



Choshi Geopark

GEO PARK GUIDE BOOK



Cho-Pi

(Choshi's publicist)

I was born in a cabbage field in Choshi.
If you want to know anything about
Choshi, leave it to me, "Cho-pi."

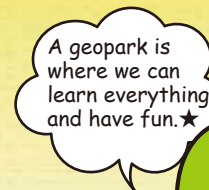


Geo-Cho

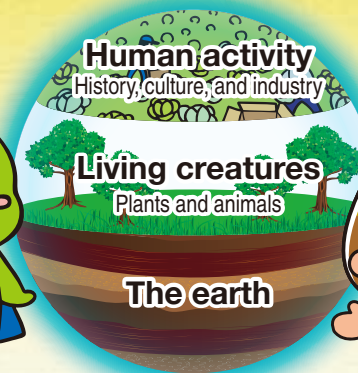
(Choshi Geopark PR ambassador)

My job is to showcase Choshi and the
Choshi Geopark. My hat is modeled
after geological strata and Cape
Inubousaki lighthouse. My blue bangs
represent waves of the Pacific Ocean.

We will guide you
through the entire park!



A geopark is
where we can
learn everything
and have fun.★



"The earth,"
"living creatures,"
and the "human
activity" are
interconnected

Choshi Geoprk related "Exhibitions"

Choshi city youth and cultural hall "Choshi Geopark Exhibition room"

【Entrance fee】 free
【Hours】 9:00 to 17:00
【Closures】 every Monday(except if Monday is a holiday, it will be closed
Tuesday.) National holidays(except for May 5th and November 3rd)
1046 Maejuku-cho, Choshi City, Chiba Pref., Japan
〒288-0031 Phone:81-(0)479-24-8911



※All the fun of Choshi geopark in one place.

Horizon Observatory

【Entrance fee】 Adult ¥ 380, Elementary and
Junior-high school children ¥ 200, Over 65 ¥ 330
【Hours】 April to September, 9:00 to 18:30
October to March, 9:00 to 17:00
The last entry is 30 minutes before closing
【Closures】 None
1421-1 Tennoudai, Choshi City, Chiba Pref., Japan
〒288-0024 Phone:81-(0)479-25-0930



※Various fossils and ambers from Choshi can be viewed.

Tokawa Mini Furusato Museum

【Entrance fee】 free
【Hours】 10:30 to 15:30
【Closures】 Tuesdays and Wednesdays (except for holidays)
Inquiries for Tokawa Mini Furusato Museum
"Choshi Tourism Association" office
Phone:81-(0)479-22-1544

※Here, you can find about the history of Tokawa town.
You can also view the collection of shellfish fossil researcher, Mr. Tomio Watanabe.



Editor:The Choshi Geopark Promotion Council office

Phone:81-(0)479-24-8911 FAX:81-(0)479-21-6622

URL <http://www.choshi-geopark.jp/>

Illustration: Chiba Prefectural Choshi High School
(Hinano Jitsukawa and Risa Ishige)



Scan this QR code
to access the Choshi
Geopark website.

Choshi Geopark Map



Yoyama shell mound

Yoyama shell mound
Here are traces of human activities from approximately 3500 years ago. (P13.14.15)

Soy-sauce Factories

Soy sauce production has been flourishing in Choshi since the Edo Periods. (P17)
(Inquiry for a factories tour)
Choshi factory of Yamasa Corporation
Visit desk at 81-(0)479-22-9809
Higeta Shoyu Co. Ltd. Choshi,
Choshi office at 81-(0)479-22-0080

Higeta Shoyu Co. Ltd. factory

Yamasa soy-sauce factory

Horizon Observatory · Mt. Atagoyama

This hill is rock formed in the period that dinosaurs lived. From the observatory, you can see the entire Choshi Peninsula. (P6. Cover)

Byoubugaura Cliff

It is a 10-km-long cliff eroded by waves. This cliff is made of strata deposited in the ocean approximately 3 million years ago. (P8)

Inuiwa Rock · Sengaiwa Rock

These rocks were formed in the period that dinosaurs lived. Inuiwa rock looks like a dog. (P6)

Choshi Port Tower · Medogahana

It is a 57.7m tower. At the foot of the tower, you can see a stratum called "Medogahana," which was deposited around the time the Sea of Japan formed. (P7)

Kurohai

At Kurohae Fishing Port can see "conglomerate," formed from small rocks, and blackish colored "andesite," formed through solidification of magma approximately 20 million years ago. (P7)

Choshi city youth and cultural hall

The "Choshi Geopark Exhibition room" is the base facility of Choshi geopark, and precious fossils of Choshi are exhibited here. (cover)

Sennintsuka
Bronzite andesite Conservation Park

Choshi fishing port
Wholesale Market 2

Choshi fishing port
Wholesale Market 3

Choshi Port Tower Medogahana

Kurohai

Nakanocho station

Choshi station

Kannon station

Moto-choshi station

Kasagami-kurohae station

Nishi-ashikajima station

Ashikajima station

Cape Inubousaki · Lighthouse

Here, You can see the lighthouse and sedimentary rocks, which deposited in the shallow sea during the age of dinosaurs. You can also see many coastal plants in this region. (P7.11)

Kimigahama station

AEON mall
Choshi

Horizon Observatory
Mt. Atagoyama

Inubou station

Cape Inubousaki

Climax forest of Laurel
forest at Tokai Shrine

Tokawa townscape

Tokawa station

Houman Rocks

Inuiwa Rock

Sengaiwa Rock



This symbol shows you points of interests within the Choshi Geopark.

Interesting.



A lot of cabbages are harvested in Choshi too. These are all gifts from the earth.



I get it!!

So everything is because of the earth of Choshi.



The earth of Choshi

During the Edo period, people were able to use the waterway of the Tone River, and that is why the soy sauce industry flourished. The climate is also perfect for growing cabbage.



Fish is also a gift from the earth, right?



People have been living in Choshi since ancient times thanks to "the gifts from the earth."

At the geopark, by understanding "the gifts from the earth," you can really feel the charm of the earth.



Geopark activities are that everyone know about Choshi through blessings from the earth. Through the geopark, We hope you'll fall in love with Choshi.

GEOPARK



What is a Geopark?

"Geo" means the planet Earth and the ground, and of course we know what "Park" means.



The logo for the Japanese Geoparks Network

What is a "geopark" for which Choshi was first certified in Chiba pref.?



Is a geopark a park just for geology and topography?

What, really? Tell me more!



One of the important roles of geoparks is to preserve precious heritage of geology and topography, and to pass it onto the future.

Of course topography and geology are important, but that's not all.



Right, it's famous!

That's right. For example, soy sauce has been made in Choshi since the Edo periods, right?



The gifts from the earth?



They are sites where you can understand "the gifts from the earth."



1. When Choshi had been located further south ②

★Events that occurred 130 million years ago



Cape Inubousaki

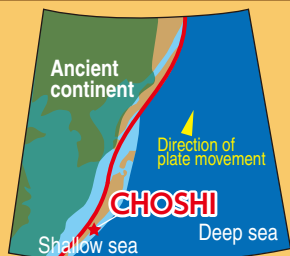
[Nationally designated natural monument]

Cape Inubousaki has a precious geological feature; hence, it is designated as a natural monument (nationally designated).

Choshi city

Here

The eastern shore of Choshi consists of rocks made of sand and mud which had accumulated in the ocean during 130 to 110 million years ago.



After these rocks formed, the earth of Choshi moved several thousand kilometers toward the north.

Choshi 130 million years ago (Modified from Asahiko Taira, 1990)

2. When the Sea of Japan and the Japanese archipelago formed

★Events that had occurred during 25 to 15 million years ago

The Sea of Japan hadn't always been there.



Approximately 15 to 14 million years ago

Approximately 25 million years ago

CHOSHI?

CHOSHI?

Edge of the continent

Continent The position of Japanese archipelago back then Ocean

During approximately 25 to 15 million years ago, the edge of the continent slowly had separated, created the Japanese archipelago and the Sea of Japan.



Houman Rocks

Islet off the coast of Nagasaki
The rocks that formed approximately 20 million years ago when lava cooled



Medogahana

A cliff under the Choshi Port Tower
The rocks that formed from mud accumulated in the ocean approximately 17 million years ago.

CHOSHI'S
GEOHISTORY



How the earth of Choshi was formed?

Events of earth of Choshi

Paleozoic
150 million(?) years ago

Mesozoic
130 million years ago
20 million years ago

Cenozoic
3 million years ago



The properties of the ground beneath you are called "geology." By studying "geology," you can understand the history of the earth.

1. When Choshi had been located further south ①

★Events that occurred 150 million(?) years ago

When dinosaurs were alive, the part of the earth that became Choshi was formed further south than the current location.

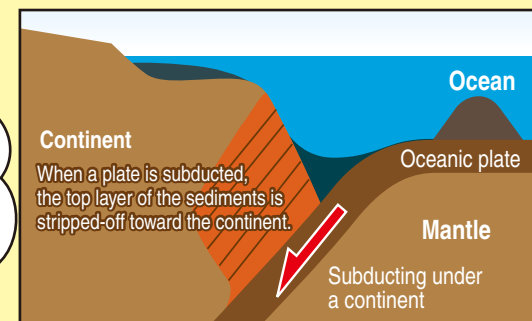
Plates?



The oldest rock (called "Atagoyama Group") was formed when overlying materials were pushed against the continent and stripped-off as the oceanic plate subducted under the continental plate. (Bottom figure)



Plates are sheets of rocks approximately 100 km thick that cover the Earth's surface. Plates move several cm per one year.



Inuiwa Rock



Mt. Atagoyama



Hence, the rocks like Inuiwa Rock, Sengaiwa Rock, and Mt. Atagoyama are formed during that time.

The gifts from the earth

Using the rocks and minerals of Choshi

◆Kurohae tile

There are many tile shops in the Kurohae district of Choshi. In the past, they were known as “Korohae fired tiles” and were a well-known local specialty of Choshi. These tiles were made from high-quality clay as a raw material mined from the Kurohae district. These clays were once the mudstone portion of a geological body that became attached to Japan approximately 150 million(?) years ago (see p6). At present, these clays have all been mined.



Kurohae tile



Whetstone



Iron sand of the sandy beach

◆Choshi stone

The old stone walls of Choshi often have rocks with rough surfaces. These rocks are called “Choshi Stone,” the sandstone formed 120 million years ago(see p7). In addition to building materials, “Choshi stone” was used as a rough whetstone.

◆Iron manufacturing with iron sand

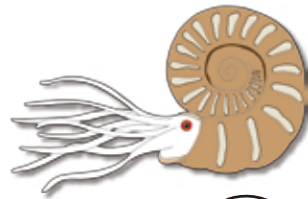
Black bands are occasionally seen on the sandy beaches of Choshi. If you place a magnet near this black band, black grains are attracted to the magnet. These grains are iron sands. At the shore of Choshi, these iron sands were mined as a source of iron until a few decades ago.

The gifts from the earth

Fossils of Choshi

◆Ammonite

Ammonite lived during the age of dinosaurs and was related to octopus and squids. The fossilized part is the hard outer shell. In Choshi, a large fossil with a diameter of over 50 cm has been found.



◆Amber

When the resin (tar) of trees was buried underground over many years, it hardens and becomes amber. Choshi is one of the three major producers of amber in Japan. The oldest amber in Japan having been discovered here.



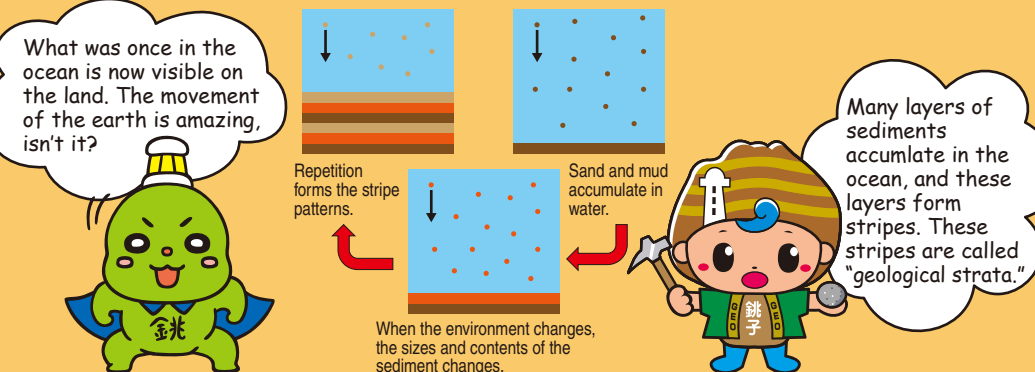
Many fossils from the strata of various eras have been found in Choshi.

◆Shark tooth

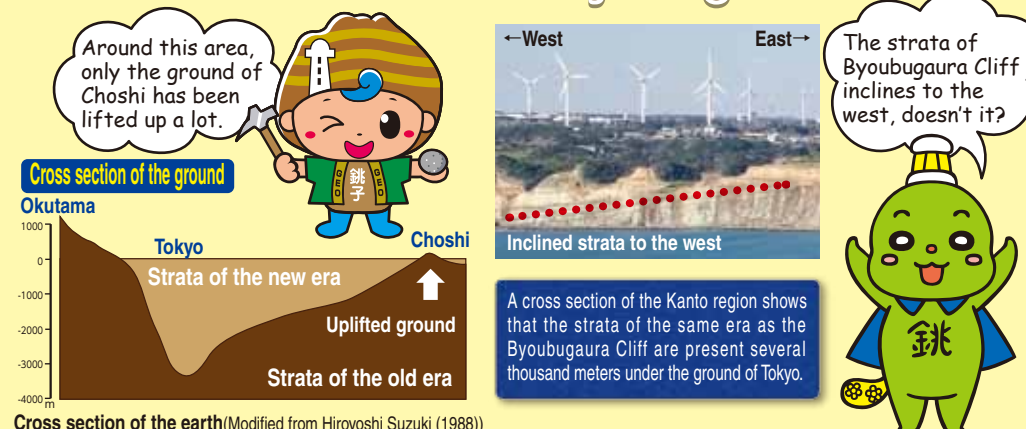
Many shark tooth fossils have been found in Choshi. Even a fossil of tooth of a Megalodon, a giant shark of over 10 m, has been found.

3. When the Kanto region was an ocean

★Events that occurred since approximately 3 million years ago



Let's look at from a distance Byoubugaura Cliff !



[Let's go look at some coastal plants]



Thunberg Lily (summer)

Bright red and orange flowers bloom during summer.



There are strong, salty winds along the coast. Many coastal plants that have adapted to such an environment are growing there.



In the Choshi coast, we can see the coastal plants with flowers for each season.
(Blooming period)

Roundleaf chastetree (summer-fall)



Beach pearlwort (spring-summer)



Japanese wild radish (spring)



Solidago Virgaurea subsp. leiocarpa (fall)



False bindweed (summer)



Angelica japonica (spring-summer)

It is believed that these flowers came from warmer regions in the south with the Kuroshio Current, and became widespread.



Ajania pacifica (fall)

Related to chrysanthemums. Flowers bloom from October to November. There are many plants at Choshi, the northernmost location, possible for their survival, such as "Ajania pacifica."

CREATURE



Flora and fauna of Choshi

Really?



The Choshi geopark is surrounded by the ocean in three directions; hence, the animals and plants here have special characteristics.



[Let's go find some sea creatures]

Rocky shores during the low tide are full of creatures.



This is a sea bat. You can often find them in the rocky shores if you go during the spring.

Wow, there are lots of gulls in Choshi.



Black-tailed gull

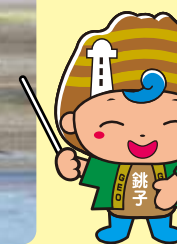


In winter, gulls such as the black-tailed gull and herring gull, as well as cormorants and ducks are often seen around fishing ports.

Choshi has also migratory tiny birds, wow.



Tringa brevipes



From spring to summer, streaked shearwaters are seen hunting sardines over the sea, and migratory birds, such as sandpipers, can be seen at the shores.



[What is a shell mound?]

Wow.



Yoyama shell mound

A "shell mound" is where ancient people threw their garbage. Yoyama shell mound in Yoyama town, Choshi city, shows that people lived here since the Jomon period, approximately 3500 years ago.



These are Jomon tools found at the Yoyama shell mound! These are the gifts from the Nature.



Jomon items found at the Yoyama shell mound —Garbage is treasure!—



I am so surprised!



There are so many tools!

Challenge!!

What nature's gift was used? And for what? Let's try the quiz on the next page.



[Forest in Choshi· Laurel forest]



Laurel leaves

Laurel

It stays green throughout the year, and it has characteristic shiny leaves. It is often found in warm areas with lots of rain during summer.

There are numerous valleys in Choshi.



Nanatsuike Pond

In Choshi, Laurel forests are often found in areas with steep slopes and in the forests of old shrines.

Japanese Laurel forests were mostly destroyed because of development.



Let's go look for it next time.



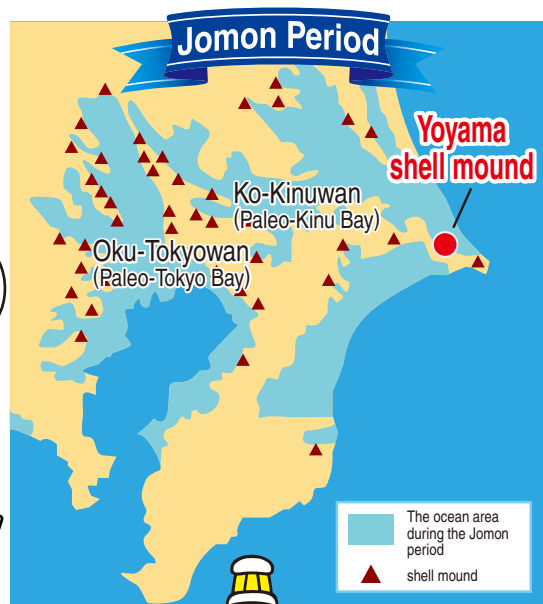
All the leaves grow in search of sunlight; hence, the leaves don't overlap. That is why it looks like the sky is hidden.



This is what it looks like when you look up.

As you can see, Choshi is blessed with rich flora and fauna from the land to the sea.

[The location of the Yoyama shell mound]



During the Jomon period, the temperatures were higher than today and the sea level was higher. Hence, the ocean spread to inland.

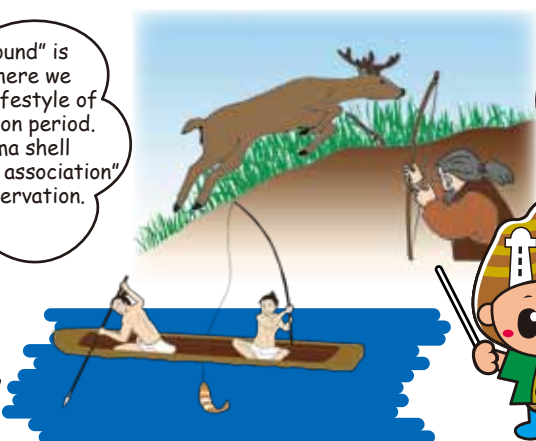
Why was the Yoyama shell mound so rich in nature's gifts?

I see!

The ocean and forests are close. That is why the bounty of the sea and forests were gathered close-by.

The "Yoyama shell mound" is an important place where we can understand the lifestyle of people during the Jomon period. Currently, the "Yoyama shell mound beautification association" is working on its conservation.

The Yoyama shell mound during the Jomon period looked like to the left pictures. People were able to catch a lot of fishes and animals.



Challenge yourself to "Jomon period tools" quiz!

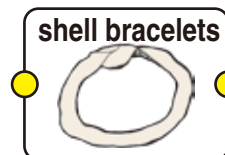
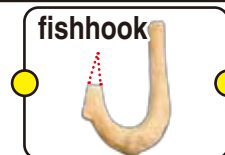
Q: What is it made from? What was it used for?
I hope you get it right!



Materials



Jomon tools



How it is used

accessory

catch fish

boil food, cook, and store

make tools and hunt animals

•deer bones.....fishhook.....catch fish •stones.....stone implements.....make tools and hunt animals
•clay.....potsherd.....boil food, cook, and store •benkei-gai.....shell bracelets.....accessory

A: Answers



Hence, tools made in Choshi and the materials were popular even outside of Choshi.



shell bracelets



arrowheads

Jomon tools made in Yoyama and the materials to make these tools were transported to inland areas.

[Soy sauce of Choshi]



That's right. Even today, companies such as Ogura Shoyu, Takara Shoyu, Higeta Shoyu, and Yamasa Corporation are making soy sauce. Higeta Shoyu and Yamasa Corporation were established during the 17th century, and have a long history.

Choshi has been famous for its soy sauce manufacturing.



Yamasa Corporation
Established in 1645

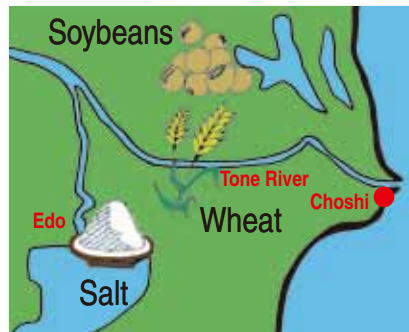


Higeta Shoyu
Established in 1616



The reasons why manufacturing soy sauce flourished in Choshi

- ① Producers of the raw materials were nearby
Soybeans and wheat were produced in Hitachi (Ibaraki) and Shimofusa (Chiba), and salt was produced in Gyotoku (Chiba).
- ② The Eastward Relocation of Tone River
Raw materials were transported by ship and the manufactured soy sauce was shipped to Edo. The Eastward Relocation of Tone River made the shipping conveniently to Edo.



A takase-bune carrying barrels
(Chiba Natural History Museum and Institute, Otone Branch storage)



Manufacturing of soy sauce in Choshi is an industry that makes good use of the advantages that the land offers.

HUMAN ACTIVITY



Industries that make full use of Choshi's regional characteristics



We will show you how the gifts from the earth have been utilized in Choshi.

[Eastward Re-location of Tone River]

Tone River after the eastward relocation.



Tone River 1000 years ago.



Provided by the Ministry of Land, Infrastructure, Transport and Tourism, Tone-river Upstream Office

The old Tone River flowed into the Tokyo Bay. During the early stages of the Edo Period, because of the repair work conducted by Edo Shogunate, the river started to flow into the Pacific Ocean at Choshi. This large-scale construction is known as "the Eastward Relocation of Tone River". It is said that this project was carried out to upgrade the water transport network, to protect Edo from water disasters, and to develop new rice fields. ("Edo" is now called Tokyo.)

After "the Eastward Relocation", Tone River developed as a waterway that connects Edo and northeastern Pacific Ocean. Choshi, located at the mouth of Tone River, flourished as a relay point where loads were transferred from ships on the sea to those on the river.



A takase-bune loaded with barrels
(Owner: Ms. Yumiko Akimoto, photo provided by Nagareyama City Museum)

How is Choshi related to the Eastward Relocation of Tone River?

Takase-bune

The takase-bune has a flat bottom and a structure that has little water draft (the depth of the boat in water) so that it doesn't run aground in a river with many shallow areas.



[Agriculture of Choshi]



Land of Choshi

The plateau (slightly higher ground) of Choshi is covered by "Kanto loam", which is volcanic ash that has turned into clay. On this plateau, since it is suitable for growing crops, many vegetables are grown.

Many types of vegetables are harvested in Choshi. Choshi cabbage is especially famous for its "Lighthouse mark cabbage" brand.



Choshi city is number one in Japan for the spring cabbage harvest!!

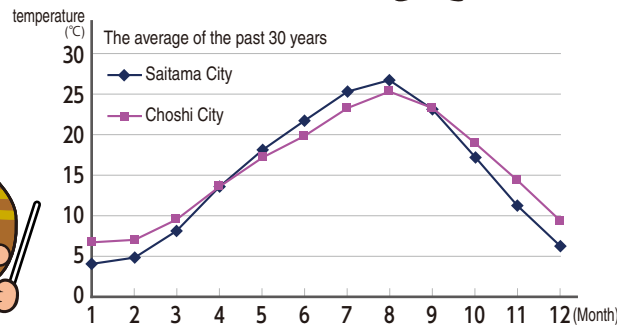
Vegetables with the top three yields in Choshi (2012)

(Ministry of Agriculture, Forestry and Fisheries)

Cabbage	81,100t (third in Japan)
Daikon radish	55,100t (second in Japan)
Tomatoes	2,851t



The most suitable temperature for cabbage cultivation is from 15 °C to 20 °C. Choshi is warm even during winter, and that's why cabbage grows well here from fall to spring.



Comparison of monthly-mean temperatures of Saitama and Choshi cities (Japan Meteorological Agency)

[Fishery of Choshi]

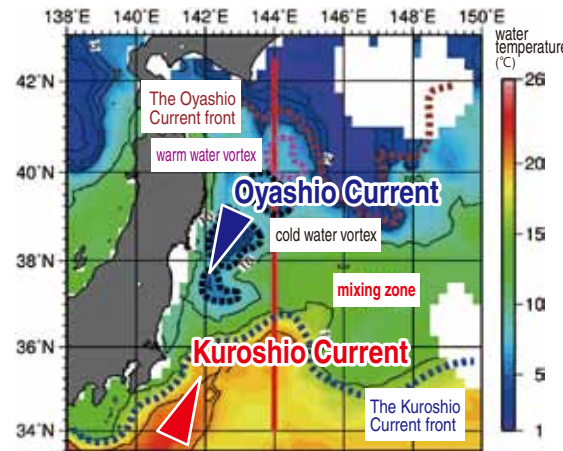


Fish landing weights in Choshi are really big! How come so many fish are caught here?

The rankings of the landing weights at major fishing ports (2013)

(According to Jiji Press)

Ranking	Fishing port	Landing weight(t)
1	CHOSHI	214,499
2	YAIZU	152,158
3	SAKAIMINATO	136,066
4	NAGASAKI	121,514
5	MATSUURA	119,176
6	KUSHIRO	110,668
7	NEMURO	107,342
8	HACHINOHE	97,601
9	MAKURAZAKI	97,073
10	ISHINOMAKI	86,087



Water temperatures at a depth of 100m during early July, 2002 (Japan Meteorological Agency)

Offshore at Choshi is where "the Oyashio Current" from north and "the Kuroshio Current" from south meet. Because of this, a large amount of plankton are here, and small fish like sardines gather here, mackerel and bonito also gather here to eat these fishes.



Choshi Tsurikinme

Alfonsin, also called "Choshi Tsurikinme," is caught by a fishing method called "soko-Tatenawa". It is designated as a Chiba-brand marine product.

