GEOPARKS JAPAN
日本ジオパーク

That's Mine. It's Mine
Miné-Akiyoshidai
Karst Plateau Geopark

Translator's note: in this pamphlet you will see Mine written both 'Mine' and 'Miné'. These refer to the same thing; the accent above the e is merely a pronunciation aid.

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Memories of the Earth in Miné

3 Miracles

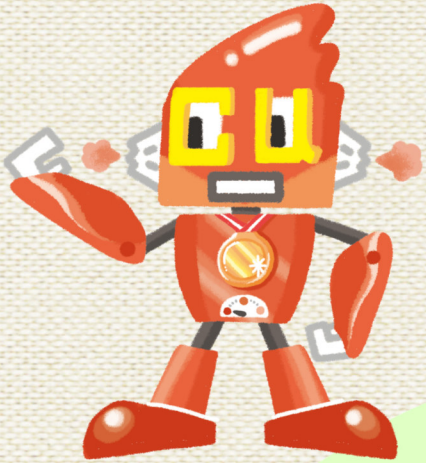
in Miné-Akiyoshidai
Karst Plateau Geopark

Long, long ago there were three mysterious miracles in Mine...

The White Miracle

The Black Miracle

The Red Miracle



The White Miracle

In the wide, wide sea, there are hundreds of volcanoes on the sea floor. When one of these volcanoes breaks through the surface of the sea it becomes an island, and coral grows on top of it. Most of these volcanoes and the coral on top of them disappear into the Earth, but the Akiyoshidai limestone survived and appeared on the land. This is the White Miracle.

The Black Miracle

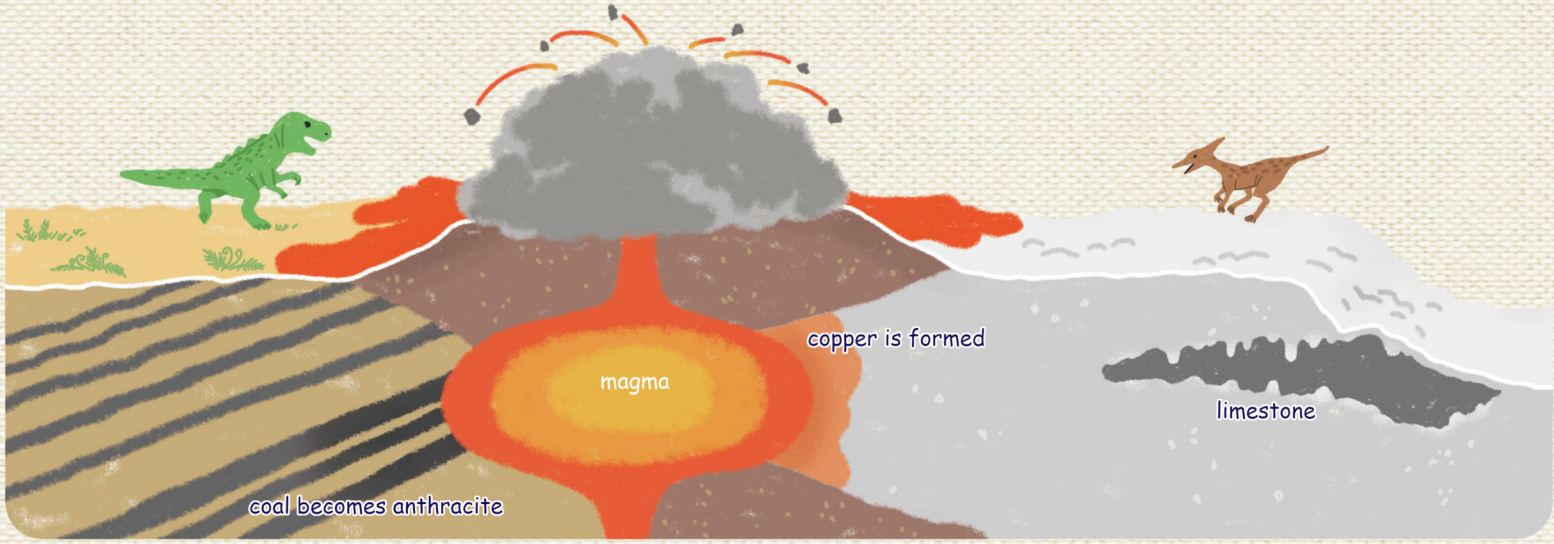
About 250 million years ago, most of the living things on Earth died out. This is known as a mass extinction. For a while after this event a 'world of death' spread over the Earth, with almost no living creatures at all.

But, not long afterwards, small creatures and plants returned. Over time these evolved into larger animals and plants. These forests full of life became the coal in Mine. Coal is the 'Black Miracle' which represents the revival of life.

The Red Miracle

Around 90 million years ago, when dinosaurs walked the Earth, giant volcanic eruptions were occurring all over the world. Underneath these giant volcanoes was molten rock called magma.

When this magma comes into contact with limestone, copper is formed where they meet. The is the 'Red Miracle'. Magma also turned coal into anthracite, or 'smokeless' coal.

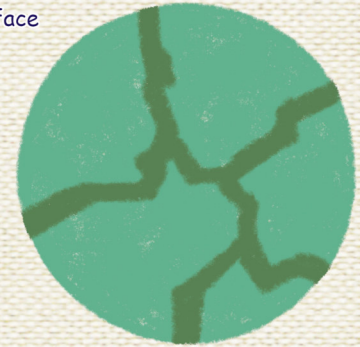


The Earth is cooling

surface

In the beginning, the Earth was a red ball of fire.

surface



These plates move along with the hot material in the centre of the Earth.

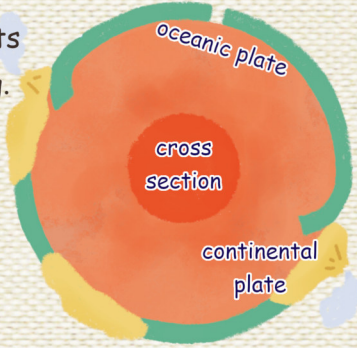
As the Earth cools, the rock on the surface harden to form 'plates'.

Rain falls, forming oceans.

surface

Great continents come into being.

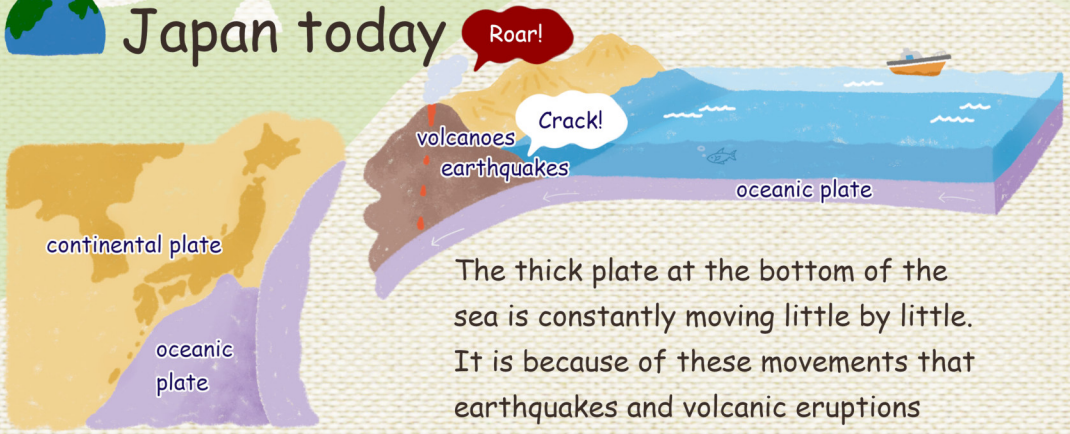
On the surface of the Earth, continental and oceanic plates form.



the Earth
4.6 billion years ago

the Earth
today

Japan today

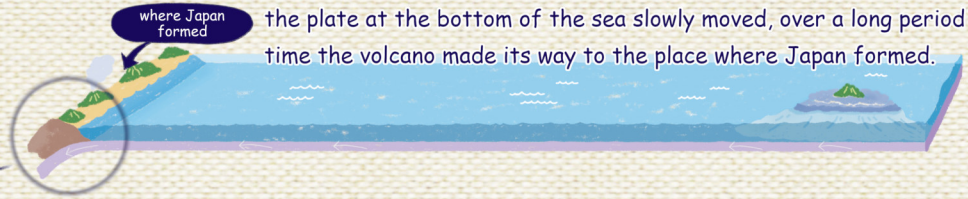


The thick plate at the bottom of the sea is constantly moving little by little. It is because of these movements that earthquakes and volcanic eruptions occur.

The coral reef arrives

Limestone

When most of Japan – including Mine – didn't exist, a volcanic island was born in the middle of the wide, wide sea. When this volcano had finished erupting, a coral reef grew on its top.



This coral reef, along with mud and sand, stuck on to the continent and became part of the land of Japan. The coral reef, which had turned into hard limestone, slowly rose up the continent and appeared on the top of Akiyoshidai.

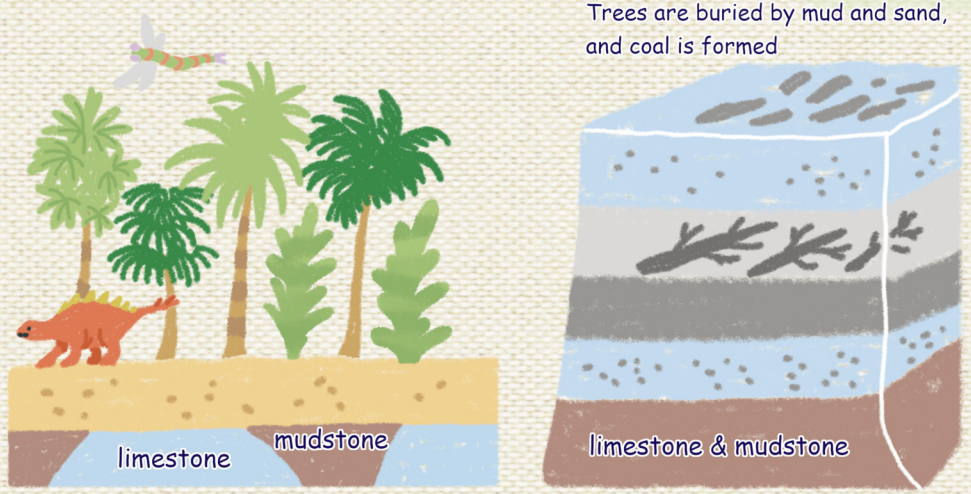
Limestone slowly rises up

Coal

After the coral reef had made its way to Mine, the Earth's environment became inhospitable and most living things on Earth died out.

A short while afterwards the environment began to improve. At first there were only small creatures and plants, but over time these became bigger and bigger until giant trees and great forests grew.

The formation of coal



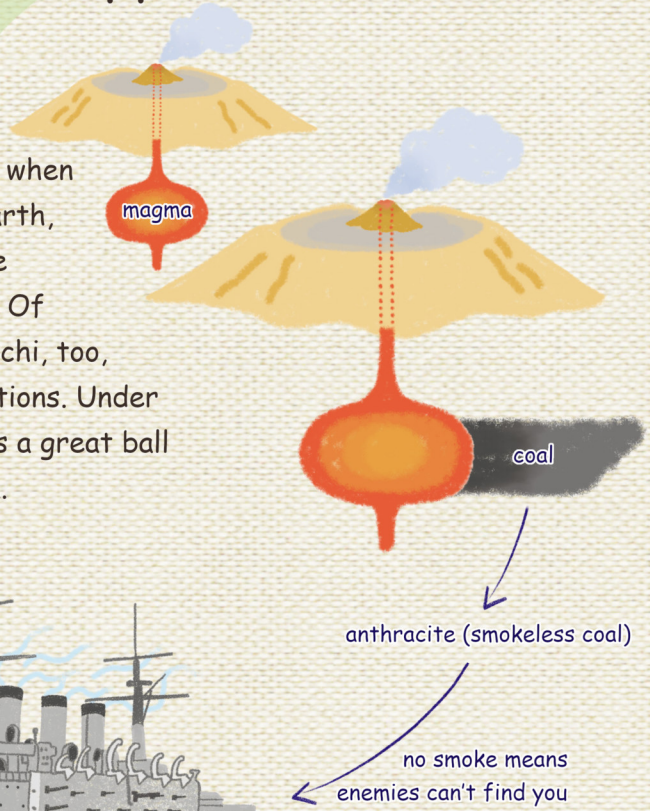
The trees that grew in these forests were buried, and heat and pressure underground turned them into coal.

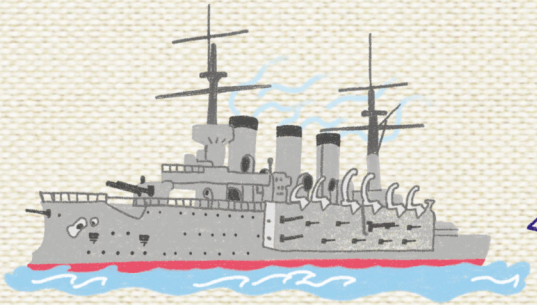
In the Ohmine area of Mine, coal formed in this way can still be found; in the layers of rock nearby, lots of fossils of insects and other creatures which lived in the forest have been found.

Coal, therefore, is a symbol of the revival of life which survived a difficult period in the Earth's history.

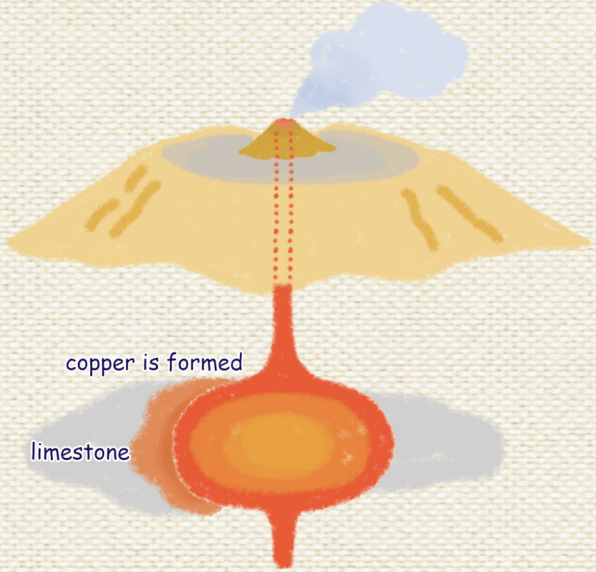
Magma and copper

Around 90 million years ago, when dinosaurs still walked the Earth, giant volcanic eruptions were occurring all over the Earth. Of course, in Japan and Yamaguchi, too, there were many great eruptions. Under these erupting volcanoes was a great ball of molten rock called magma.

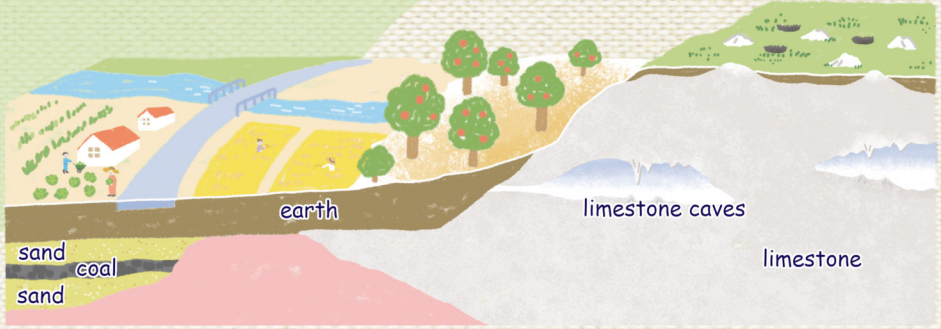




This magma heated up the surrounding rock. When the magma interacted with limestone, copper was formed; when it interacted with coal, the coal was turned into anthracite.



Karst and limestone caves



Coral reefs harden and turn into limestone. One feature of limestone is that it is dissolved by rainwater containing carbon dioxide. When limestone pops out on the surface of the Earth, it is dissolved by rainwater and its surface becomes sharp and spiky. This is known as karrenfeld. On Akiyoshidai there are lots of these sharp rocks, but these rocks are actually one big ball of limestone connected underground. If lots of rain falls, this rain seeps into cracks in the limestone, dissolving it from the inside and creating large holes called dolines. Most rain falling on the limestone drains underground through these holes, so there are no rivers on top of the karst plateau. The rain which runs down underground from the surface dissolves the limestone underground to form stalactite caves. There are more than 400 caves formed in this way underneath the Akiyoshidai plain. The most famous of these is Akiyoshidō.

Geology and our lives

You may think that rocks aren't very useful. But rocks support our lives in more ways that you might expect. As rocks are battered by wind and rain, they slowly turn into soil: every tree, every blade of grass, every fruit and vegetable which grows in the soil is related to rocks. The soil on top of the limestone here has good drainage and is well-suited to growing the famous Shūhō pear; in nearby Mitō, a lot of work is required to grow the local speciality – burdock – in the sticky, clayey soil. In the past the top of the plateau was used for farming and cattle-grazing but, because there was no water on the plain, carrying water there was a big effort. The people of Mine built their lives around the vital rocks and soil here using many clever methods.

Afterword

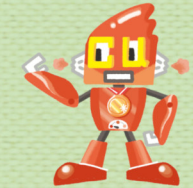
The surface of the Earth that we look at every day is covered by grass, trees and concrete. But do you know what's underneath it? Underneath the concrete and soil are hard rocks. Beneath your house and school as well are lots of rocks. These rocks, made by the White, Black and Red Miracles that we introduced in this book – limestone, coal and copper – are even now beneath our feet. Some of the rocks here have been dug up: limestone for the cement to make buildings, coal to power ships and trains in the olden days, and copper to make money and the Great Buddha statue at Nara. The White, Black and Red Miracles have left great treasures – memories of the Earth – to us; it is up to us to look after these treasures for future generations.

A message to everyone

This book is about Miné-Akiyoshidai Karst Plateau Geopark. The 'geo' in Geopark means the rocks which support Mine City from underground. Hopefully you have enjoyed reading about the three miracles of Mine and the treasures they created.

The Geopark programme helps us to look after the rocks which support our city so that Mine can continue to be a wonderful place long into the future. Everyone living in the Miné-Akiyoshidai Geopark is a member of the Geopark. And so is everyone who reads this book! Now head out to see the treasures of Mine for yourself!

Mine City Tourism Map



copper etc.

coal

limestone

Geosites

1. Hirano granitic gneiss (orthogneiss)
2. Hirano serpentinite
3. Miya-no-baba basalt
4. Mt Kanmuri
5. Mt Kita
6. Kaerimizu
7. Ryūgo Peak
8. Chōja Nishiki rock extraction area
9. Kamisobara chert
10. Ayagi sandstone
11. Shibukura limestone-block mudstone
12. Tsunemori gravelly mudstone
13. Momonoki former strip mine
14. Okubata fossiliferous siltstone
15. Ofuku granite
16. Naganobori skarn (strip mine)
17. The Great Stones of Magura
18. Akiyoshidō cave
19. Kagekiyo-ana hole
20. Taishōdō cave
21. Nakaodō cave
22. Ofukudō cave
23. Suijin pond
24. Shiramizu pond (spring)
25. Beppu Benten pond
26. Mitō Force
27. Saigatōge tectonic fault escarpment

Cultural sites

1. Naganobori Copper Mine ruins
2. Suebara kilns
3. Mt Rakan stone Buddha carving
4. Aoyama silver mine ruins
5. Arakawa horizontal shaft
6. Miné inclined shaft
7. Ofuku lime kilns
8. Chōjagamori forest
9. Yowara uvala and hamlet
10. Kaerimizu doline fields
11. Kinreisha shrine
12. Suijin park
13. Ōishi terraced fields
14. Kuzuga'ana hole

Nature sites

1. Mt Katsuragi
2. Mt Hanao
3. Nitanda reservoir