



350,000,000
years old

**Exploring the 350 million years of history
and memories of the earth and life.**



m.

That's Mine. It's Mine

**Mine-Akiyoshidai
Karst Plateau Geopark**

History of the earth and life is still alive in karst plateau.

From 350 million years ago, a drama of the earth and life began.

Let's start
from here!



Karstar (Mine-Akiyoshidai Karst Plateau Geopark Center)
(MAP C-2)

This building is
very cool!



Wow, what a beautiful
landscape.
It's just amazing.

?

Why are there many white stones and sinkholes
or so-called dolines in the ground of Akiyoshidai?

Not only
should you
enjoy beautiful
scenery, but
you should
further
explore karst
landscapes.

Grassland is dotted
with white stones.



A lot of jagged white stones!

Spreading in front of you is
sinkholes in the ground.



Lots of sinkholes!
Did meteorites hit the ground?



Tip The earth moves.



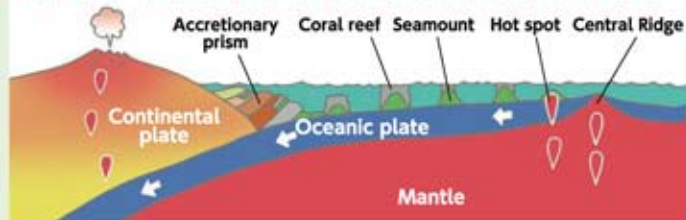


Where did white stones come from? Eighty million years journey of coral reefs

These white stones are officially known as "limestone". Limestone was formed from sedimentary deposit that is made of corals lived in warm water and other organic residues. The limestone rocks of the Akiyoshidai plateau were initially created as corals built on "plates" that move across the surface of the earth. Over the course of about 80 million years, the plates gradually moved and later delivered them to the edge of a continent. Limestone carried by the plate was mixed with various sediments rocks and accreted onto the continental plate. The accreted sediments are called "accretionary prism" that consists of most of Japanese basement along with Akiyoshidai.

Limestone was formed about 250 million years ago.

The plate carried coral reefs.



Limestone melts!

Akiyoshidai is karst plateau formed on limestone which was eroded by rainwater and groundwater. The surface of karst is characterized by sharp stone columns or sinkholes, which are also called as dolines, while an enormous limestone cavern is formed underneath.



Environment has been protected by people

For many years Akiyoshidai has been the place where people cut grass or plowed their fields. The grassland landscape we see today has not changed for hundreds of years thanks to mowing and burning. From Bakumatsu period (1853-1868) to Show period (1926-89), the area was used for the military exercises. There was plan to turn the area into the bombing exercise field during the postwar period, however, as local residents and researchers strongly appealed to value of Akiyoshidai, the plan was finally withdrawn.



Is it permitted?
Burn the mountain?



Bullets were discovered in Akiyoshidai!



If you want to learn more, please visit here!



Akiyoshidai Museum of Natural History (MAP C-2)

The illustration allows visitors to easily understand the history of Akiyoshidai. Many fossils are also being displayed. Let's get Akiyoshidai's basic information here!

What you choose depends on your interests!

Choose favorite course among three and enjoy tour!

A
course

For those who are interested in melting land.

① Akiyoshidai Eco Museum → ② Kagekiyo Cave → ③ Taisho Cave → ④ Akiyoshi Cave

Mission

What type of topography does melted land shape?

① Akiyoshidai Eco Museum (MAP C-1)

Lots of experience corners in the museum enable you to fully utilize your five senses!! Cylinder-style exhibition is a must-see! You can immediately learn about the Akiyoshidai's underground structure.



Check it out!

Visit three caves and enjoy differences among them!

Northern part of Akiyoshidai

Upstream

② Kagekiyo Cave (Uppermost stream) (MAP D-1) ③



As river water is flowing into the cave, you can see how the water dissolved and changed landscape of limestone formations.

③ Taisho Cave (Upper stream) (MAP C-1) ⑤



The structure of this cave is very complex and limestones retain same shapes as when they were created by the water erosion. The elevation difference between the highest and lowest points is more than 100 meters.



Is there any difference between groundwater upstream and downstream in terms of features of each cave?

Southern part of Akiyoshidai

④ Akiyoshi Cave (Downstream) (MAP C-2) ⑥

The most spacious limestone cave in Japan. After passing through limestone for several kilometers, the water contains abundant calcium carbonate that created many stalactites that can be seen in the cave.



The cave began to form around million years ago!

Downstream

For those who are interested in the links between melting land and people.

① Doline Farming → ② Yowara Uvala and Hamlet → ③ Beppu Benten Pond



Mission

How do people utilize melted land?

Check it out!

Circle Fields



① Doline Farming (MAP C-2) 9

The doline farming area in which floors of dolines are used for cultivation. In the Edo period (1603-1867) people already used dolines as farmland because surface streams drained easily from the basin while relatively flat bottoms were conducive to agriculture.



Check it out!

Where does rainwater go?

② Yowara Uvala and Hamlet (MAP B-2) 25



Soaring limestone alongside house

This village has developed within the uvala, the enclosed depression formed by the fusion of several dolines. This place is far from other villages, houses are concentrated at the bottom. Without a river, a stream of rainwater sinks underground through a deep, vertical hole known as a ponor.



Ponor



③ Beppu Benten Pond (MAP C-2) 23

It is a spring pond where water is constantly gushing out. The pond is about 40 meters around and 4 meters deep. Since early times, water has been used in households and agriculture. It is also selected as one of the best 100 natural water sources in Japan by Ministry of Environment.



Locals tell you interesting stories.

Column

Water in Akiyoshidai

The limestone is easily dissolved by rainwater or groundwater that contain carbon dioxide (CO₂). Hardness of the water flowing this region is high as it contains abundant calcium ions. The bottom of the kettle or the pan which are often used for boiling this water turned completely white. A white substance left behind is calcium carbonate generated from reaction of calcium ions and this phenomenon is one of the unique characteristics of this region.



Pan is totally white!!

The land of Akiyoshidai was carried by the plates.
For those who are intrigued by timeline of the earth.

① Naganobori Copper Mine Ruins → ② Arakawa Mine Gallery Ruins

Mission

What is Mine-Akiyoshidai Karst Plateau Geopark like?



Check it out!

The formation of copper dates back about 100 million years ago!

Magmatic activity about 100 million years ago was very active caused by the plate subduction and had two major effects on limestone. One is partial conversion of the limestone into marble and the other is copper and silver that were made by reaction between thermal water heated by magma with limestone. Against this historical background, many mine ruins are remained in this area among which the most famous is "Naganobori Copper Mine Ruins".

① Naganobori Cooper Mine Ruins

(MAP D-2) 18

This is the Japan's oldest state-owned copper mine where copper was extracted intermittently until around Showa 30' (1950s) from Nara period (710-794). Copper extracted from this mines was used for making Nara Daibutsu.



Check it out!

Coal formed about 200 million years ago!

About 250 million years ago when limestones and other rocks were accreted to the continental plate, "mass extinction" was happened. About 90 percent of all species are believed to have died off during this time. Ten million years later, large forests spreading across landmass of the earth. These ancient plant materials formed the coals of Ohmine Coalfield. Although this type of high quality coal called anthracite, is rarely found in Japan, they are available in this coalfield. It is due to the fact that magmatic activity which happened about 100 million years ago accelerated the carbonization of coal and covered them into anthracite.

② Arakawa Mine Gallery Ruins

(MAP A-3) 26

The entry/exit point of the digging tunnel built to extract smokeless coal from underground. The Navy Ministry developed this coal mine method in 1904.



Click! 50,000,000
100,000,000
200,000,000



Mine-Akiyoshidai Karst Plateau Geopark's Recommended food!

?

What are grown in the land
of Akiyoshidai?

Let's drop by!



Mito Roadside Station

(MAP D-2)

5480-1 Oda, Mito-cho,
Mine City

TEL:+81-(0)8396-2-2500



Mito-Gobo (Burdocks)

Mito-Gobo features a soft flesh and fine texture. It is believed that the secret of this characteristic lies in hard and clayey soil which is said to have been formed by the weathered limestone and gobo only gradually grown in this soils have this unique texture. As the ground is so hard, harvesting work requires the use of heavy machines and the process is painstaking and time-consuming.



Ofuku Roadside Station

(MAP B-2)

4383-1 Kami, Ofuku-cho, Mine City
TEL:+81-(0)837-56-5005

Let's drop by!



Shuho-Nashi (Japanese Pears)

Twentieth Century Pears which have feature of a well-balanced sweetness and sourness along with fresh and crisp textures. At the foot of Akiyoshidai, where vast limestone ground is spreading, pears are produced by using well-drained fertile soil and day-night temperature difference.





Mine-Akiyoshidai Karst Plateau Geopark

Mine-Akiyoshidai Karst Plateau Geopark Promotion Council
 1237-862 Akiyoshi, Shuho-cho, Mine City, Yamaguchi Prefecture
 TEL +81-(0)837-63-0055 FAX +81-(0)837-63-0089
 E-Mail mine-geo@city.mine.lg.jp



Mine Geomap

Exploring memories of the land of Mine-Akiyoshidai Karst Plateau Geopark while visiting must-see spots in Geosite.

A course

For those who are interested in melting land!

- 1 Akiyoshidai Eco Museum (C-1)
 - 5 min by car
- 2 Kagekiyo Cave (D-1)
 - 5 min by car
- 3 Taisho Cave (C-1)
 - 15 min by car
- 4 Akiyoshi Cave (C-2)

Akiyoshi Cave (C-2)
 3506-2 Akiyoshi Shuho-cho, Mine City
 TEL/+81-(0)837-62-0018
 Admission fee/Adult, high school: ¥1,200
 Junior high: ¥950 Elementary: ¥600
 *Group discounts available
 Hours: 8:30am-5:30pm (Mar.-Nov.),
 8:30am-4:30pm (Dec.-Feb.)
 Closed/Open 365 days a year

B course

For those who are interested in the links between melting land and people.

- 1 Doline Farming (C-2)
 - 30 min by car
- 2 Yowara Uvala (B-2)
- 3 Beppu Benten Pond
 - 10 min by car

C course
 The land of Akiyoshidai was carried by the plates.
 For those who are intrigued by timeline of the earth.

- 1 Naganobori Copper Mine Ruins (D-2)
 - 45 min by car
- 2 Arakawa Mine Gallery Ruins

Area including coal bed (anthracite) [Mine group]

Rocks formed when magmatic activity occurred about 100 million years ago. [igneous rock]

Rocks formed by cementation of skeletons and shells of organisms like radiolarian that piled up on the seafloor. [chert]

Rocks originally from seamounts that were served as breeding grounds for coral reefs. [basaltic rock]

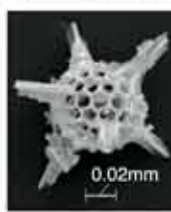
Rocks formed by the hardening of mud accumulated in deep depressions on the seafloor. [mudstone]

Sedimentary rock formed after the sand had been deposited in deep depressions in the seafloor. [sandstone]

Rock formed from pieces of coral leaf and other organisms that were accumulated and solidified over the time. [limestone]

What is radiolarian??

Radiolarians are part of the marine plankton. This is the photo of radiolarian fossil whose size is only about 0.1mm! (Photo: Takanori Nakagawa, Koji Wakita)



What is a seamount?

They are mountains rising from the ocean. The height of seamounts is more than 1000 meters from the seafloor. Most of seamounts were formed by eruption of submarine volcanos.

What kind of creatures lived in ancient age?

Let's have a look together!

Akiyoshidai limestone & Extensive strata in Ohmine Coalfield (Area) (Area)

There are reasons why many fossils have been discovered here!



Mine Fossil Museum (B-3)

315-12 Higashibun, Ohmine-cho, Mine City TEL/+81-(0)837-52-5474
Admission fee/Individual: ¥100 Elementary & Junior high: ¥50
*Group discounts available
Hours: 9:00am-5:00pm (Reception desk is open until 4:30pm)
Closed/Mondays (if a national holiday falls on Monday it is closed the next day), national holidays, the year-end and New Year holidays (Dec.29-Jan.3)

How did anthracite form?

Let's have a look together!

Ohmine Coalfield (26~29)

Unraveling the mystery of "Ohmine Coalfield", the largest anthracite coalfield in Japan!



Mine City Museum of History and Folklore (B-3)

279-1 Higashibun, Ohmine-cho, Mine City TEL/+81-(0)837-53-0189
Admission fee/Individual: ¥100 (Elementary & Junior high: ¥50)
Hours: 9:00am-5:00pm (Reception desk is open until 4:30pm)
Closed/Mondays (if a national holiday falls on Monday it is closed the next day), national holidays, the year-end and New Year holidays (Dec.31-Jan.3)
*Group discounts available



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Please come here first!

Karstar (Mine-Akiyoshidai Karst Plateau Geopark Center) (C-2)

1237-862 Akiyoshi, Shuho-cho, Mine City TEL/+81-(0)837-63-0040
Admission fee/Free Hours: 9:00am-5:00pm
Closed/The year-end and New Year holidays

How did Akiyoshidai form?

Let's have a look together!

Akiyoshidai limestone & Basaltic Rock Outcrop at Miyanobaba (Area) (Area)

Here you can find the key to the mystery!

Akiyoshidai Museum of Natural History (C-2)

1237-938 Akiyoshi, Shuho-cho, Mine City TEL/+81-(0)837-62-0640
Admission fee/Free Hours: 9:00am-5:00pm
Closed/Mondays (if a national holiday falls on Monday it is closed the next day), national holidays, the year-end and New Year holidays (Dec.28-Jan.4)

How were caves formed?

Let's have a look together!

Akiyoshi Cave (16) Kagekiyo Cave (3) Taisho Cave (5)

Learning about Akiyoshidai while enjoying its beautiful nature!

Akiyoshidai Eco Museum (C-1)

2368-1 Aka, Mito-cho, Mine City TEL/+81-(0)8396-2-2622
Admission fee/General: ¥200 (Free for high school students and below)
Hours: 9:00am-4:30pm
Closed/Tuesdays (if a national holiday falls on Tuesday it is closed the next day), the year-end and New Year holidays (Dec.28-Jan.4)

How was copper formed?

Let's have a look together!

Naganobori Copper Mine Ruins (19)

The hometown of the Nara Daibutsu!

Naganobori Copper Mine Cultural Exchange Center (Daibutsu Museum) (D-2)

610 Naganobori, Mito-cho, Mine City TEL/+81-(0)8396-2-0055
Admission fee/Individual: ¥300 Students (Elementary and junior high): ¥150
*Group discounts available
Hours: 9:00am-5:00pm (Reception desk is open until 4:30pm)
Closed/Mondays (if a national holiday falls on Monday it is closed the next day), the year-end and New Year holidays (Dec.28-Jan.4)

What is Geopark?

How we can enjoy here?

Geo stands for "the earth and land", while park refers to "a place where people can play". Join our Geotour which takes you to journey of discovery of amazing facts about "awesome earth" through exploration of landscapes stretching in front of you and lives of people living here.

What does Mine-Akiyoshidai Karst Plateau Geopark offer? How to enjoy here?

The highlight of Geopark is "Akiyoshidai", the one of Japan's largest karst plateau. You can feel the earth's dynamism by trekking on the grass field or exploring caves. There are also many attracting spots such as "Naganobori Copper Mine Ruins", Japan's oldest state-owned copper mine and "Ohmine Coalfield", the site of anthracite. Touring with geoguide will make your experience way more interesting.

*Prior reservation is required for geoguide.

