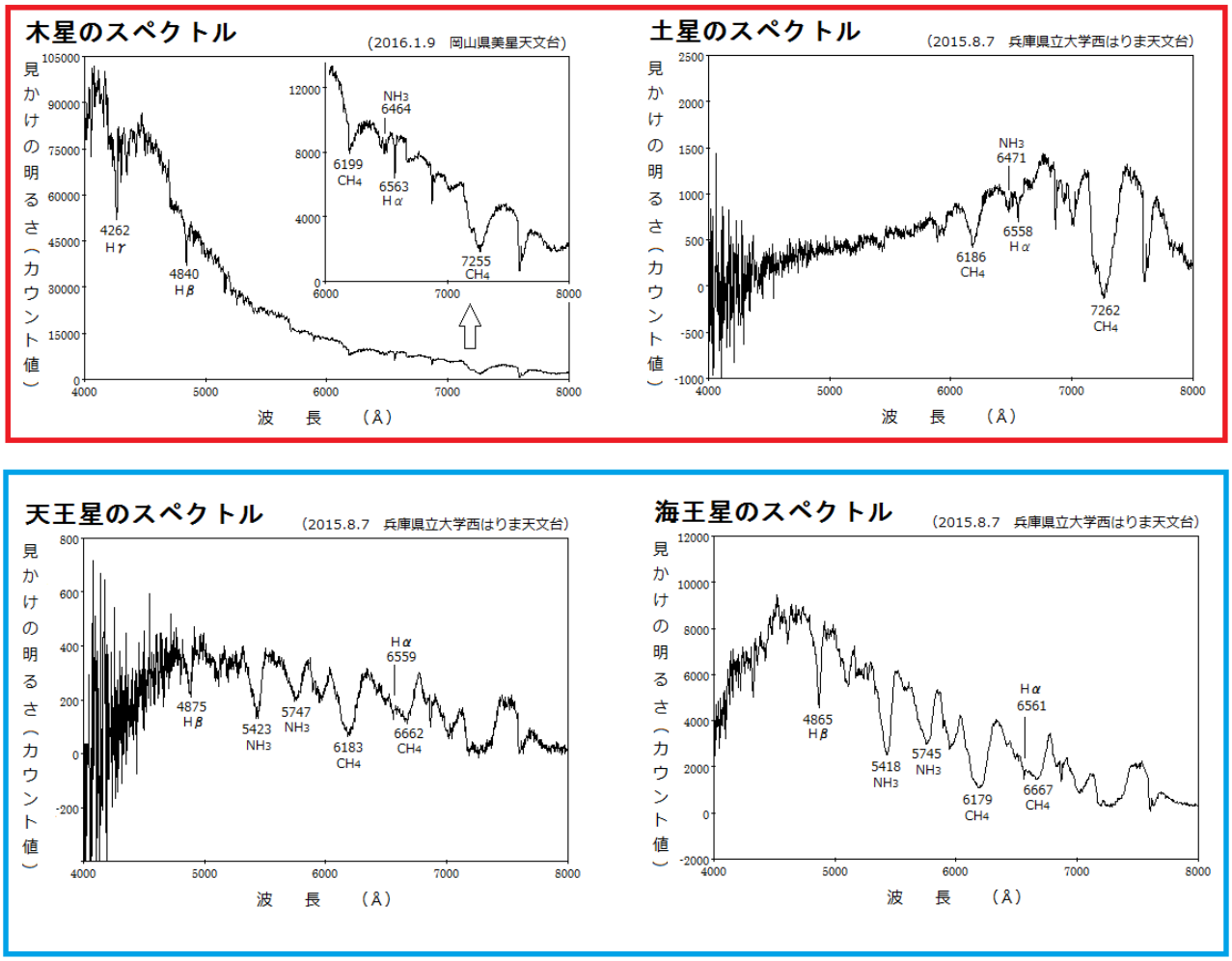
Ingredient Analysis of the Planetary Atmosphere

*Togo Tanaka[1], *Kazuma Kosugi[1], *Kaede Murakami[1], *Hibiki Yoshida[1]

1.Nara Prefectural Seisho High School

We used a spectroscope and a large diameter telescope, from Nishi Harima Astronomical Observatory in Hyogo Prefecture and Bisei Observatory in Okayama Prefecture. Then, we decided to examine the components of the planetary atmosphere in the solar system. The spectrum of Mars, Jupiter, Saturn, Uranus and Neptune could be obtained. The chemical composition was identified from be absorption lines in each planets spectrum data. As a result, the spectrum of Mars had a clear difference to be other planets. In addition Jupiter and Saturn as well as Uranus and Neptune had different absorption lines. From this date, the atmospheric composition of Jupiter and Saturn, was confirmed to be a little different to Uranus and Neptune.

Keywords: Spectrum, Absorption line, Atmospheric composition



各惑星のスペクトル図

Permeability of residual granitic soils create landslide conditions on Mt.Ohfuji,Hyogo.

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A large-scale landslide occurred on Mt.Ohfuji of Kakogawa City following a major typhoon in 2011. However, no landslides occurred on the adjacent Mt. Takamikura, which has a similar slope. The main difference between these mountains is that Mt.Ohfuji is composed of granite while Mt.Takamikura is composed of tuff.In addition, landslides occurred in Hiroshima City in 2014. It is said that residual decomposed granite soil was one of reasons why they occurred.We thus thought that granite bedrock may be related to landslides.
First, we compared how samples of granite, tuff and rhyolite change when heated. Upon heating gaps developed between mineral grains in the granite.We determined the calcium concentration of surface water at Mt.Ohfuji and rainwater. The water flowing at Mt.Ohfuji contained a high concentration of calcium while rainwater did not. Calcium is easily leached as granite weathered by water.
We examined granite samples and tuff samples and measured their primary permeability. The granite samples were found to have low permeability, and standing water collected on granite samples easily. We then examined the grain size and permeability of soil samples from Mt. Ohfuji to determine their coefficient of permeability. We found that permeability decreases in a soil layer as the sand particles become finer. Because there is little fine sand in surface soils formed from altered granite, as is the case at Mt. Ohfuji, water easily reaches the bedrock layer, further weathering is promoted, and a thick soil layer is formed. Through these processes, the layer of soil just above the granite boundary quickly becomes saturated during a storm event. The result is a destabilization of the soil column in which the upper soil slips over the saturated lower layer, causing large-scale landslides to occur.

Keywords: granite, permeability, weathered process

Development of an aerodynamic free-fall apparatus for microgravity experiments

*Urara Tamada[1], *Yusuke Koroyasu[1], *Kenta Aratani[1], Kayo Sugishita[1], Chisaki Yashiki[1], Tsutsui Yuta[1], Ayano Kanzaki[1]

1.Hyogo Prefectural Kakogawa Higashi High School

Because it is difficult to control water in microgravity, experiments involving water are not generally performed aboard the International Space Station (ISS). In previous research, we designed a pipette which uses differences in surface wettability and should make experimenting with water much easier in microgravity. We have been performing experiments with a homemade, free-fall type apparatus. Within a 40 x 30 x 25cm box in free-fall, we have shown that water will rise in a glass tube and stop at the boundary between surfaces of differing wettabilities. These experiments have shown that the apparatus can effectively create microgravity conditions. The apparatus used in these experiments was a rectangular prism. Presently, we propose novel improvements to increase the stability of the gravitational environment within the capsule. To reduce air resistance, corners will be removed and conical panels will be attached to the upward and downward facing sides of the capsule.

Keywords: wettability, microgravity environment

Visualization of the stress distribution of the seismic center dislocation ~riverbed outcrop Chomon-kyo as an example~

*Mizuki Syouji[1], *Kaho Tanaka[1], Momoka Ota[1], Suzuka Kugizaki[2]

1.Yamaguchi Prefectural Hagi Senior High School, 2.Yamaguchi Prefectural Tokuyama Senior High School

We have been conducting a study to reproduce the stress that was applied to the rock formation when the Tokusa-Jifuku fault was active. The stress that moved the fault cannot be measured after the movement, but the size of the crack in the rock is related to the size of the stress that was applied to the rock. So we hypothesized that the stress that was applied to the rock can be deduced by measuring the crack density as well as the distance of the crack from the fault surface.
We chose a location on the host rock where we could measure the area per 10 cracks. To determine the corrected crack density, we calculated the rough crack density and standardized it by comparing it with a known value on a line perpendicular to the fault.
Here are the results: the closer the cracks are to the fault surface, the higher the density becomes and the farther the cracks are from the fault surface, the lower the density becomes. We found that this is the fractal distribution. The fractal dimension is 0.5.
We concluded the following. Stress concentrates on the shear zone of the fault, and attenuates in inverse proportion to the square root of the distance.
This result of this calculation corresponds with the theoretical value of the stress in the Griffith Theory which is used in the field of fracture mechanics. Based on the measurement of the crack density, we believe that the relative stress distribution was reproduced.
The distribution of the relative stress has a fractal dimension of 0.5. This suggests that the earth's crust, which is considered to be an elastic body, has a large number of cracks which falls within the fractal distribution.
This also suggests that the host rock can be destroyed by fault movement, because stress is concentrated on the edge of the crack. Therefore, when the crack grows, the rock can be destroyed
Furthermore, fractal distribution appears in the destruction of other familiar objects, such as Aosaebisen sea lettuce shrimp cracker .

Keywords: Tokusa-Jifuku fault , stress, visualization

Airflow measurement on the weather observation equipment using "Can Sat"

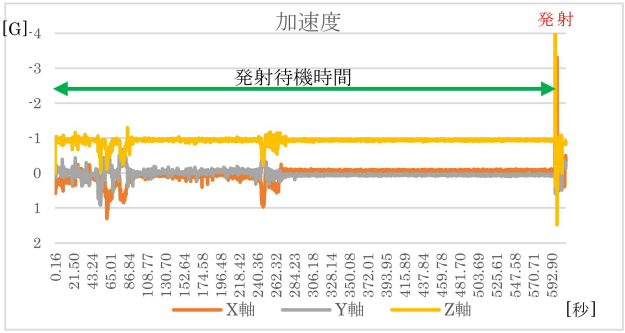
*Masahiro Takahashi[1], *Kinari Yamamoto[1], *Yuuki Saitou[1]

1.Chiba Prefectural CHOSEI High School

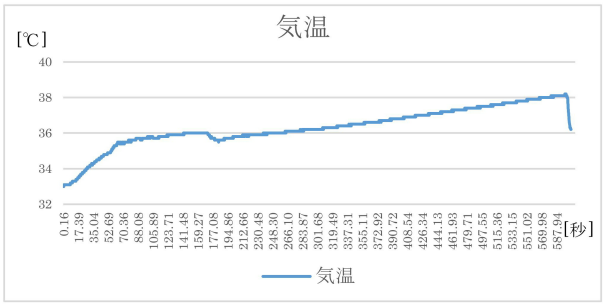
This study is monitoring the weather using “Can Sat”, which is the imitation of an artificial satellite made with an empty can. Can Sat was launched into the sky using a model rocket, GPS antenna and several sensors, these sensors are as follows: temperature, humidity, air pressure and acceleration. As the Can Sat descended, various data was recorded. We think it possible to forecast the weather precisely using the recorded data. This report is about an experiment of a model rocket that was announced as a part of a study last summer and which tried to measure the current state of the sky.

Keywords: Airflow measurement, Can Sat

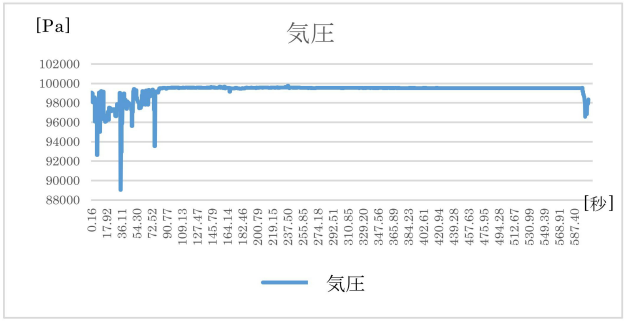
缶サット概観



計測された加速度データ



計測された気温データ



計測された気圧データ

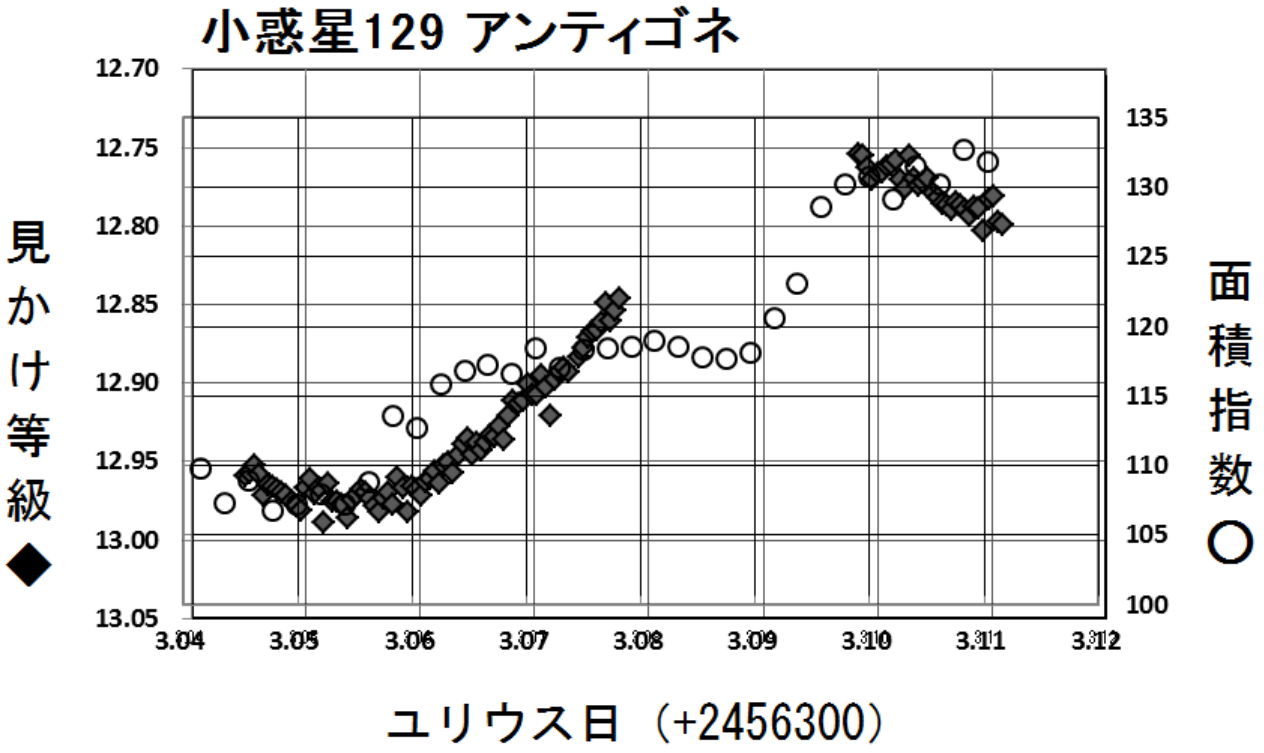
Surface properties of asteroids inferred from light curves and 3-D models.

*Kentaro Tsuchiya[1]

1.Nasu-kogen Kaijo High School

Generally, surface properties of asteroids are observed by a spectral photometry or a spacecraft. However, we thought that surface properties of asteroids might be inferred from light curves and 3-D models.
Our method is as follows. (1) We observed asteroids (using 65cm reflector) and made a light curve. We call it “Light curve by observation”. (2) We measured sectional areas of asteroid 3-D models. (3) We made a line graph about a change on standing of the sectional area. We call it “Light curve from 3-D models”. (4) We compare those two kinds of light curves.
It is considered that if those light curves indicate good agreement, the surface properties of an asteroid are homogeneous. If those light curves indicate disagreement, the surface properties of an asteroid are heterogeneous.
It was concluded that (1) the flux ratio (amplitude) of the observed light curve agrees with that calculated from 3-D models, (2) sectional areas of an asteroid can be regarded as flux of an asteroid, (3) surface properties (geology, geomorphology) of an asteroid can be inferred from light curves and 3-D models.

Keywords: Asteroid, Lightcurve, 3-D model



The Relationship between the Terrain around Minamidaira high school and the weather

*Seishiro Koda[1], Asuka Takaki[1], Takeaki Kubo[1], Akira Tamura[1]

1.Tokyo metropolitan Minamidaira high school

In Minamidaira high school, we have been recording since about six years ago the wind direction and wind speed.
On April 3, 2012, strong winds caused damage in many parts of Japan.
In adjacent Hachiouji the wind speed of 38.9m/s was observed, but Minamidaira school recorded only 12m/s.
We thought the reason the wind was suppressed in the school has something to do with the characteristics of the terrain of the school area.
So, we did a survey and research, to explore the relationship between terrain around Minamidaira high school and wind speed, using the experimental model that was created from the past wind speed data.
As a research method, we convented the data from the anemometer into a chart and summarized the characteristics of the wind that blows around school.
Tha results were compared to the wind speed data from the Japan Meteorological Agency Hachiouji-Fuchu Area to ascertain their differences and similarities
In addition we carried out a test to verify if the results were affected by the terrain.
We created a three- dimensional terrain model of the school area, and winds similar to natural conditions were applied to the model.
Also, there is a concern that the school's southest side slope might collapse.
The Slope has been specified as a hazard slope area by the Tokyo Metropalitan Government.
Therefore, we collected the rock samples on the formation of the strata, and conducted a survey to ascertain the seriousness of the dauger.

Keywords: wind direction, wind speed, anemometer , a hazard slope area

Revision of criteria of Nakisuna and the difference of region

*Misaki Hishinuma[1]

1.Fukushima Prefectural Iwaki Senior High School

I revised former criteria of Nakisuna in this study.
Study method is that five members tapped sand, which we collected from Kotohikihama, Aoya Shore, Yostukura Shore and Iwamasanuka Shore. Kotohikihama, Aoya Shore and Yotsukura Shore are Nakisuna, and Iwamasanuka Shore is Non-Nakisuna. I recorded the sounds of the sand and analyzed them. Frequency spectra were shown in this way. A frequency spectrum is represented by 'frequency in horizontal axis' and 'sound pressure level in vertical axis'.
As a result, some result didn’t match between “numerical judgment” and “hearing judgment”.
So, I paid attention to difference of people and areas, and revised preceding study’s criteria of Nakisuna.
In conclusion, by revising our former criteria, we succeed in making more reliable criteria of Nakisuna, by which we could judge the results of any analysis.
As a future prospect, I would like to examine seasonal changes of Nakisuma. I also would like to study how Nakisuna was piled up.

Keywords: Nakisuna, frequency spectrum

Observation of electric solar waves using self-made radio telescope

*Yosuke Suzuki[1], Haruka Saito[1]

1.Fukushima Prefectural Iwaki Senior High School

We made radio telescope by ourselves and observed the electric waves from the sun. Through the study we found that solar waves were changing with passage of time. Especially, we inspected the correlation of 3 points the water vapor content, the atmosphere pressure and the weather. We found that the value of solar waves become high when the water vapor content increase, and the value of solar waves in the cloudy day is lower than that of in the sunny day. The atmosphere pressure had little influence on the solar waves. The few dust cling to the water vapor so solar waves travel without diffused reflection. Furthermore, clouds absorb the solar waves in cloudy days. That is why it showed the results.

Keywords: solar wave, weather condition, self-made radio telescope

A relation between river water hardness and geology in Natui river line

*Narihiro Owada[1]

1.Fukushima Prefectural Iwaki Senior High School

In Iwaki city, the Natsu River runs for 65km.The geological map of Iwaki shows that there are many kinds of rocks and sediment in the upper side of the Natsui River line.I think that dissolved matter is different in each river, because the matter dissolved in each river is changed by geology.I serched for the relationship between geology and river water by measuring water hardness.I obtained water from the main river and also from branches of the river.The water was collected from midstream to downstream.And I measured the water hardness by chelatometric titration.As a result, I found that river water hardness affected by basic rocks.

Keywords: water hardness, basic rocks

What causes the change in the color of the sky ?

*Asuka Goto[1]

1.Fukushima Prefectural Iwaki Senior High School

When I observed the sky, I found that the shade of the blue sky different day by day.I began my study because I was interested in the factor of how the sky shade changed.According to the preceding studies, water vapor is involved in the shade of color of the sky. The fewer vapors the air contains, the blue sky color is more deeply.

This time, I studied the factor expect water vapor which causes the changes in the color of the blue sky, and compared the color in autumn with that in winter.

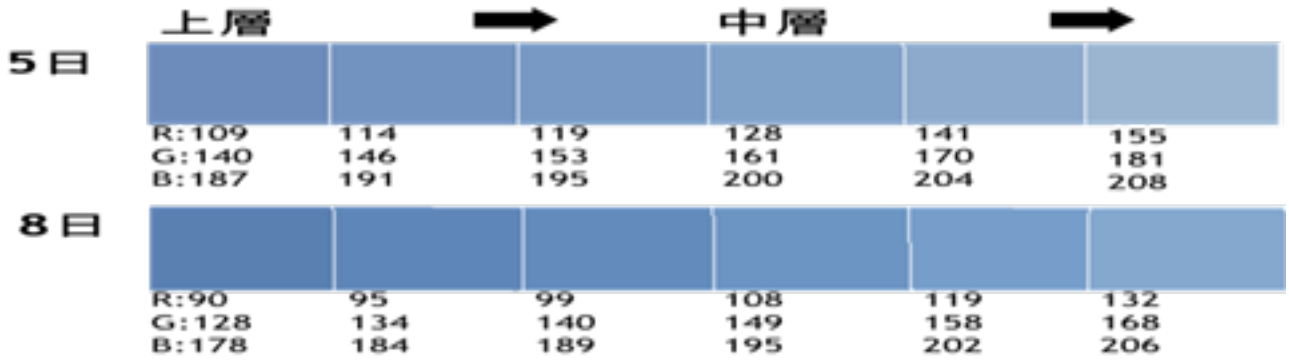
I took pictures of the sky. I later lowered the pixel, and then I examined “RGB” using analysis software and researched the association of weather data and the color of the blue sky.

I obtained the result that the shade of the blue sky was changed by the atmospheric pressure and wind power.

The quantity of water vapor contained in the air in autumn was larger than that in winter. I compared the color of the blue sky and found that it was deeper in autumn than in winter.

I compared the atmospheric pressure and the amount of water vapor of the days in autumn and in winter in which the color of blue was the deepest. In winter, the atmospheric pressure was low, but the water vapor was high compared to other observation days. That result was different from preceding studies.According to the research, the atmospheric pressure is the common factor which causes the change of the shade of the blue sky.

Keywords: shade of blue sky, water vapor, atmospheric pressure



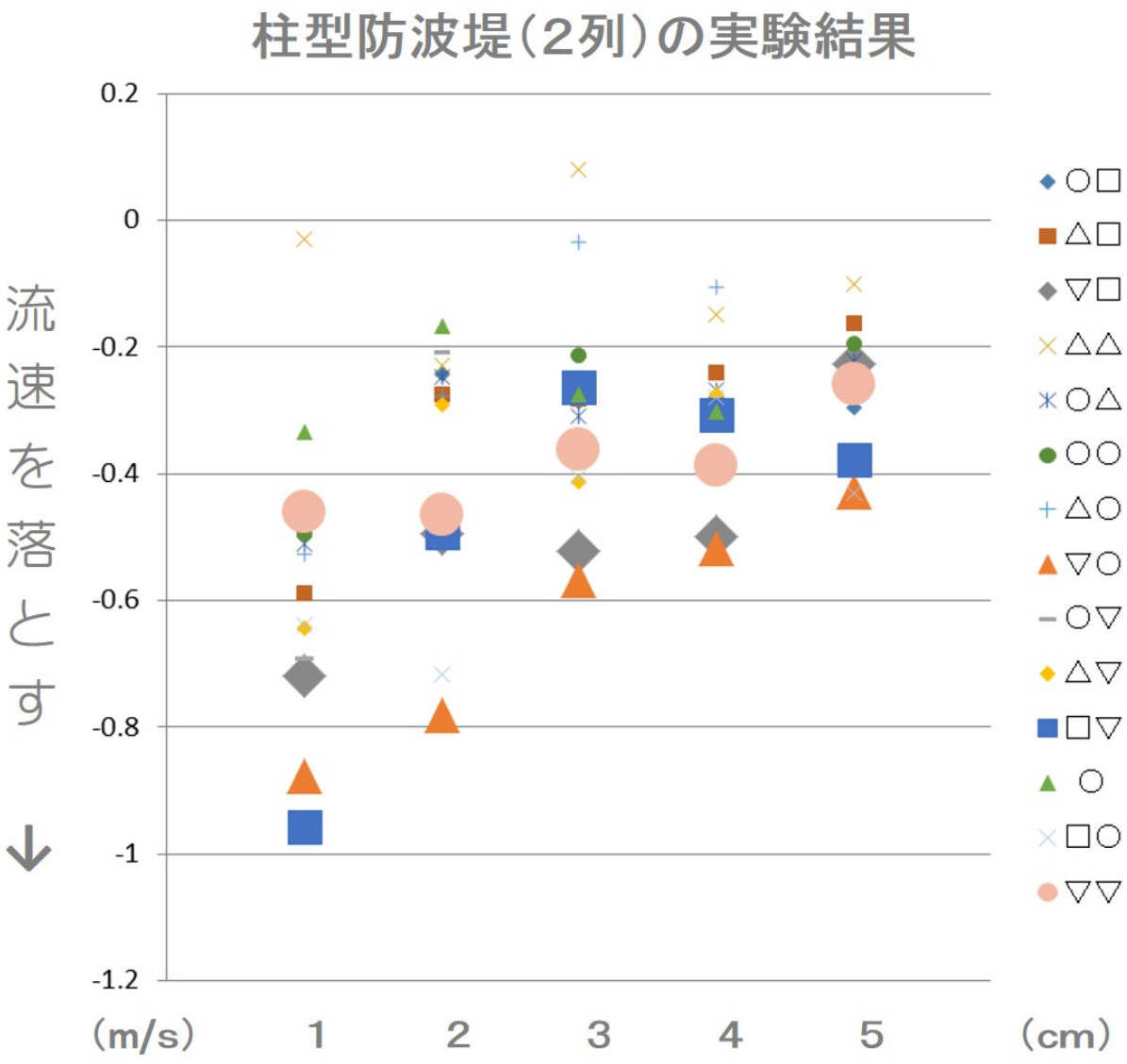
Decreasing disaster by using pillar type of breakwater.

*Kazuki Nitta[1], Yutaro Yabuki[1]

1.Fukushima Prefectural Iwaki Senior High School

The Great East Japan Earthquake happened, so we studied about the hazard map, and so on. But we find it difficult to inhibit the damage of tunami by the use of land. So we thought that we deal with tunami before it arrive at land, namely at sea. Moreover, we focus on a breakwater at sea, then we make the pillar type breakwater .The breakwater has many characteristic. For example, low cost construction, and informing space.in addition, we try to inhibit the damage by thinking about minimizing damage. Our purpose is making more time in order to evacuate from tunami by using “a pillar type breakwater “.The breakwater” has many preconditions, so we classify the preconditions into three types, “figure of the pillar” ”how much leave a space”, ”how many lines” and study about it.

Keywords: tunami, decreasing disaster, breakwater



Gemini meteor shower -Locus analysis by two-point observation-

*Miyuki Tanaka[1], *Moe Tachibana[1], *Yune Otsu[1], Haruka Kasai[1], Reiko Maruyama[1], Yuta Otsuki[1], Masanosuke Oto[1]

1.Suwa Seiryo HS Nagano.prf

Gemini meteor shower -Locus analysis by two-point observation-

The spread of volcanic products estimated from the caldera model experiment

*Yukiko Kondou[1], *Kenta Kawashima[1], *Ayaho Ishida[1], *Kyousuke Nakano[1]

1.Chiba Prefectural Narutou Senior High School

We made explosive caldera models with materials of sawdust, PET bottles, and balloons to search for conditions to blow sawdust as far as possible. In addition, we hypothesized the behavior of grains of real volcanic eruptions from the results of experiments. We found that if we use longer PET bottles for the equipment, the mass of blown sawdust can increase. From this result, we predict that certain sized grains from real volcanoes can be blown in proportion to the mass of water vapor, if we regard the length of PET bottles as the mass.

Keywords: Volcanic landform, Model experiment, Phreatic eruption

Chase of Rifu Fault

*Misaki Sasaki[1], Ayaka Suda[1], Rika Kawahara[1]

1.Miyagi Rifu senior high school

In order to investigate earthquake systems, understanding fault constructions is important. In fact, between east-Japan MEGA earthquake which we experienced in 2011 and Nagamachi-Rifu fault earthquake are quite different systems. It is valuable to investigate the relation of fault's influences to human society.
It obviously exists as the fault under our region, where our school stands, but we have had poor information of the fault location along our region with thick soils and heavy urbanization. Therefore, we gathered the informations of fault location and discussed fault affects in our area.

URL: http://rifu-h.myswan.ne.jp/html5_club/club/kagaku/index.html

Keywords: Rifu Fault, Active Fault, in situ observation

The easy “School-made” constellation-projection device and its improvement of accuracy

*Kaito Saeki[1], Yamato Sugawara[1], Aoi Kobayashi[1], Rikiya Kon'no[1]

1.Miyagi Rifu senior high school

It was carried out to create of constellation-projection device which can project constellation as seen from our Miyagi region with easy “Students’-made” style.
We considered the accuracies of stellar locations and shaped stellar images. At the stage of design, we calculated the pinhole sizes less than φ2.5mm and the height of light source from the baseline is 19.1mm.
We discussed how to raising accuracies, keeping a low cost.

Club activity URL: http://rifu-h.myswan.ne.jp/html5_club/club/kagaku/index.html

Keywords: constellation-projection device , Optical system, Students' made style

Chemical Substances and its components in rainwater

*Shoki Yabutani[1], Nozomu Karai[1], Atsushi Miwa[1], Kazuo Osada[2]

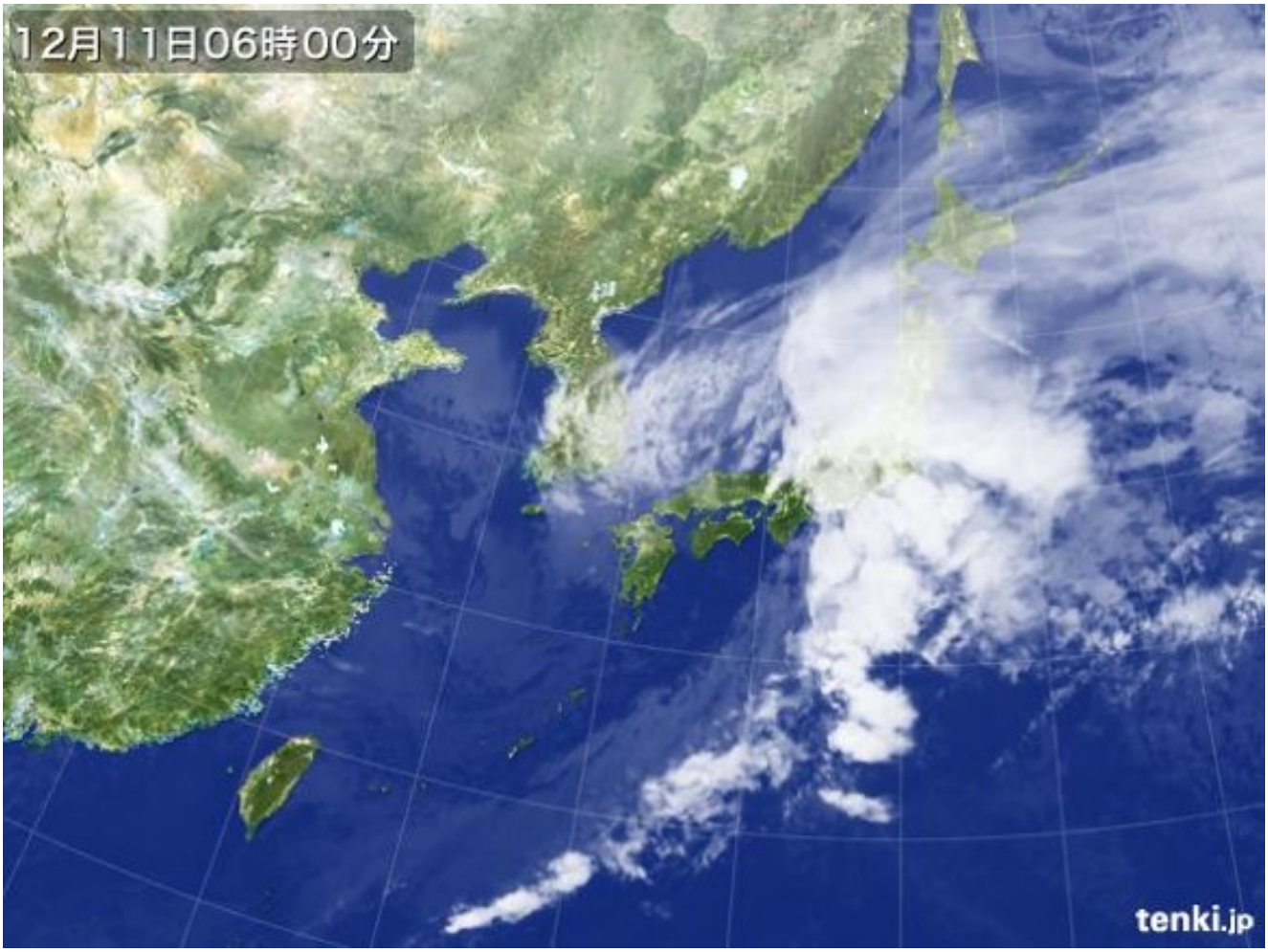
1.Taki High School, 2.Nagoya University

Large amount of nitrogen oxide and sulfide oxide is emitted from factories and homes from winter to spring every year, and problems of air pollutant for example PM2.5,are taken up. We decided to study how much air pollutants is contained in rainwater by gathering rainwater and checking air pollutants dissolving in rainwater. It is still being researched now but we submit an interim report.

1 : Gather rainwater with “raingoround” (“raingoround“ is a device developed by HORIBA factory which can gather rainwater by 5mm.
2 : Analyze rainwater with ion chromatograph system.

1 : Rainwater on Dec 11 had thick constituent concentration of the sea (Na or Cl).
→Rainwater brought by south wind have more sea water than that brought by north wind.
2 : Through four times experiments (Dec 11, 13, Jan 18, 29) as rain down, the concentration becomes low.
3 : We can find the tendency that the conductance becomes low steadily while pH doesn’t have any clear tendency.
→The rain has a lot of air pollutants in the beginning.
*After this experiments we want to study continuously how weather condition affects substances in rainwater and each amount of them.

Keywords: meteorology, atmospheric pollution, acid rain



Magician of gravity
~Gravity of Moon, Mars and Enceladus is made with variable gravity producing apparatus~

*Yusuke Kamino[1], *Akira Nagata[1], *Yutarou Arai[1], Hiraku Toda[1], Keita Nakamura[1], Jun Imabayashi[1]

1.Kasugaoka High-school of Osaka prefecture, The evening course

Our science club possesses a short drop shaft for microgravity experiments. Then, we thought it was possible to make gravity of Moon and Mars on the earth. Using a Atwood's machine which appeared on a physics textbook, we tried to make gravity variable apparatus. We manufactured apparatus for the preliminary experiment to examine Moon, Mars, Europa and Enceladus. For example, how does water run at the Mars surface? An unexpected phenomenon may be observed under the gravity in the Moon. Although our apparatus has the problem which restrains the vibration when falling, we made various stellar gravity with adjusting a weight using an basic principle.

Keywords: microgravity, gravity variable apparatus, planetary exploration

Influence of precast concrete armor units on coastal erosion

*Riku Kawai[1], Hiroki Maeda[1], Shogo Yamada[1], Keiichi Hashimoto[1]

1.Iwata Minami High School

We have conducted microtopography measurements at Samejima coast continuously since July 2013. According to our survey data, the average altitude of the coast is decreasing gradually with time, indicating that coastal erosion is occurring. Precast concrete armor units have been placed throughout Enshu-nada as a measure against coastal erosion, however it remains unclear to what degree they are effective in preventing erosion. We conducted a study to determine the effectiveness of the precast concrete armor units.
The methods are as follow; we took pre- and post-storm microtopography measurements of the coast line around a precast concrete armor unit. In addition, we compared past airscapes of the Samejima coast to observe coastal erosion overtime. We also looked at aerial photographs of how waves moved around the concrete armor units. Finally, we conducted trench investigations on the sandy area around the unit. The tendency of sand to accumulate in certain spots was analyzed using the difference in the mean particle diameter of various spots.
As a result, we concluded that sand is accumulated on the land side of the precast concrete armor units after storms. In addition, we can observe better results with the use of multiple precast concrete armor units than a single unit. We made it clear that waves go around the precast concrete armor units. Finally, as the distance between the unit and the water line increases, the amount of minute sand can deposit also increase.

Keywords: precast concrete armor units, coastal erosion, Samejima coast

Estimation of the origin and the age of tephra found in tsunami deposits at the mouth of Ota River

*Takuto Muraki[1], Kohei Fujiwara[1], Syogo Yamada[1], Syunta Miyahira[1]

1.Iwata Minami High School

When we did simple boring research with hand auger at Shoshuji Temple in Fukuroi city, which is located 3.5 kilometers upstream from the mouth of Ota River, we discovered the deposits which were porous and yellowish white like tephra, with tsunami deposits. If this deposits were really tephra, we could specify the origin and the age of the eruption, moreover, estimate the age of the tsunami. Therefore we decided to research it deposits.
We compared the form of volcanic glasses included in the tephra from Shoshuji Temple, with widely distributed tephra. We also estimated the age of the deposition by ^{14}C included in the dead plants.
As a result, we revealed that the tephra found at Shoshuji Temple is the deposits from the eruption of Mt.Tenjo in Kozu Island in 838. It was scattered by floods and tsunami, and then they reaccumulated.

Keywords: tsunami deposits, widely distributed tephra, Kozu island Mt.Tenjo

Building of the Airglow waves observation System and Relation to the Elves with striped structure

*Keiichi Hashimoto[1], Koki Mogi[1], Soma Uchida[1]

1.Iwata Minami High School

Our passed study indicated that the striped structure on the Elves are related to the Airglow. However, we analyzed only one Elves at that study. In addition, the data of the Airglow we compared with the Elves we observed in Iwata, Shizuoka was from Shigaraki Observatory of Solar-Terrestrial Environment Laboratory, Nagoya University.
Thereupon we built an observation system for the Airglow that runs simultaneously with ones for TLEs and afterward, we succeeded in observing an Elves occurred over the Sea of Japan and the Airglow at the same time on January 15th, 2016.
The result of our analysis matched with the passed study.

Keywords: Transient Luminous Event, Airglow, Elves

Causes of whirlwinds blowing in compus

*Tatsuya Kubota[1], *Ayumi Kubonoya[1], *Koto Kobayashi[1], *Shu Kondo[1], *Kei Yamamoto[1]

1.Nagano Prefectural Yashiro High School

We measured the temperatures at the two spots in our school campus where whirlwinds were likely to occur; one was the air temperature measured just on the ground, while the other was the one measured about 10 meters above the ground level. We found that there was little difference between the temperatures when whirlwinds occurred. In another experiment, we also found that there was little difference between the temperature measured in the upper level of the water in a beaker and the one measured in the lower level when a swirl was seen in the water. Therefore, we concluded that differences in air temperatures between two levels do not cause whirlwinds.
In addition, we succeeded in visualizing whirlwind model in the water using color-coded media. The water mixed with color-coded media was thought to have almost the same fluidity as the whirling air. First, we put a wall vertically in the water in a beaker. Second, we put color-coded media in the water and turned the stirring bar by using the stirrer. Then, we confirmed that two types of swirls were created: one type was dropping from the top of the water and the other was rising from the bottom up along the wall. Of these two swirls, we focused on the latter type of ascending swirl and continued to study because it resembled a whirlwind.

Keywords: Atmosphere

Analysis and consideration of metal ion concentration of water taken in a stream in Yosemite Valley using ICP-AES Ver.5

*Makihito Nakamura[1], *Ayano Ikeuti[1], *Saya Machida[1]

1.Nagano Prefectural Yashiro High School

We took water samples at six spots in the Merced River and surrounding rivers flowing through Yosemite National Park. Then we measured ion concentration of 28 different metals using ICP-AES with the support of Shinshu University Faculty of Engineering Department of Environmental Science and Technology. Among those metals, the detected amounts of these 8 ions -Barium, Calcium, Iron, Potassium, Magnesium, Sodium, Strontium, and Yttrium- were relatively high. So referring to this data, comparing that with the data from the past 4 years, we considered correlations between the length of the rivers and concentration of ions.

Keywords: Water quality

Create a Disaster Mitigation Action Card Game for overseas student studying in Japan.

*Tomohiro Suzuki[1], Kyoka Endo[2], Katsuhito Oikawa[3]

1.Sendai Daisan High School, Miyagi prefecture, 2.Ohunato High School, Iwate prefecture, 3.Mizusawa High School, Iwate prefecture

This game has a correct knowledge of disasters such as earthquakes and tsunami, and to allow action to protect themselves in case of emergency, has been developed by Tohoku University. We have to seek improvements in order to get more interested in the disaster reduction to foreign students. Japanese 92 high school students, and 28 international students, conducted a survey in the game before and after, whether the usefulness and purpose of the game has been achieved, a change in the awareness of disaster and mitigation action, discussed the difference between disaster reduction by the country. Game has been an increase in the interest in the disaster mitigation later than before, was considered to have deepened knowledge and ideas by the game. As also outlook, problems created for the region-specific disaster, proposal of understanding how foreign students for commentary carried out after the game, improved and was found.

Keywords: Disaster mitigation, earthquake, tsunami

Cosmic Ray Muon Detection using Plastic Scintillators

*Kazuma Nishimura[1], Momoko Yokoyama[1]

1.Asaka high school

We measure the mean speed and lifetime of cosmic ray muons.

Keywords: Muon, Plastic Sintillators, Lifetime

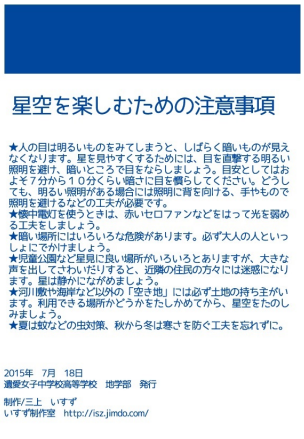
Making a Sky Glow Map in and around “Luminous city Hakodate”

*Yui Okada[1], Ami Hanada[1]

1.Iai Girls' Junior and Senior High Shool

We have observed night sky brightness using by Sky Quality Meter with Lens (SQM-L) and Sky Quality Meter with Lens Ethernet (SQM-LE) in and around Hakodate since 2011.We had conducted fixed point observation, moving observation at the 280 points in Hakodate for 5 years. Also, mass of point observation was conducted in 2012 October using 40 SQM-L by many students who live in and around Hakodate. Hakodate region is separated into seven regions by the night sky brightness every 0.5 magnitude by square arc seconds. Also, we observed naked eye limited magnitude and found the relationship between naked eye limited magnitude and night sky brightness at the fixed points. Then, we published Sky Glow Map in and around “Luminous city Hakodate”.
It is considered that the night sky in and around Hakodate is not brighter than other big cities .The milky way visible area is not so far from urban area. Although, according to the result of experiments , it is considered that reflected lights by snow in winter season ,and high humidity, high concentrations of spm and pm2.5 affect the night sky brightness .

Keywords: The Night Sky Brightness



The Costal Erosion at Omorihama Coast, Hakodate,Hokkaido.

*Ami Hanada[1], Yui Okada[1]

1.Iai Girls' Senior High School

Our club have measured land height above the sea level and observed coastal erosion at Omorihama coast Hakodate city since 2006. At the west part of the coast, the sandy beach was badly eroded in 2010 and 2011durnig winter season. A sign board which was put up on the sand was felt down in March 2011 because it had lost foundation sand by Tsunami and windstorm. After that a wave carried sediments on a sign board in summer season and it was buried under the beach. .In 2015, it appeared again on the beach because the sand was eroded by a storm surge caused by a bomb cyclone. It is considered that high tide level and strong longshore current cause serious erosion on the beach.

Keywords: The coastal erosion

Effect of Moonlight on Night Sky Brightness

*sotaro Hiroki[1]

1.Kaijo senior high school

When I see stars, I mind the moonlight. Because the moon brights itself, and it lights the sky around it.
I researched the effects of the moonlight (;based on my last research that I have studied at Shinjuku, Tokyo for few years).
I used the data got at Showa Station, Antarctic in 2014, because the one got at Shinjuku includes the change of the artificial light.
I choose the data got when the moon is out, revised them using two variables, and compared with the ones got in the day of new moon.

Sedimentary environment of the Nabeyama Formation in the Kuzu district

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1.Kaijo senior high school

The Nabeyama Formation consist of Permian carbonate rocks and distribute in the Kuzu district, Sano, Tochigi. This Formation is divisible into the lower part, the middle part, and the upper part (Yanagimoto, 1973). The lower part limestone include fossil of plants, debris of shells, crinoids, bryozoans and so on. Therefore, it is very probable that allochthonous was brought by some factors such as storm. Most of the middle part was changed into dolostone from limestone, so, there is no structure or fossil that indicate environment. The upper part limestone is mainly consist of a lot of fusulinas, it probably means its sedimentary environment is different from this of lower part.

Keywords: Limestone, Sedimentary environment

Multifunctional Roles of Sagano High School Forest - phytocoenosis and soil profile-

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The functions of the Woods for Field Practice Owned by Sagano High School (WFS), which is located in Kyoto city, is now being evaluated.

This study reports the relation between phytocoenosis and soil, and clay mineral.
According to our research, it was revealed that the WFS was formed on the stable soil. On the other hand, the layer which prevents the growth of the roots was observed. Also, various phyllosilicates were confirmed from the clay layer.

Keywords: village-vicinity mountain, microtopography, soil profile, clay minerals

Light pollution in Kochi - The result of observation for three years-

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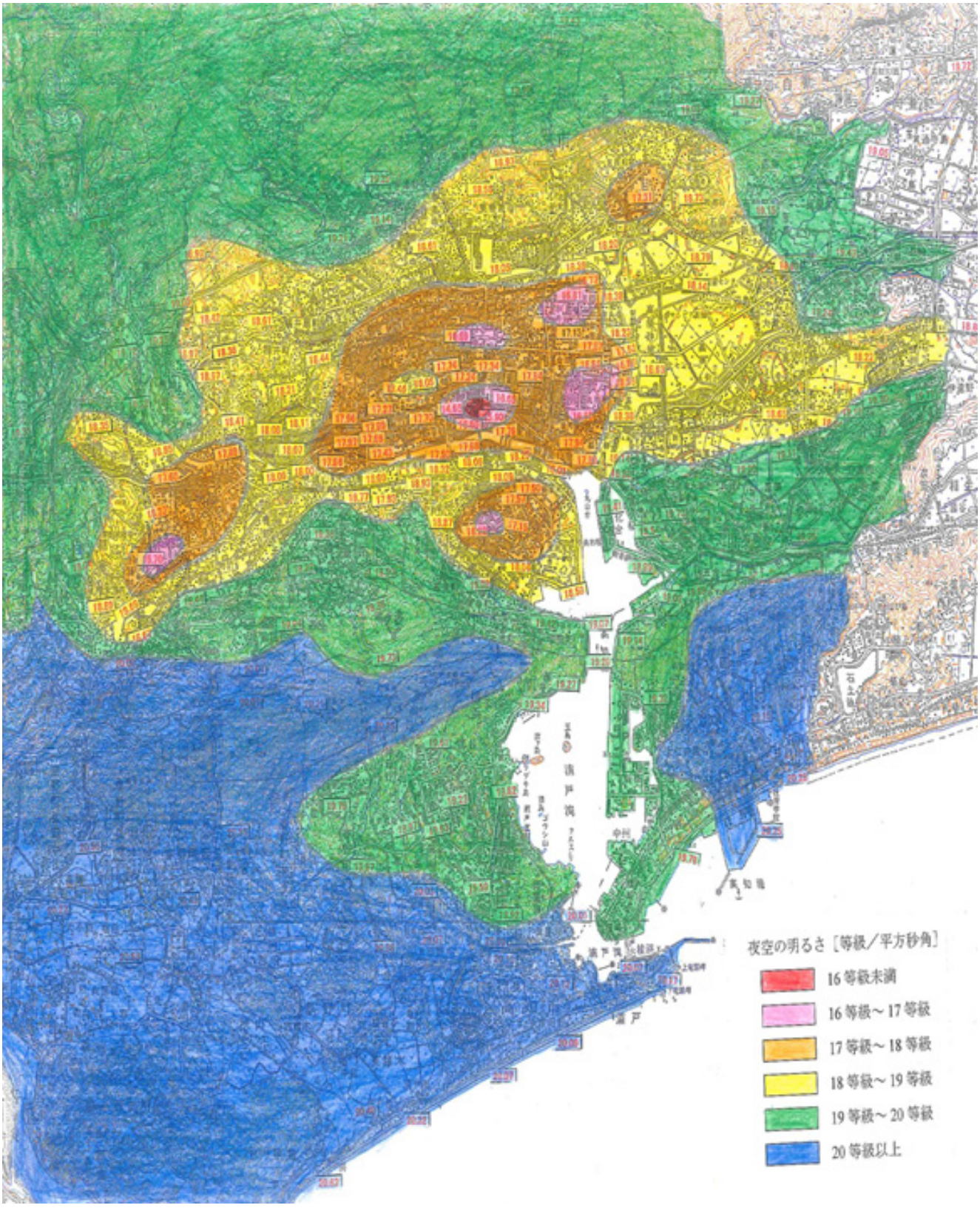
1.Tosajuku Senior High School

Our astronomy club decided to investigate how much the sky in Kochi had become bright due to light pollution five years ago. Since then we have been observing the brightness of the night sky by using a device called Sky Quality Meter, SQM. On top of that, we have been using another device called SQM -LE, which was set up in our school three years ago, to observe the sky in Kochi. The research shows us that the brightness of the sky tends to change according to seasons.
We collected the date from 217 spots around Kochi -city using SQM and made a brightness map of the night sky in Kochi-city. Having examined the date, we estimated the altitude of layers to which light emitted from the surface on the earth.
In February 2016, working with the students of the club and other teachers, we investigated how many stars around Orion we can see with our naked eyes. We had actually conducted a similar investigation in February 2013. Then we compared those results and found that the visibility in the night sky became better than before. This result accorded with the one we had observed it using SQM-LE for three years.

Keywords: global environment



Do not swing farther earthquake ? - Exploring the distance attenuation and site effect around Tokyo -

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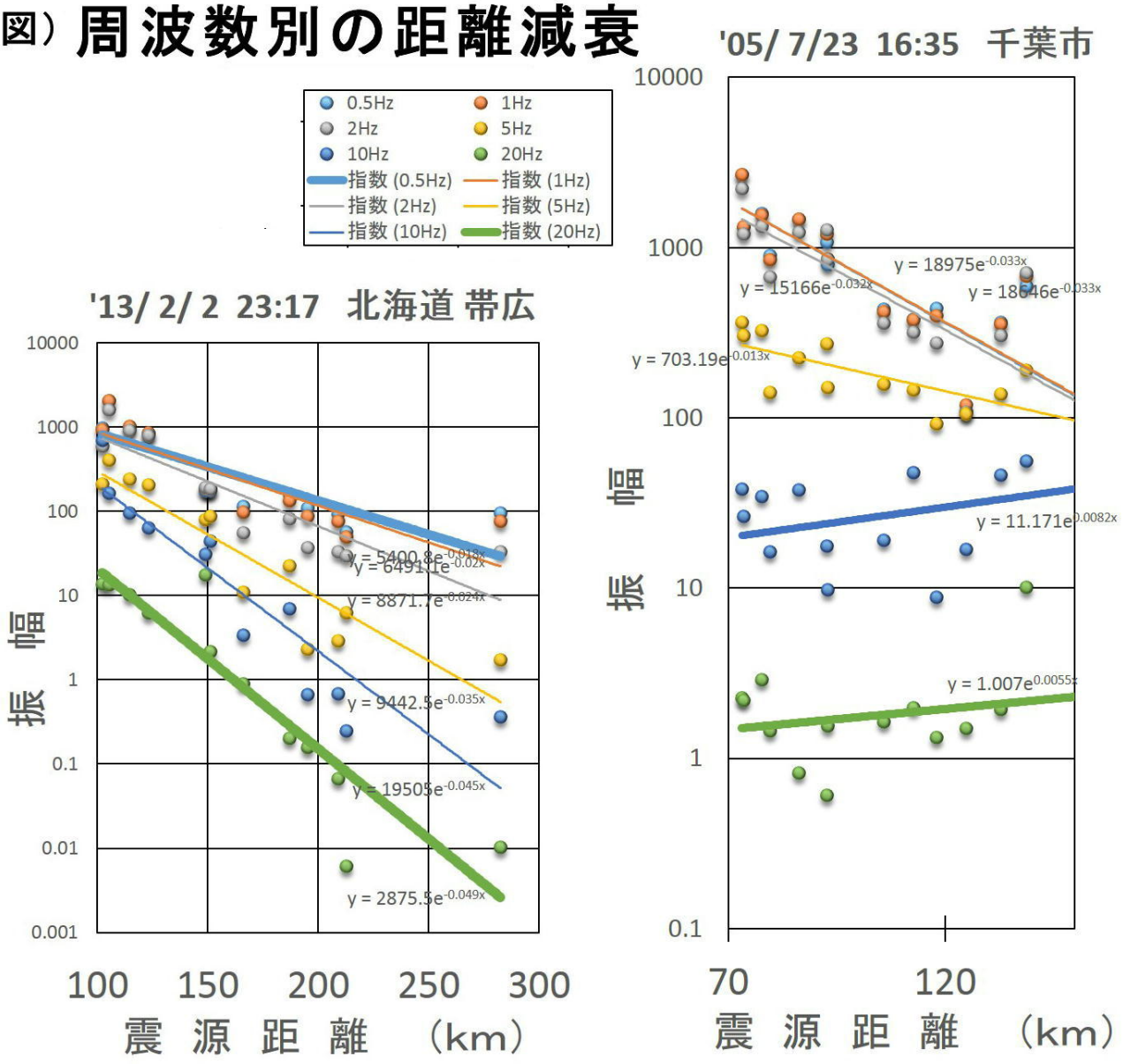
There are three elements in the mechanism of seismic ground motion. It is a thing about a source region, propagation path and ground condition. To separate influence of propagation path and ground condition, I acquire the attenuation of seismic wave according to distance in a frequency domain, and compare Kanto region with Hokkaido region. Based on the characteristics of the attenuation in a high frequency domain, I investigate the effect of sedimentary structures around Tokyo.

Keywords: distance attenuation, site effect , Kanto

（図）周波数別の距離減衰



The Mechanism of "Red" Matsukawa River.

*Hiroto Manba[1], *Ibuki Kamikura[1], *Kentaro Nashimoto[1], Hiroaki Kuroiwa[1]

1.Iiyama High School

“Matsukawa River” in northern Nagano Prefecture is an acid river and contains much iron. Therefore, it looks red. It is known that this “reddening” phenomenon is caused by the sulfur mine in the source of the river. However, it occurs not near the source of the river but in the lower point, where the River meets the other stream. The concentration of iron goes down after the river meets the stream because the stream doesn’t contain iron. We researched why the reddening phenomenon occurs at the point.The results are as follows: 1st, the following equation shows the reddening phenomenon: $2Fe^{3+} + 6H_2O \rightarrow Fe_2O_3 \cdot 3H_2O \downarrow + 6H^+$; 2nd, either of oxygen and hydrogen sulfide doesn’t affect the reddening phenomenon; 3rd, the reddening phenomenon occurs when acidity of water weakens and when temperature of water rises.Therefore, the reddening phenomenon tend to occur in summer when the river rises and temperature of water rises.

Estimation of atmospheric correction coefficient by Digital single-lens reflex camera

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1.Kobe College Senior High School

I search for atmospheric correction coefficients and the brightness of the night sky by Digital single-lens reflex camera. Then, I plan to estimate the density and the radius of aerosol.
Many researchers estimate the brightness of the night sky use SQM. On the other hand, researchers who estimate the starlight reduction by the atmosphere use telescope. However, there are few researches using Digital single-lens reflex camera. In my research, I photograph the night sky continuously and do the photometry of many stars with the altitude by an image analytical software. I made a graph of star magnitudes and air mass and estimated atmospheric correction coefficients. In fact, however, there are some graphs which their coefficient are minus. I will present the result and remaining problems.

Keywords: Photometry, Aerosol, Atmospheric correction coefficients, Digital camera, Starlight reduction

Is slash-and-burn method good for the earth?

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We began to research global warming because we are interested in the state of global warming today. But, this is a global issue. It's difficult to recognize the immediate problem. So, we are looking at our local area before looking at the global situation.
Gokase and some nearby villages were chosen as a "Global Agriculture Heritage Site" last year. We took notice of the slash-and-burn agriculture system used in Shiiba village, a village near Gokase. The system is a way to burn down farmland and restore soil fertility. We thought it must have an influence on the earth. So, we began to research the influence of this system on the environmental.
First, we took notice of the fact that the slash-and-burn system produces CO_2 when fields are burned. CO_2 is thought to be global warming's cause. We thought that the slash-and-burn system may prevent poor soil. We began to examine the actual effects of this farming method.
We are analyzing the influence of slush-and-burn agriculture on the earth though this research.

Keywords: slash-and-burn

Genealogy of the horseshoe crab

*Takuma Ue[1]

1.hongo senior high school

"Horseshoe crab" which is said to be "living fossil" is between the also two hundred million years, not changed its form. As the evidence is to resemble the form of three types of horseshoe crab in existence with the biological forms that Mesorimurusu that have been discovered from the Late Jurassic strata of the German Zorn Four Fen. However, only the United States Kabuto moth two are not to be the system. This time, whether I was there are organisms that American horseshoe crab is common to the form that appears in the origins of the North American continent, the American horseshoe crab growth process of living, also.

Investigate a Design of The Jupiter Surface.

*Shousuke Ogura[1], *Akihiro Kobayashi[1], *Naoto Yamada[1], Yuuto Ooshiro[1], Yukito Une[1]

1.Maibara HighScool

Investigate a Design of The Jupiter Surface.

Keywords: Jupiter

The Paleoenvironment Reconstruction of The Last Glacial Stage.

*Naoto Yamada[1], *Akihiro Kobayashi[1]

1.Maibara HighScool

The paleoenvironment reconstruction of the last glacial stage in Ibuki and Ryouzen mountains.

Keywords: Last glacial stage, Aira Tn volcanic ash, Pollen fossil

The relationship between IC and angle of drop

*Atsuya Sakamoto[1], *Yukiko Fujita[1], *Shun Okihara[1]

1.Sapporo Kaisei High School

There are some ways to measure the scale of an eruption, such as using the gross volume of volcanic products or using the kinetic energy from volcanic bombs. However, the former way is difficult to measure accurately because volcanic products are in liquid or solid form. Therefore, we decided to use the latter one. We researched the falling angles of volcanic bombs from the shapes of their impact craters (IC) in order to measure their scale. We focused on the major axes to minor axes length ratios and set up the hypothesis that the closer the shape is to a circle, the larger the falling angle is. Then we carried out experiments using a steel ball as a volcanic bomb and hit it to the ground to investigate the relationship between IC made by volcanic bombs and the falling angles.

Keywords: impact craters, volcanic ejecta

Observation of 12GHz Radio Wave Fluctuation using BS Antenna : Relationship to Atmospheric Conditions

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1.Dokkyo Saitama Junior and Senior High School

A 12GHz radio wave has been received by a BS antenna, and radio wave fluctuation under rainfall has been observed. We also have observed rain intensity by a tipping bucket type rain recorder and that makes it clear that they are correlated. This presentation also discusses the correlations with other atmospheric conditions.

Keywords: 12GHz radio wave fluctuation, BS antenna, atomospheric condition

Spatial Distribution of air temperature and the surrounding environment in Tsukuba city (IV)

*Ryota KARUBE[1]

1.Namiki Secondary School

Background

I knew that urban heat island occurred last year in the central area of Tsukuba city because minimum temperature was higher than suburbs part, and a diurnal range was small. Therefore, I intended to investigate the characteristic.

Definition of the urban heat island

It is the phenomenon that the temperature of the urban area becomes higher than the that of the penumbra. when we drew a distribution map of the temperature, a high temperature level was distributed over the shape such as the island around a city.

Purpose of the study

It is to investigate clarifying the relationship between temperature in Tsukuba city and surrounding environmental from observation using the Stevenson screen, a characteristic of the urban heat island in the central area of Tsukuba city from movement observation.

Method of the study

・The relationship between temperature in Tsukuba city and surrounding environment

I set up a data logger for temperature measurement to the Stevenson screen of eight elementary and junior high schools in Tsukuba city and measured temperature. I expressed data of the minimum temperature that temperature difference was easy to appear of the day when the highest temperature appeared and date of the National Land Numerical Information use in the scatter diagram in total afterwards.

・Making of the detailed temperature distribution of the urban area

I moved and observed it to know the distribution of detailed temperature. I tied stick with Wireless Thermo Recorder RTR-502 to a bicycle with white plastic tape, rode the bicycle along the route decided beforehand, and measured temperature every ten seconds. At the same time, I recorded the position using GPS. I arranged the observed temperature data and corrected temporal axes. I made a synthetic figure of the temperature distribution with the plot tool.

Result of the study

・The relationship between temperature in Tsukuba city and surrounding environment

I found that minimum temperature tended to be lower as the ratio of field became big, and to be higher as the ratio of building site became big.

・Detailed temperature distribution of the urban area

As a result of having composed data of the 5-day movement observation, I was able to reproduce outbreak of the urban heat island that was similar to a same temperature diagram.

In a center and the suburbs part, I found that temperature suddenly changes in spite of distance not being far very much. Temperature is high at the spot where there are many building sites ,and temperatureis low at the spot where there are many a field and for agricultural use ground.

In the central area of Tsukuba city, I found that temperature lowers suddenly on the spot with a pond and the park.

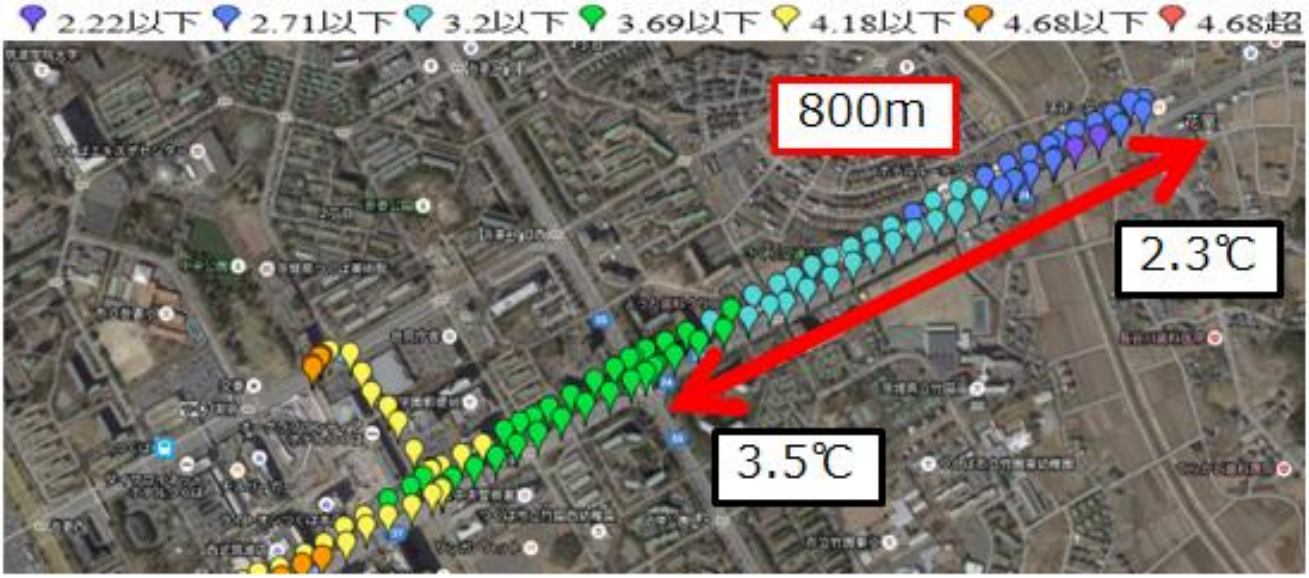
Summary of the study

1 The factor to lower minimum temperature is a field and another for an agricultural use place. On the other hand, the factor to higher minimum temperature is a building site and other sites.

2 In the thing that I move early in the morning and observe of the winter season, I can confirm

outbreak of the urban heat island in the central area of Tsukuba city.
3The movement observation can obtain the result that is similar to observation using Steevenson screen and watch detailed temperature distribution, so there is beneficial.
4 The temperature respond sensitively to the land use, and the small structure such as a park and the pond affects the temperature.

Keywords: Urban heat island, Tsukuba city, Geographic Information System, Moving observation, Steevenson screen



High school students see the space weather

*Saki Ishida[1]

1.Code Academy high school

I gathered that it was checked about the space weather in visual way easily.

Keywords: spaceweather, sun, sunspot

Investigation of formation age around of Mt. Olympus in Mars using by counting craters

*Hiroki Miki[1], Kazunari Nakajima[1], Shuko Tanizawa[1], Shimpei Akita[1], Kyoichiro Ogawa[1]

1.Kobe University Secondary School

We investigated formation age around of Mt. Olympus in Mars using by counting craters. The formation age could be estimated from numbers of craters because old surfaces has many craters. We investigated four areas (North, East, West and South) around Mt. Olympus. The formation age of South and East area was estimated to be one billion years ago. West area was estimated to be less than one billion years ago. In North area, north sites was estimated to be one billion or three billions years ago. South sites was estimated to be one hundred million or one billion years ago. In South sites, trace of lava was observed by the picture. Therefore, Mt. Olympus might erupt one billion years ago intensely, then lava might flow to all direction. And Mt. Olympus might erupt one hundred million years ago less intensely, then lava might flow to north and west.

The Geological History of Kanto Loam Formation

*Rio Higuchi[1]

1.Yokohama Science Frontier High School

There are large outcrops of Kanto loam formation along one of the tributaries of the Kikugawa River in Ohi-machi in Japan. The purpose of this study was elucidate the geological history around the Kikugawa River. The results of the field surveys show a fault and strata originally formed at the sea-bottom. In addition, the strata were tilted to the northwest. And the older the strata, the more tilted. It was presumed that the strata in this area were affected by a slip on the fault, and transgression in the Quaternary Period.

Keywords: Geology, Quaternary Period

The Transition of Mineral Composition by Weathering

*Hiroki Oka[1]

1.Yokohama Science Frontier High School

All kinds of rock are weathered in nature. Minerals in rock are changed into other minerals as time goes on. In this study, a process of weathering was presumed by observing minerals of olivine-bearing two-pyroxene andesite under a polarization microscope collected at Nagaotoge, Hakone. Some kind of reddish brown substance was in orthopyroxene. The substance turned out to be limonite derived from a main ingredient of orthopyroxene. In addition, a cross sectional diagram which shows a look of weathering with depth from a surface of the rock was made based on the observations of three thin sections. It is thought that the dissolution or formation of minerals is happening near the surface. However, the weathering process was not presumed enough because the number of thin sections was small.

Keywords: weathering, thin sections, andesite, orthopyroxene, limonite, the weathering process

Replication of stellar color in the pinhole planetarium

*Tsubasa Nakajima[1], *Sumire Kawamata[1], *Yoshihiro Kinoshita[1], *Daiki Aoki[1]

1.Yokohama Science Frontier High School

The purpose of this study is to make the pinhole planetarium, which replicates the real starry sky. There were three problems in the previously made planetarium.The first problem was about the brightness of the stars. We expressed the brightness with the size of hole, but the size of bright stars was too big.The second problem was that it took too much time to see the stars.The third problem was that all the stars were white.This study showed the improvement on these problems.

Keywords: Planetarium

The shape of the optimal windbreak fence to minimize the damage of the wind

*Gai Mihori[1]

1.Yokohama Science Frontier High School

Most windbreak fences in Japan are peculiar shapes.
There should be more efficient a shape.
Therefore this research was done with changing a shape of fence.

Keywords: windbreak fences, wind power

Research on Mizugamori Volcano in the part of Kofu Basin

Sanae Osuga[1], *Hikaru Nakazawa[1]

1.Yamanashi Prefectural Hikawa High School

Research on Mizugamori Volcano in the part of Kofu Basin

A study of tuff layers in Kada coast

*Aoi Ikeuchi[1], *Rion Hamada[1], *Yuki Morita[1]

1.Tennoji High School attached to Osaka Kyoiku University

The purpose of this study is to investigate whether two tuff layers in Kada coast are same or not.
Observing these layers in the coast, we discussed and analyzed it.
About two layers, one is in Miyama, the other is in Jogashima.
Both of them consist alternate layers of fine grain and coarse one.
When we observe these layers, we focused on three points; strikes/dips and thickness, geological structure, and mineral composition.
As a result, the total thickness of Miyama tuff layer and Jogasaki's one was similar. Geological structures connect two layers are not obvious.The mineral composition looks like similar, however the details are still unknown.
Therefore we have not got a conclusion yet, so at the conference, we will present the additional data of upcoming field survey.

Keywords: Kada coast, Izumi group, tuff, sedimentary structure

Study on the Seismorograms Recorded at the ASL

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1.Tennoji High School attached to Osaka Kyoiku University

By using seismorograms of the ASL (Albuque Seismorogical Laboratory),continuous recording for 40 years, we invetigate some characteristics of earthquakes such features as, durations, distinations, and waveforms etc.

Our results are,
・We found a positive correlation between magnitudes and duration times.
・Distribution of hypocenters is irregular.
・The intervals between major earthquakes are not at random but successive.

Dr. konishi(Osaka Kyoiku University) kindly advised at the SSH symposium.
Mr. Okamoto(Osaka Kyoiku University) encouraged and advised.
Thanks.

Keywords: Seismograms, Albuquerque Seismological Laboratory