



# Progress Report 2015

## Muroto Global Geopark



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# 1. Overview

Muroto Global Geopark is a place where the “birth of the earth” through plate tectonics can be seen before the viewer’s eyes. These sights include Paleogene-Neogene accretionary complex, marine terraces formed by sea-level changes through glaciation in the Quaternary and by continual coseismic crustal movements, and emergent coastal landforms associated with major earthquakes. Japan, located on an active margin where four tectonic plates interact, is one of the most earthquake-prone and volcanic countries in the world. Even in this environment, Muroto Geopark stands out as a representative area of the mobile belt. The Shimanto belt, which offered the first on-land proof of the theory of plate tectonics, can be observed up close. In addition, subduction zone earthquake which occur every 100 to 150 years, along with the concomitant rising of the earth’s crust – which occurs at the astonishing rate of approximately 2 m every 1,000 years – have brought about remarkable topographical changes, with major impact on the lives and livelihoods of the area’s inhabitants.

The special characteristics of Muroto Global Geopark are not limited to its geological and geomorphological heritage; another major point is how these are utilized with such wisdom by the local inhabitants in sustaining their livelihoods. For example, agriculture thrives on the level surfaces of the terraces, taking advantage of the topography, the soil’s good drainage and long hours of sunlight. The land surface of Muroto is raised up by 1 to 2 m by subduction zone earthquakes. In the past, it has been necessary to re-excavate fishing ports in the area that shallowed after the earthquakes in order to put them back into operation. In this way, we see how Muroto is an area which functions as a locus of preparedness for the geohazards, a locus of strong resilience after disasters, and a locus of the application of resources that became available as a result of disasters.

In recent years, as a series of major earthquakes and tsunamis have occurred at the active margins, along with other large-scale geohazards such as volcanic eruptions, it has become apparent that Muroto Global Geopark’s mission is to tell the world how to live in a mobile belt, leaning from the people living in this drastically and constantly changing environment.

Muroto Geopark Promotion Committee was established in June, 2008. Having become a Japanese Geopark in December, 2008 and having joined Global Geoparks Network (GGN) in September, 2011, our geopark has grown to gain external recognition. Now in Kochi Prefecture, the word “Muroto” is almost always associated with “Geopark.” Local residents’ initiative in geopark activities has been strengthened, leading to active involvement in various areas.

This report of our activities will focus on the 4-year period since Muroto Global Geopark joined the CGN.



## 2. Our contribution to the network of geoparks

Since the start, Muroto Geopark Promotion Committee has been a positive player in activating the network in Japan. Since joining the GGN, however, Muroto Geopark has been especially successful in seeking out and finding ways to contribute to the Network. In tandem with this process, Muroto Geopark dialogs and shares information with the other members of GGN.

### **2.1 Participation in International conferences and other forums, and sharing our knowledge and experience**

When we take part in international conferences, we are aware that this is not simply a matter of introducing Muroto Geopark to a wider audience; rather, by sharing our knowledge and experience with the other members of GGN at these conferences, we can make a contribution to all geoparks as a whole. For example, at the 6th International Geoparks Conference in 2014 in Canada, four participants from Muroto Geopark spoke about the geopark activities in Muroto and the resulted findings. We gave the

presentations under separate themes such as education, geotourism and intangible cultural assets. At the 1st Regional Workshop on Sustainable Geopark Management, held in 2015 at Langkawi Geopark, Malaysia, a large number of Aspiring Geoparks were present. In response, we shared Muroto Geopark's experience in the effective use of logos and in encouraging local community involvement.

## **2.2 Dialog with other geoparks**

Also, in forums like international conferences and APGN symposiums, Muroto Geopark has been proactive in building opportunities for dialog and information-sharing with other geoparks, and pushing forward in this area. Specifically, we have been in dialog with Langkawi Geopark, Tianzhushan Geopark, Jeju Geopark, Hong Kong Geopark and Grutas del Palacio Geopark, Uruguay. In the case of Langkawi Geopark in particular, the chair, secretary-general and specialist staffs attended an information exchange meeting, and discussed in a concrete way what kind of dialog should unfold between the geoparks. Since then, both parties have co-operated in mutual information exchange, doing groundwork preparations toward an inter-university student exchange program, distributing leaflets at each other's facilities, and adding links to each other's websites on their homepages, among other steps. In 2014, an education exchange program was designed with younger students as the focus, and exchanges started in the areas of handicrafts and letter-writing. The next step in the plan is to start using the Internet for exchanges between students. In the near future, it is also planned to start making the



necessary preparations to establish a sister geoparks relationship. Muroto Geopark is also active in mutual information exchange with Tianzhushan Geopark and Jeju Geopark, and is in contact with Grutas del Palacio Geopark through exchanges between younger students over the Internet.

## **2.3 Our contribution to JGN and our activities with the Network**

Japanese geoparks are members of the Japanese Geoparks Network (JGN); Muroto Geopark Promotion Committee is actively co-operating with this Network. Two members of staff work for JGN secretariat, and play a supporting role when the

secretary general of the JGN goes abroad to attend international conferences. Muroto Geopark is also doing its utmost in a whole range of JGN activities – participating in meetings of geopark committee chairpersons; having our geology and geography specialists popularize the geopark concept on a national scale; and having our international relations specialists co-operate with JGN on the international stage, among other contributions. In particular, at the Third JGN National Conference, which was held at Muroto, we prepared a conference program which took the current situation of the JGN into full account, and succeeded in organizing a gathering which helped to move forward to resolution of a number of issues facing the JGN. Muroto Geopark staff also played the leading role in creating English and Japanese versions of JGN pamphlets for the entire Network as a whole. Also, with regard to UNESCO Global Geoparks Initiative, Muroto Geopark has cooperated with other Japanese geoparks as a member of GGN, translating communications from UNESCO and the bureau members of GGN, and sharing these communications with JGN. In this way, it can be said that Muroto Geopark has made a positive contribution to the work of the GGN also, through our activities with the JGN.

### 3. Muroto Geopark's Management Plan and Financial Situation

#### 3.1 Management plan and its execution

The creation of an overall plan allowing for both the stable management of Muroto Geopark and for sustainable development of the local communities has been a major issue for us since we started operation. After a series of discussions with local residents, committee members and others from FY2012, the Committee formulated a three-year action plan to be carried out between FY2013 to FY2015. The plan was composed of five major elements – management, networking, surveys and researches along with education and conservation, disaster prevention, and geo-tourism. It was decided to set up a promotion team to forward the plan in each of these five areas. The promotion team offers a forum which is easy to join for anyone with a positive interest in the area the team is working on. Each team is expected to implement the plan in a hands-on, pragmatic way. The geo-tourism team started its work in FY2013, with the other promotion teams coming on-stream in FY2014.

### 3.2 The financial situation of Muroto Geopark Promotion Committee

Since the foundation of Muroto Geopark Promotion Committee in 2008, the Committee's management of the geopark's finances has been largely dependent on subsidies from the local governments of Muroto City and Kochi Prefecture, and from contributions from private businesses. Subsidies and payments of commissions from Muroto City government have risen in particular since the financial year Muroto Geopark was recognized as a member of the GGN; with the aim of increasing the number of specialist staff, and of furthering our efforts in education, consciousness-raising and spreading the geopark concept to a broader audience, this enhancement of our funding has continued to the present day. [See Table 1]

[Table 1] Subsidies and Payments of Commissions from Muroto City Local Government to Muroto Geopark Promotion Committee (Unit: yen)

| FY                  | 2010       | 2011       | 2012       | 2013       | 2014       |
|---------------------|------------|------------|------------|------------|------------|
| Commissions         | 10,948,000 | 22,910,000 | 20,802,911 | 16,244,773 | 20,123,000 |
| Municipal subsidies | 6,189,000  | 7,999,020  | 5,970,071  | 6,043,037  | 5,269,987  |

Muroto City government has kept in close pace with the Committee's action plan and been offering thoroughgoing support, carrying out public works projects to further the geopark's activities since the geopark joined the JGN. Contributions from private enterprise have also increased remarkably since Muroto Geopark gained recognition as a member of the GGN; these contributions have played a role in furthering geo-tourism, thus making a contribution to the local economy. [See Table 2]

[Table 2] Funds Contributed by Private Enterprise etc. to Muroto Geopark Promotion Committee (Unit: yen)

| FY                      | 2011    | 2012    | 2013      | 2014      |
|-------------------------|---------|---------|-----------|-----------|
| No. of companies/groups | 1       | 1       | 2         | 3         |
| Amount of contributions | 300,000 | 532,466 | 1,203,380 | 1,820,604 |

### 3.3 Financial management plan

While relying as before on municipal subsidies as a main source of income, Muroto

Geopark’s financial plan envisions further priority being placed on the activation of projects subsidized by the national and prefectural governments, leading to the realization of a more effective financial management plan. Also, contributions from private enterprise will be proactively invested in Muroto Geopark’s conservation activities, in geopark educational projects for youth, in promotion of geotourism and in the sale of specially produced merchandise. Along with the conservation of Earth heritage and economic vitalization, Muroto Geopark will work toward securing autonomous income streams.

### 3.4 Aiming for sustainable economic development

With the aim of encouraging sustainable local economic development through the geopark concept, Muroto Geopark is actively forging links with local enterprises and other groups in the area.

Muroto Geopark has been the object of sustained media attention, especially since gaining recognition as a member of the GGN, and this has had a favorable influence on the business activities of companies and other groups in Muroto City. In the first place, the number of guided tours has been remarkably increased at our representative geosite, Cape Muroto, along with an ongoing increase in the numbers of visitors at major tourism facilities in the locality. [See Table 3]

[Table 3] Number of Guided Geotour Participants at Cape Muroto (Unit: individual)

| FY                       | 2 0 1 0 | 2 0 1 1 | 2 0 1 2 | 2 0 1 3 | 2 0 1 4 |
|--------------------------|---------|---------|---------|---------|---------|
| No. of tour participants | 947     | 5,083   | 8,013   | 6,886   | 7,301   |

The development and sales of the products by private companies making use of the Muroto geopark logo has contributed to enhancing local economic activities.

In the same way, since recognition of GGN membership, the Committee has commercialized and marketed specially designed polo shirts and parkas. In addition to these efforts to develop autonomous income streams, the income generated from these projects has been channeled back into the geopark’s activities, thus contributing to further education and consciousness-raising efforts and the vitalization of the local



economy. Licenses to use the Muroto Geopark logo have been granted in 124 cases so far, and the logo also appears on campaign leaflets and posters for road traffic safety, etc. For example, in FY2013, sales numbers for products bearing the Muroto Geopark logo reached 67,898, for a total sales figure of 19,603,840 yen.

### **3.5 Municipal policy**

In its March 2011 “General Development Plan for Muroto City” (10-Year Plan), the local government of Muroto City, aiming at local development, positioned the development of Muroto Geopark as instrumental in the protection and utilization of local resources, in the development of tourism, and in the increase of the nonresident population of the city.

As projects for the progress of Muroto Geopark, Muroto City administration has undertaken tangible operations such as maintenance of base facilities and sites, along with providing various forms of signage in coordination with Muroto Geopark Promotion Committee’s development plans.

Since GGN recognition, links between Muroto Geopark and Muroto City administration’s Tourism Section have been strengthened even further, and a framework for cooperation has been established in areas such as the conservation of Earth heritage and environmental conservation activities, along with the development of local tourism through the geopark.

Information-sharing with Muroto City administration’s Disaster Prevention Section on earthquakes and tsunamis has been strengthened, and links are being furthered in planning evacuation policy for local residents and tourists in the event of a disaster.

## **4. Geosite Maintenance and Conservation Activities**

The situation with regard to geosite maintenance is generally good. Our geological heritage is maintained under the legal framework of the Natural Park Act, the Act on Protection of Cultural Properties, the Muroto City Ordinance on Protection of Cultural Properties, and the Muroto City Basic Ordinance on Protection of the Environment. In particular, the area along the coastline was designated in 1964 under the Natural Park

Act as Muroto-Anan Kaigan Quasi-National Park, and severe restrictions are placed on development. Also, under the Muroto City Basic Plan for the Environment, policy and action plans for forwarding environmental protection have been determined in partnership between the public and private sectors.

#### **4.1 The natural cedar forest Sakihama Yakudo Tennen Sugi Kyodo no Mori**

Until Muroto Geopark became a GGN member, the stand of very large natural-growth cedar trees at the Mount Dannotani Site (within nationally owned forest land) was largely unknown, even among most residents of Muroto. However, around the time membership was decided, the trees garnered extensive media attention as a non-geological attraction, and the number of visitors to the area grew very rapidly. This stand of very large trees became an arena for activities centered around locally based groups involved in education at the local schools, etc., and it was designated as a “Kyodo no Mori” (Home-place Forest) by the Ministry of Agriculture, Forestry and Fisheries (MAFF).

Along with contributing to the vitalization of local communities, MAFF’s “Kyodo no Mori” project aims to recognize the significance of forested areas as symbols of their locality etc., and to maintain those forested areas that enjoy strong community support for their preservation. Taking local support for the project into consideration, an application for inclusion in the program was made through Muroto City local government, and the natural cedar stand at Mt. Dannotani was designated as a forest conservation area under the title Sakihama Yakudo Tennen Sugi Kyodo no Mori on October 30, 2012. The term of conservation is set at 30 years.

In conjunction with this development, the maintenance and guiding group Sakihama Yakudo Tennen Sugi Kyodo no Mori wo Mamoru Kai (Association for the Protection of Sakihama Yakudo Tennen Sugi Kyodo no Mori; Dansugi-kai for short) was set up, with local residents as the core members. Guide training course is provided, aiming toward the training of guides who can relate the geo-narrative of how this stand of very large natural cedar trees has interacted with and helped to form the natural environment which sustains it. Furthermore, given the rise in the number of visitors to the Mount Dannotani Site, the Muroto City administration has installed new toilet facilities.

## 4.2 Development of a walking trail by Aki Forest Management Office

At the Kanagi Landslide Site, one can get a real feel for the large-scale landslide scars and subsequent re-afforestation efforts that have taken place there. After joining GGN, a new walking trail was opened by Aki Forest Management Office. The Kanagi Landslide Site was chosen as one of the geopark's 22 geosites because of its geological and civil-engineering heritage, meriting the development of a walking trail.

## 4.3 Graffiti damage to the Cape Muroto Site

On April 12, 2012, spray-painted graffiti was reported on a boulder beside the Cape Muroto walking trail. The damaged rock was a gabbro boulder which had rolled into its current position within the Class I Special Zone in Muroto-Anan Kaigan Quasi-National Park – an area also designated by the national government as a place of scenic beauty. As well as contacting the police, the Committee issued a statement by its chairperson. Also, in concern for the conservation of cultural assets, the graffiti was removed using a high-pressure hose, and the boulder was restored to its original state. This operation was carried out in cooperation with the Cultural Assets Section of Kochi Prefectural local government.



The Committee chairperson's statement was as follows: *Even within Muroto Geopark, which has achieved recognition as a member of the Global Geoparks Network, Cape Muroto is an important highlight. This is a place which has become known and loved by many people, local residents and visitors alike. It has also been a venue for outdoor study for children from both inside and outside Kochi Prefecture. It is extremely regrettable that such an important resource should be damaged through the actions of some heartless individual.*

*Together with related organizations and groups, we at Muroto Geopark intend to continue our efforts in the conservation and utilization of nature into the future.*

*Kenji Komatsu, Chairperson, Muroto Geopark Promotion Committee (Mayor of Muroto City)*

#### 4.4 Beautifying the environment

Regular patrols and shoreline cleanups are conducted in Muroto Geopark to dispose of debris deposited by typhoons etc. and of illegally dumped trash. Activities for beautifying the environment have become more broadly popular since GGN recognition. These activities are being undertaken not only by the Committee, but also by local residents, the Muroto City Tourist Guides Association, the student council of Muroto Prefectural High School, and private groups, among others. Public awareness of beautification of the environment is growing little by little. For example, candidates in Muroto High School's student council elections have included "doing cleanups at Muroto Geopark" as a plank in their manifestoes.



(Left) Local residents conducting a cleanup along with Muroto City's administration (Gyodo-Kuromi Coast Site)

(Right) Total citywide weeding along the National Road by local residents in preparation for JGN National Conference.

#### 4.5 Sampling procedures

It was discovered that research in the geopark had involved the collection of samples without application for the requisite permission for sampling. We mentioned in our application dossier for GGN membership that, as a measure to forestall such activities, the Committee appeals through academic societies to a broad range of researchers for strict compliance with procedural requirements.

Following this, our geology specialists became the liaison for matters connected with sampling. The liaisons are intended to contribute to the maintenance of geological resources, to give advice on sampling locations while taking scenic concerns and protection of the geological resources into consideration, to join in attendance at on-site surveys and to expedite permit applications with the relevant authorities, etc. This approach has the merit of supporting staff at the local administration, among whom

there are few members with the relevant specialized knowledge, and of also assisting researchers, who had faced obstacles in achieving a smoothly organized process of applications for permission.

While at first, only one or two approaches for application for such permission were made per year, the number has risen year by year, and such permits were granted in six cases in 2014. This increase seems to reflect an increased level of understanding of conservation and maintenance issues, along with a heightened awareness of these concerns following GGN recognition. A framework is being put in place whereby the Committee can closely monitor the situation with regard to research surveys inside the geopark and manage the maintenance of the geopark's geological heritage.

#### **4.6 New maintenance and conservation activities**

In cooperation with Muroto City Tourist Guides Association, the Botanical Conservation Activities Group, and other groups involved in local beautification activities, Muroto Geopark is removing extraneous plants from the natural habitat of the primrose-willow-like *Ludwigia stipulacea*, an endangered species (at the Nabae-Sakamoto Site), thus aiding in the conservation of the species.

## **5. Local Education Awareness-raising Activities through Science Education, Disaster-Prevention Education and Environmental Education, etc.**

Local education and awareness-raising activities have been demonstrating more active and sustained growth and popularity since GGN recognition. The Committee is actively promoting education with a wide range of approaches, such as organizing educational and disaster-prevention events, activating education in schools in Muroto City, organizing hands-on instruction for universities both inside and outside Kochi Prefecture, accepting intern students, cooperating with Kochi Prefecture-based research organizations of all kinds, and supporting research surveys by students and researchers. An increasing number of initiatives are also originating from outside the Committee.

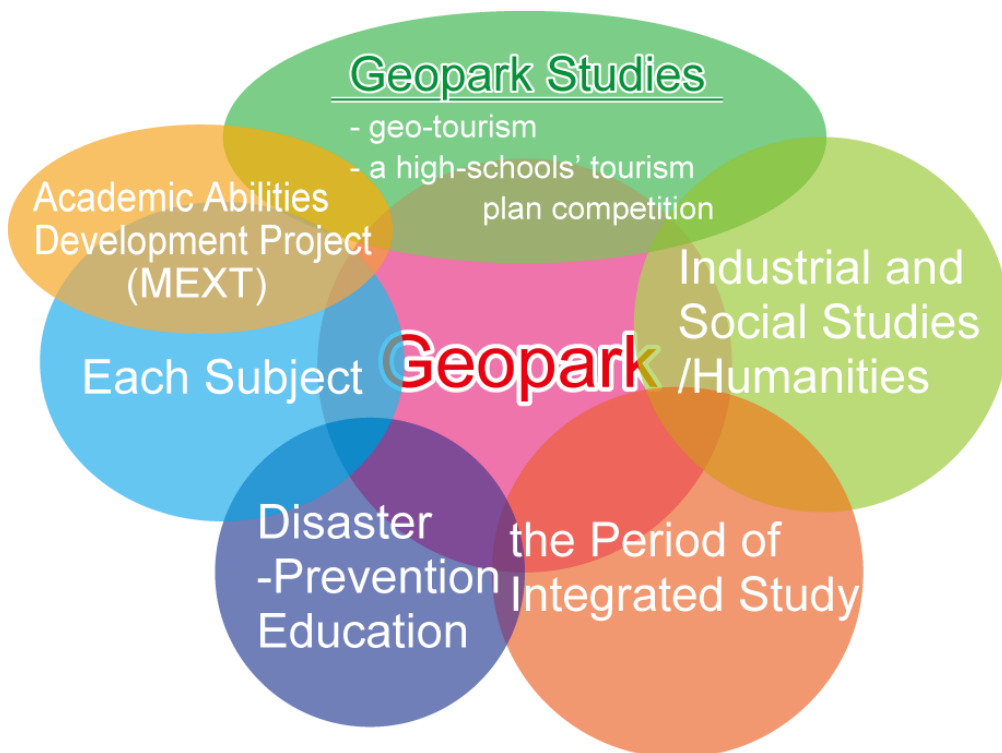
### **5.1 Promotion of geopark studies including field trips etc. by the Muroto City Board of Education**

Muroto Geopark is aiming to promote a more substantial educational program in

concert with relevant educational authorities. In 2011, the Social Studies supplementary reading material, *Muroto Geopark Geo-guidebook* was published by the Muroto City Board of Education and Muroto Geopark Promotion Committee. In 2014, in order to effectively promote the Kochi Prefectural Basic Plan for the Promotion of Education, an education-oriented edition of the *Local Action Plan* was published (in a joint initiative by Kochi Prefectural local government and municipalities in the prefecture); in tandem with this, the budget for items such as bus transportation of elementary-school pupils taking educational field trips to the geopark was raised (in an initiative entitled “Go for It! Muroto Geopark Guide”).

### 5.2 Initiatives with Muroto High School

Muroto High School is the only high school in Muroto City. Muroto Geopark is actively involved in geopark-related educational activities with the school, through subjects including Geopark Studies, Industrial and Social Studies / Humanities, research projects, and through all branches of the sciences.



Students enrolled in “Geopark Studies” joined a high-schools’ tourism plan competition in 2014 for which 69 schools submitted a total of 131 tourism plans. Muroto team’s plan was in the ten plans selected for the 2014 final held in Kobe, Hyogo Prefecture. Discussing their plans in front of a large audience was a major



experience for the participating students, who were in their second year of Geopark Studies. Many people from Muroto came to the final to support the team. This was a good opportunity to create links between students and local residents under the banner of “Geopark Studies.”

Under the “Industrial and Social Studies / Humanities” label, first-year students take a module called “Getting to Know the Locality,” with the aim of better understanding their hometown. They study about geoparks and local industry from the angle of fisheries and agriculture, tourism, etc. Geopark-related topics form part of a wide range of other subjects also; in classes tailored to raise students’ academic abilities, students learn about how Muroto Geopark became a member of GGN, and about the hard work of local volunteers making a contribution to the vitalization of the locality. Hearing their stories from the people themselves, the students are motivated to be self-starting and confident in their own abilities. The program aims to develop people who can contribute to the area and to its further development.

In 2013, the module “Learning about Disaster Prevention through Geo-studies” was chosen for inclusion in the Japanese Ministry of Education’s Disaster-prevention Challenge Plan. The approach was to give students experience of the mechanism of earthquakes through exposure to the seismically active Muroto Geopark area. The first objective was to have the students themselves take the main initiative, rather than having the school staff or local residents prepare the plan. Running the initiative by themselves and communicating with local residents, the students created an “Evacuation Chart.” This was drawn up to enable the map of existing hazards to be used more effectively, and evacuation routes and disaster-mitigation plans tailored for each individual resident’s needs were set up.

### **5.3 Making use of lectures given to teachers when their licenses are renewed**

Teaching about local geological features, terrain, natural environment and livelihoods is an important issue in school education and in sustained local development, given that such education forms the next generation of working adults. However, the number of educators who fully grasp the importance of such studies is still rather limited. Moreover, the education of the educators themselves is also an issue. In February 2015, as a new initiative, the Committee dispatched geological specialist staff to address teachers attending lectures on having their licenses renewed. Hosted by the National Muroto Youth Outdoor Learning Center, a lecture on leadership methods for nature-experience programs using geoparks was given to 40 educators from elementary and junior high schools.

### **5.4 Outreach activities**

- Summer school

Muroto Geopark has held summer schools on three occasions. Researchers working at the cutting edge of their disciplines were invited to help children's comprehensive understanding of topics such as land formation and disaster prevention. The programs were attended by pupils from the 5th grade of elementary school to the 3rd grade of high school.

Participants each year number about 20 pupils from schools in Kochi Prefecture and other prefectures in Shikoku. Though the Committee members play central roles, there is a distinctive degree of active involvement by local residents, the National Muroto Youth Outdoor Learning Center, and educators from schools in Muroto City. Also, as a platform for creating links between researchers and the local community, the program also functions as an arena for the development of educational programs and for the development of geopark guides. Local junior high schools and the National Muroto Youth Outdoor Learning Center will make sustained use of the educational programs developed for the summer school.

- “Magari Lab”

An event was held to promote earth-science education in a fun way through creative projects and hands-on experience, with the main initiative taken by the Committee's





geological specialist staff. Unlike the summer school, this event did not require attendees to reserve places in advance, and attendees were free to come and go at any time as they wished. The aim was to give as many local people as possible a chance to experience an event dedicated to local nature and the nature sciences. The event was

held for three hours in the afternoon on a holiday and attended by about 80 people from young to old. It is noteworthy that over 70% of the attendees were local residents from Muroto City. This program aims to spread accurate information on the locality as broadly as possible, in order to foster the next generation of working adults in the area. A temporary laboratory called the “Magari Lab” was set up to offer insights into the earth sciences, which form the basis for all geopark activities. The level was less specialized than at the summer school.

- Lecture and study walk aimed at local residents

The Japan Landslide Society held an interesting study walk, and at the same time hosted a special lecture meeting aimed at local residents and junior high-school students. Local residents and junior high-school students from the Sakihama district were introduced to the world of research, questioning why landslides happen and how we can co-exist with them.



Lecture for people from the Sakihama district, given by the Japan Landslide Society

- Lecture on plants used for disaster relief

In 2013, a joint event was held by the Committee and Kochi University of Technology. Educators including Professor Takashi Watanabe (Botany) spoke on “Plants Used for Disaster Relief,” and there was also a study walk and food tasting. Knowing enough about edible plants to find food during shortages after a disaster is another way to help mitigate the effects of such a disaster. Also, the local Ladies’ Association made a bento using such plants. This event was also given at the Geopark Lecture in 2014.

- Joint ventures with JAMSTEC

Muroto Geopark has always developed in conjunction with the Japan Agency for Marine-Earth Science and Technology (JAMSTEC). They are linked by a cooperation agreement, and conduct joint research and popularization projects.

In July 2012, the ocean survey vessel *Natsushima* held an event welcoming visitors at Muroto City; 1,200 people came.

The Geopark Lecture Series was held in July 2014, under the theme of “searching for the future of Muroto using cutting-edge technology.” A lecture was given on ongoing research on the Nankai Earthquake, which occurs every 100 to 150 years, and there was an awareness-raising lecture on earthquakes and tsunamis. In this way, the attendees were encouraged to think about Muroto’s future.

In April 2015, JAMSTEC’s on-land station for earthquake and tsunami monitoring system opened in the Muroto Geopark Center site, allowing observation of real-time measurement data at the Center.

## 5.5 Support for Research Surveys

- In the field of Geology

Muroto Geopark retains links with the latest research survey activities. Since joining the JGN, structural geological and paleontological research has commenced on the Muroto Peninsula, including the research of cabbro at Cape Muroto. Research is being done by staff and students at Nagoya University, Kanazawa University, Kochi University and Kokushikan University. Kochi University and Kokushikan University’s approaches are distinctive in that they take into full consideration maintenance for geosites and the research needs of the locality. Also, information on the earthquake and tsunami monitoring system for the Kii Channel (DONET) has been made accessible from the system’s existing infrastructure, and can be used for disaster-prevention education.

Note: Current research themes

Nagoya University: the influence of heat on intrusive bodies at Cape Muroto

Kanazawa University: fossilized *calyptogena soyoae* on the Maruyama Coast

Kochi University: recording of traces of undersea landslides on the coastline of the Muroto Peninsula, and their mechanism; trace fossils on the west coast of the

Muroto Peninsula

Kokushikan University: generative mechanism of carbonate nodules on the coastline of the Muroto Peninsula

- In the field of Humanities and Social Science

In the fields of Descriptive Geography and Tourism Studies, students' graduation theses are actively sought and welcomed. Research results are compiled in book form and aimed to be archived. University field trips are actively sought and welcomed. Groups have included Osaka City University's Geographical Field Survey I (Faculty of Humanities) and Hiroshima University's Area Survey I (General Studies) among others. Research results are archived at Muroto Shimin Library, enriching the store of information available.

## 6. Tangible Infrastructure

### 6.1 Muroto Global Geopark Center

On the occasion of GGN recognition, it was decided to renovate a closed junior high school building into the Muroto Global Geopark Center. The school had closed down in March 2011. With a view to equipping the headquarters, the Muroto Geopark Headquarters Facility Exploratory Committee was set up in November 2011, comprising members of the administration, community groups, community representatives, etc. The Committee discussed the purpose and internal functions of the Center. The Committee held twelve meetings before producing a basic plan in March 2013, had six workshops for members of the local community, and compiled a broad range of opinions in setting out the plan. The opinions included the importance of “attractive PR of each geosite to motivate visitors to come” “an arena for dialog between tourists and residents,” and “a forum where local people can learn about Geo-topics.”

Refurbishment work started in December 2013, and was completed at the end of March 2015. The Center is open year round, and is free to enter; it promises much in the areas of maintenance of the local Earth heritage, education and progress of local tourism through geotourism, along with disaster-prevention education.

## 6.2 Other tangible infrastructure

Muroto Geopark aims to share and conduct the maintenance of the information gathered from all its geosites, and to improve their safety.

Hioki walkway improvement (in 2011)

Steps at the car park Hane Misaki Park (completed in 2012)

Landslide site at Kanagi in Sakihama, Dannotani walking trail (2012)

Public toilets in Sakihama Dannotani-yama (completed in 2013)

## 7. Geotourism

### 7.1 Increase in tourist numbers; guiding activities

The number of tourists in Muroto City has been increasing since GGN membership began (2011). In recent years, not only individual tourists but organized group tours have been availing of the services of Muroto Geopark guides. Guided tours to three sites are usually available, and the reservation process is being made easier, with reservations now capable of being made through the geopark's website, etc.

Table 5: Changes in Numbers of Tourists visiting Muroto (in the 10 years) (Unit: individual)

| Year | Total Number | Of which, from inside Kochi Prefecture | Of which, from outside Kochi Prefecture |
|------|--------------|--|---|
| 2005 | 177,086      | 100,384                                | 76,702                                  |
| 2006 | 198,802      | 116,905                                | 81,897                                  |
| 2007 | 263,730      | 145,512                                | 118,218                                 |
| 2008 | 360,919      | 201,576                                | 159,343                                 |
| 2009 | 440,885      | 230,793                                | 210,092                                 |
| 2010 | 461,964      | 198,742                                | 263,222                                 |
| 2011 | 487,261      | 217,542                                | 269,719                                 |
| 2012 | 531,876      | 237,791                                | 294,085                                 |
| 2013 | 519,643      | 255,820                                | 263,823                                 |
| 2014 | 632,881      | 298,655                                | 334,226                                 |

Source: Commerce, Tourism and Deep-sea Water Section, Muroto City administration

Of the three guided tours normally available, the Cape Muroto Site visit is the one most commonly conducted; it is given by the Muroto City Tourist Guides Association. Guiding at the geopark is available all year round, and while prior reservations are

recommended, same-day participation is accepted on a flexible basis. As of May 2015, over 30,000 people have been guided by the members of this guide association.

While the lack of guides had been an issue previously, a sustained program of training and development lectures saw the number of guides rise to 46. The number of visitors from outside Kochi Prefecture being guided is rising. The Muroto City Tourist Guides Association holds a study meeting every Saturday, and the Association is actively raising the quality of its guides through providing this opportunity for mutual learning and information exchange.

## 7.2 The Geotourism Promotion Team

In 2013, Muroto Geopark Promotion Committee moved from the planning to implementation stage in deciding to set up five “Promotion Teams” as dedicated units to tackle one issue each. One of these units is the “Geotourism Promotion Team.” The Geotourism Promotion Team announced to a broad range of people, such as local residents and members of Muroto Geopark Promotion Committee, that anyone who really wanted to join could do so at any time they wished.



As a result, the team has been active since July 2013, holding meetings at a pace of once almost every month, and doing preparatory studies to develop new geopark tours. New tour concepts are tried out for real on a fee-paying basis. The team then holds postmortem meetings, factoring their findings – along with feedback from tour participants – into new and further improved tour plans, which are then tried out for real in turn. Up to now, tours developed by the team have been run on a seasonal basis, but the achievement of year-round tour programs is within sight.

Through their work together, the members of the Geotourism Promotion Team are able to develop a lively discussion on what kind of shape geotourism should take as it develops in Muroto Global Geopark. Through their preparatory meetings, the members

are also able to develop a better feel for the locality and its attractions, to make new discoveries about the locality, and to find out about new developments which they had not known about before. In these ways, the Geotourism Promotion Team is building up an extremely significant record of successes.

### **7.3 The East Kochi Regional Exhibition**

From April to December 2015, a regional exhibition is held covering nine neighboring municipalities in eastern Kochi Prefecture, an area which includes Muroto Geopark. Preparations for the exhibition began in 2013, with the Muroto Geopark Promotion Committee fully involved from the start of the planning process. The exhibition was planned under the concept of “a journey to discover the hospitality of the people of eastern Kochi Prefecture, and its wealth of Geo,” and this approach made the impact of our geopark activities on the surrounding area highly apparent.

The exhibition aimed to create a range of new programs for hands-on experience for visitors, and the geopark fielded a large number of proposals and ideas to that end. Three programs were finally decided on – the Experience Nature program, the Cycling program and the Animal Observation program. The proposals fielded by Muroto Geopark were based on previous discussions between members of the Geotourism Promotion Team, geo-guides, geo-masters and others, and these discussions bore fruit in the programs that were adopted. Each program was designed to allow visitors to really enjoy the geopark to the full, and was scheduled to be continued after the exhibition itself had finished.

### **7.4 Promotion of geotourism centered around the Muroto Global Geopark Center**

The Muroto Global Geopark Center opened in April 2015, aiming to draw visitors in to get field experience of the main theme of Muroto Global Geopark: “Where the ocean and the land meet; the forefront for the birth of new land.” The Center also aims to provide visitors with a richer experience than they could have in the field itself, because the Center can communicate information that is not visible to people in the field – for example submarine topography, and past movements of the earth over a geological timescale.

The Center's reception desk also acts as the reception counter for geo-tours and experience programs, and is starting to function as a focal point for geotourism. A bicycle rental service has been set up, and tours of local factories have also started, organized in conjunction with these local firms. New programs for geotourism are being developed, along with new tools.

## 8. Activities and Changes in the Locality

### 8.1 The JGN National Conference

The Third JGN National Conference was held at Muroto Geopark from November 2 to 5, 2012. Around 500 geopark-related professionals and well-wishers gathered for four days of intense discussions.

Local residents of the Muroto area were involved in wide range of ways in the hosting of this conference. Almost 50 local residents, mainly from Muroto City community groups and private firms, were present at the establishment of the Conference Organizing Committee. They discussed access, accommodation and hospitality for the conference delegates, and decided how the conference would be managed. A week before the conference began, almost 1,000 local residents took part in a cleanup along approximately 50 kilometers of national roadway within the geopark.

Local elementary school pupils and residents were active as guides on geo-tours during the conference, and a brass band composed of junior high school students and other local people performed a newly composed song with Muroto Geopark as its theme. Over 450 volunteers were directly involved in the running of the conference.

Thanks to local participation in the conference, new links were forged with people who had no previous connections to the geopark, which will no doubt lead to its further vitalization in the future.

Attendees were also present from Jeju Geopark in Korea and Langkawi Geopark in Malaysia, allowing for the geoparks to plan closer links in the future.

Our mutual relationships were deepened over the four days of the conference, during which we held section meetings and symposia etc. to discuss the sustainable development of geoparks under the theme of “for people, for the earth and for good relations between us.”

### 8.2 Initiatives in accommodation and catering

Businesspeople involved in the accommodation and catering sectors are feeling the benefits of the geopark, with comments like: “Since the geopark activities started, more visitors have come to stay on study trips, and we’ve had media people come to cover the geopark.” (hotelier); “We’re getting more business for our coaches.” (tourist bus operator), and “Since we made a menu with a geopark theme, we’ve had people coming in especially to try it out.” (restauranteur). Foreign tourists, who were previously rare, have steadily increased in numbers since GGN recognition. A framework for catering to foreign tourists is being gradually built up in conjunction with other industry players, Committee specialists in international relations, local English-speaking circles and so on. Efforts include translation of food menus and emergency instructions in the event of an earthquake into English, etc.

### 8.3 The geopark and everyday life in the locality



Sales by the Committee of the Muroto Geopark polo shirt started in 2010, and total sales had reached 5,000 shirts by March 2014. These shirts are being used as summer uniforms for staff at banks, post offices and supermarkets in Muroto City, and are otherwise becoming a common sight in

the area. There is considerable local demand for new colors, and the range of colors is being steadily expanded year by year.

The local residents of the area are also taking an increasing number of steps on their own initiative. In one case, a farm producer labeled their products with the copy “Produced in



the Nishiyamadaichi Area of the Global Geopark.” Transport



companies have also placed Muroto Geopark PR slogans on long-distance trucks traveling outside Kochi Prefecture.



On May 9, 2015, the Youth Branch of the Muroto City Association of Commerce and Industry staged the “Muroto Geopark Triathlon,” in cooperation with the local administration and private groups, making use of funding provided by a grant for the East Kochi Regional Exhibition.

In the same way, as the activities of the geopark progress, the geopark logo can be found in abundance in all places where local people can be found living in Muroto – on fire trucks and bus stops, on schoolbags and municipal waste bags. Since GGN recognition, the links between the geopark and the daily lives of the local community in Muroto have become stronger and stronger; rather than thinking of the geopark as “something special for somebody else,” awareness is growing among the local community that “This is our geopark” and that “We are living in a geopark.”

