

Japanese continental drift theory mentioned over 1200 years ago, before the Wegener's theory

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Geology of the Shimane Peninsula has been known as having the most deformed strata among the Miocene series of the Japanese Islands. Otsuka (1939) named it as "Shinji folded zone." Tai (1952) mapped the northwestern part of Matsue City and first discussed the stratigraphy of the Miocene formations. Large-scaled investigations carried out by the governmental institution (1967-1971), and subsequently Yamauchi et al. (1980) and Nomura (1986), respectively, discussed the stratigraphy and biostratigraphy of the eastern and middle part of the peninsula. Kano et al. integrated the areal geology into 1/50,000 scaled map such as Taisha, Izumoimaichi, Etomo, Sakaiminato and Matsue.

Izumo-no-kuni-fudoki (The Izumo Province fudoki) was compiled in 733, which was 1282 years ago. A very stimulated story, the Shimane Peninsula was formed as added the land pulled part from the peninsula, somewhere of Shiragi, old name of Korean country (A.D. 6~10 century). This story is very popular in Japan, known as "the Kunibiki myths." The physicist and essayist, Torahiko Terada, took up this story just like the Wegener's "Continental Drift Theory" in his essay of "Geophysicist and mythology." Up to the present, no one discussed the place where is the peninsula of Shiragi. However, the place is clearly located in Korea.

One more stimulated concern on this story is the paleomagnetic reconstruction of early Miocene Honshu Island. Clock-wise rotation of southwest Honshu Island has been well studied, and the geographic location of southwest Honshu Island in the early Miocene is clarified as being very near Korea.

We investigated the geology of the Pohang basin and its neighboring area. The early Miocene series of the Guryompo Peninsula are mainly composed of the Beomgogni Group and Janggi Group, both of which are characterized by volcanoclastic rocks such as dacite and andesite. Lithology of shale in the Janggi Group is similar to that of the Koura Formation distributed in the Shimane Peninsula, which yields brackish fossil *Corbicula*. The geologic ages of the Beomgogni Group and Janggi Group are ranged in 22~17Ma, earlier ages of which are also similar to those of the Koura Formation.

Surprisingly enough, the story of the "Kunibiki myths" suggests the people 1300-years ago figured out geographic nature of the earth that is unchanged with the present view of the earth. The "Kunibiki myths" never mentioned the geological reason, why is the Guryompo peninsula similar to the Shimane peninsula. However, we suppose the myths have been born through the people interchanged between Shiragi and Izumo countries. We suggest thus high potential of people's observing ability to the geology and topography of the earth indicated in the "Izumo Province fudoki."

Keywords: Izumo Province fudoki, Kunibiki myths, Shimane peninsula, early Miocene, Continental drift theory

2014 Eruption of Nakadake Aso Volcano and countermeasure of Aso Global Geopark

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After 6 years of continuous efforts with our community, Aso becomes a member of the Global Geoparks Network. We have to carry on and illuminate our geo-activities further to contribute to the regional area. In this station, Nakadake Aso Volcano has erupted at November 25, 2014 until February 2015. We investigated about the activities of Nakadake Aso and provided information to tourists and local residents. In this report, we introduce the video observation and volcanic ash in 2014. And we compared with today's data and historical data.

Keywords: Geopark, Volcanic ash, Nakadake Aso Volcano, Ash eruption, Strombolian eruption, Disaster reduction

Ibaraki university students' academic support activities on North Ibaraki Geopark

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Ibaraki University Geological Information Utilization Project consists of Ibaraki University students who interested regional contribution by geology. Our project team mainly support North Ibaraki Geopark using geological information that was not well known generally.

Until 2013, we published "geo tourism maps" of 14 sites of North Ibaraki Geopark and performed geo tours using these maps. Furthermore, we committed North Ibaraki Geopark Promotion Council and drew maps and signboards, and assisted geo tours. In 2014, we extended our regional contribution activity based on the industry-government-university-civil-bank collaboration. The performance is as follows.

1) Producing a North Ibaraki Geopark promotion video (PV)

We collaborated with a professional cameraman, Tsukuba Bank and local governments. The PV can introduce geological feature of North Ibaraki area by aerial video. The PV will be screened at branches of Tsukuba Bank, the North Ibaraki Geopark Satellites, and several events.

2) Producing a North Ibaraki Geopark official product "Geodora"

The North Ibaraki Geopark official product "Geodora" was produced in partnership with Kamejirushi Corp., Kasumi Corp., Seibu Corp., a designer, and North Ibaraki Geopark Working Group. The action was paid attention by mass medium, and raised Geopark awareness.

3) North Ibaraki Geopark Summit

We hold a North Ibaraki Geopark Summit. At the summit, 40 participants consisted of North Ibaraki Geopark guides (interpreter), local government officers, Tsukuba Bank officers and civils debated about "geo tour". By information sharing, the connection was stronger and contributed North Ibaraki Geopark revitalization.

4) Producing a new map

The new map in Hitachiota (Mt. Mayumi area) was produced. The information on animals, plants, historical and culture offered by interpreter was added to the geological information. Hitachiota local government will incur the printing costs of the map in the coming year.

We introduced Ibaraki University Geological Information Utilization Project and North Ibaraki Geopark in the annual meeting of the Geological Society of Japan and Science Agora.

Keywords: North Ibaraki Geopark, Regional Contribution

Effects and Issues of Resident Involvement in Geopark Model Route

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One of the important roles of geopark activities is resident understanding of the geopark concept, territory and its features. For this purpose, it is important that local residents participate in geopark activities positively. However, in Japan, where local development has been undertaken by governmental organizations, it is difficult for local residents to take part in geopark activities. This time, we planned "Geopark Model Route" across the San'in Kaigan Geopark in cooperation with local people, to promote better understanding and communication with local people, government and academia involved in geopark activities.

<San'in Kaigan "Geopark Model Route">

In a geopark, creating a tour route and map which allow visitors to explore the geosites easily is required. We have therefore prepared a "Geopark Model Route" for walking tours, sea kayaking, driving in half-day or one day, and for enjoying the feature of each area. Each map includes outlines of about twelve must-see geological spots, allowing visitors to enjoy sightseeing and learn about the San'in Kaigan Geopark.

<The process for planning a "Geopark Model Route">

1) San'in Kaigan Geopark Promotion Council Academic Group selects the candidate sites from the area where geopark activities are prosperous, and if requested to create a map by local residents. 2) Local guides, tourism facilities, local residents, geopark-related officials and academic members form a working group on creating a draft of map. 3) The working group surveys the field and checks the highlights, safety, estimated walking time, etc. 4) Academic Group creates a map. 5) The working group checks the content of the map.

Since Academic Group directly got involved in creating a map, the contents were thought to become difficult. To make it understandable to the general public, we posted images and descriptions on the map to Facebook and modified them to more simply by collecting public opinions through SNS during the process 5).

<Effects and issues of resident involvement in "Geopark Model Route">

We were able to make "Geopark Model Route" useful for local residents, by involving experienced local guides and people in the area. It is important that geopark guides take part in map creation especially in the process 2) & 3). Firstly, geopark guide's participation made the map more practical. Secondly, by working together by local residents and researchers, scientific information could be shared among local people. As mentioned above, we think that resident involvement in planning "Geopark Model Route" was effective, however, some problems were found in its operation. The map is not used effectively in the area which has fewer visitors and no local guides.

From now on, it is also necessary to accept visitor's opinions and correct continuously so that the map may come to be more effective and useful for both visitors and local residents.

Keywords: Geopark, Community Development

Present condition and challenge for the future in using information tools in San'in Kaigan Geopark

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Geopark has been actively performed geotourism for the purpose of the regional sustainable development. Geotourism uses a variety of information tools for PR. For example, a website, brochures, signboards, guide, app, SNS, etc.. We examined a website, signs, guide in San'in Kaigan Geopark.

Through the examination , we could discover an aspect that website has not been used effectively. However, there are visitors from overseas and outside of Geopark area. Utilization of the signboards is about 26 percent in Genbudo Cave. And utilization of guide is about 10-30%. As a result, it becomes clear that information tools have not been effectively utilized. From now on, we have to consider how to use information tools, and how to convey to foreigners and so on.

Keywords: Geopark, Geotourism, Information tools, San'in Kaigan Geopark

The Geo-Tetsu World of Shikoku District from Keywords in the Newspaper Series

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1. What is the Geo-Tetsu ?

The Geo-Tetsu (Kato et al., 2009) is discover wonders of the earth by train trips, that enjoy and learn the nature along the railway. The Geo-Tetsu is supported by the members of Geo-Tetsu Project Committee of the Fukada Geological Institute (<http://fgi.or.jp/geo-tetsu/>). We select enjoyable Geo-Tetsu courses and Geo-points through which people can see geoscientific phenomena and railway facilities through train trips, and continue the proposal of geo-tours using a railway (Fujita et al.,2013).

2. The new approach of the Geo-Tetsu

We started writing the series of "The Geo-Tetsu Trip: Let us Enjoy Wonders of the Geological feature and the Topography of Shikoku District by Train" by a request from the Kochi Shimbun Company. It was published as the series in a "Saturday Nature" in 24 times of the Kochi Shimbun on every month third Saturday from April, 2013 to March, 2015. According to the marketing data which the Kochi Shimbun Company announced in January 2013, as for the morning edition circulation is 198,350, estimated total readership is 539,156, share in Kochi is 86.3%. It was a good opportunity in a meaning to have many people could know the Geo-Tetsu with or without interest to earth science and railways. It also became the new method of the Geo-Tetsu that the style of writing the familiar sceneries as Geo Points in around a station or along a short interval between the stations.

3. The style and layout of the series of "The Geo-Tetsu Trip"

The series was constructed as follows: the size about 1/2 (A3 size) of the newspaper space; the subject, subtitle, the text; a geological map and route map; one piece of big color photo and others 1-2 pieces; the surrounding map and the illustration of the geological structures as necessary. The series is complete in one issue. A member of the Geo-Tetsu Project Committee of the FGI wrote it by turns and tried improvement of the content with the committee.

4. The Geo-Tetsu world of Shikoku district from keyword of the series

We selected 9 routes of railway of Shikoku district in the series for two years. There are many keywords of disasters and railway facilities. The rugged topography and complicated geology of Shikoku district are reflected in them. You can know the railway technological invention to overcome the difficulties; fault motions of Median Tectonic Line, large-scale landslides, the re-routing and disused lines. It was also reported the flood of the Niyodo River and the Shimanto River.

Not only those keywords, we introduce the pleasure from the train window. We can enjoy various topography of the famous sightseeing at Oboke, the incised meander at Shimanto River, and the erosion topography of Sanuki plains. On the Geo-Tetsu trip, we can feel the benefit of geological feature and topography, too. It was focused on the people living along the railway that the springs called Uchinuki of the alluvial fan at Iyo-Saijo, the beach ridge at Akano and so on. In addition, there are episodes of the historical context until construction of the railway and the dawn of the geological history. There are also articles about the origin of the place name about the land. From various keywords only in Shikoku district, we can feel the original Geo-Tetsu story.

Keywords: Geo-Tetsu, Shikoku district, newspaper series, the Geo-Tetsu trip, keywords

The Akatsuki Tourism: Venus observation campaign as next-generation geopark contents

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This paper discusses the potential of planetary science as next-generation geopark contents, which has not been focused ever. It should be easy to divert existing geopark contents to planetary science outreach because the Earth is a planet.

In order for the geopark tourists to understand planetary science contents, the guides have to require considerable time and patience of the guests to tell the whole story beyond the story about the Earth. Clearly, we cannot challenge the patience of lay tourists. We should therefore target the geo-fan base, and make them to become a word-of-mouth hubs that popularize the geocontents.

In order for the geopark tourist not to understand planetary science but just to touch the topics, astronomical observation events may work. A good example is the Venus observation campaign in 2017, supporting and cheering the Japanese spacecraft Akatsuki in geoparks.