



**JAPAN**

The motion of the Earth from the time when the Japanese archipelago was part of the Asian continent. The San'in Kaigan Geopark is full of dynamic geological history and other wonders. Go on a trip to feel the heartbeat of Mother Earth!

Production  
The San'in Kaigan Geopark Promotion Council & Graduate School of Regional Resource Management, University of Hyogo  
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## San'in Kaigan Global Geopark

### San'in Kaigan Geopark: recording earth's ever-changing activities

#### The Japanese archipelago as part of the Asian continent

Long ago, the Japanese archipelago was part of the Asian continent. As a result of volcanic activity, pyroclastic flow occurred on the surface of the earth, while magma slowly got cold and hardened to form granite deep underground.

Granite from this period (Sengamatsushima, Uradome Kaigan Coast, Iwami Town)

Granite from this period (Tainohama Beach Shin'onsen Town)

Pyroclastic deposits, etc.

Magma erupts and is forced upward

Subduction of plates (numerous flat rocks covering the surface of the earth)

### Formation of the Sea of Japan

The edge of the continent began to split. During the separation, hollows were formed, which later became lakes and rivers. Elephants, deer and other animals lived in these freshwater areas. Later, the hollow spread to form the Sea of Japan. In the process, many volcanic rocks were made by the nearby volcanic activity.

Volcanoes

Rivers

Lake/sea

Marshes, ponds and grassy plains

Magma path (dikes & sheets)

Fossilized deer footprint in the early age of the formation of the Sea of Japan (Kasumi Kaigan Coast, Kami Town)

Volcanic rocks (lava) in the early age of the formation of the Sea of Japan (Shishi-no-kuchi (Lit. the mouth of lion) Tajimamihonoura, Shin'onsen Town)

Volcanic rock (sheet) in the latter age of the formation of the Sea of Japan (Tateiwa Rock, Kyotango City)

## Geological features, natural environment, people's lives, and the formation of the Sea of Japan

### Activity of the Japanese archipelago

After the Japanese archipelago began to look like it does today, volcanic activity continued and at the same time, ria coasts and coastal terraces were formed, as well as deep valleys and beautiful waterfalls in the mountains. In the meantime, plains, basins and sand dunes were also formed and people began to live in this region.

The present

San'in Kaigan Geopark

Asian continent

The Sea of Japan

The Japanese archipelago

The Pacific Ocean

Volcanic rocks that spouted out through volcanic activities after the formation of the Sea of Japan and a waterfall formed by later erosion (Kirigataki Waterfalls, Shin'onsen Town)

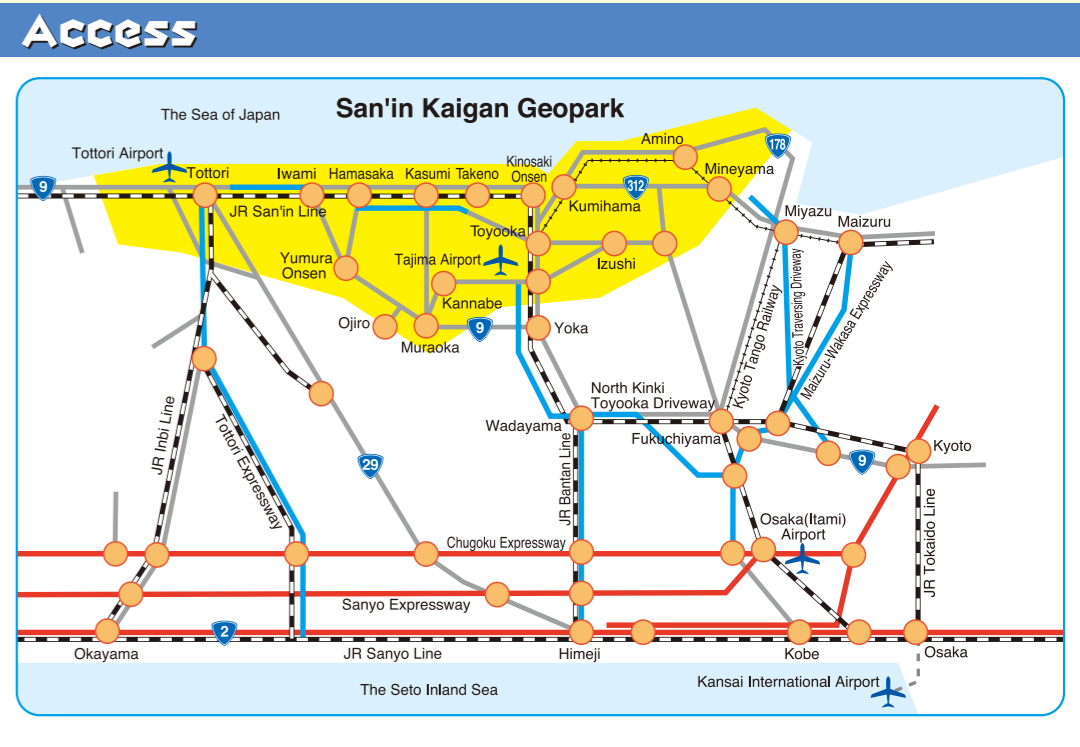
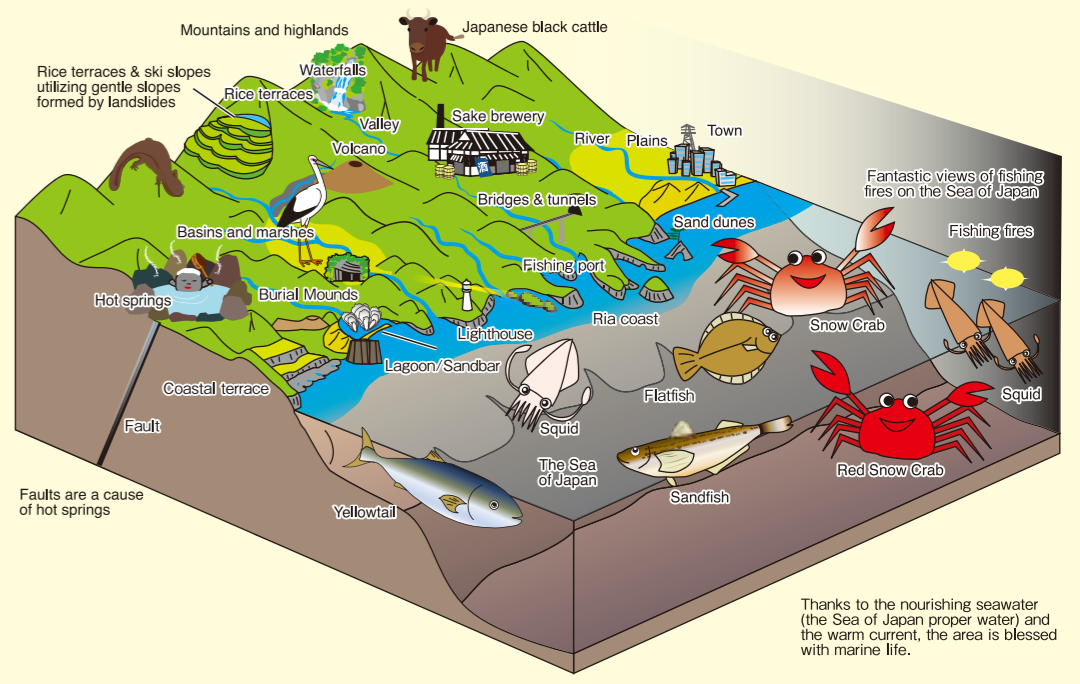
Sand dunes formed by the sedimentation of sand transported by rivers and ocean currents (Tottori Sand Dunes, Tottori City)

### Various landscapes and people's lives in the San'in Kaigan Geopark

Beautiful landscapes featuring various kinds of rocks, strata, and coastal landforms, as well as inland waterfalls and valleys can be observed in the San'in Kaigan Geopark. Making use of such features, the people of the region developed a highly characteristic way of life.

- Sand dunes, sandbars & lagoons**  
Highlights: Tottori Sand Dunes, Idagahama Beach, Shoterkyo Sandbar, Kotohikihama Beach, Kumihama Bay  
Making use of sand dunes as Chinese shallot field (Fukube Sand Dunes, Tottori City)
- Ria coasts & marine landforms**  
Highlights: Kasumi Coast, Tajimamihonoura, Uradome Coast  
Canoe tour around sea caves (Takeno Kaigan Coast, Toyooka City)
- Waterfalls & valleys**  
Highlights: Hattandaki Waterfalls, Sanudaki Waterfalls, Yoshiki Waterfalls, Kirigataki Waterfalls, Amedaki Waterfalls  
Umbrella Dancing (Tottori prefectural intangible folk-cultural property) performed at a seasonal opening festival (Amedaki Waterfalls, Tottori City)
- Coastal terraces**  
Highlights: Sodeshi, Fudeshi, Tangamatsushima, Kyogamisaki  
Burial mounds on terraces (Onuru Burial Mound Group, Kyotango City)
- Volcanoes, mountains & highlands**  
Highlights: Kannabe Volcanic Fields, Mt. Hachibuse, Mt. Oginozen  
Highland vegetables grown in kuroboku soil (Kannabe Highlands, Toyooka City)
- Landforms by landslides**  
Highlights: Wasabu, Nukida, Yokoo, Tando  
Rice terraces (Rice terraces of Nukida, Kami Town)

The rocks and strata in the San'in Kaigan Geopark contain the history of the earth from the time when the Japanese archipelago was part of the Asian continent, through the formation of the Sea of Japan, to the present.



## Biodiversity

The formation of the Sea of Japan and the movements of the earth brought about an environment blessed with diverse geological and geomorphological features, which serve as the natural habitat of various creatures.

- Sand dunes & sandbars**  
Plant species include: Asiatic Sand Sedge, Sea Bells, Veronica Ornata  
Animal species include: Antlio, Wolf Spider
- Forests near coasts**  
Plant species include: Eelgrass / Sea Grape, Wakame Seaweed, Japanese Black Pine, Japanese Chinquapin  
Animal species include: Horned Turban Shell, Abalone / Iwagaki Oyster, Sea Urchin Osprey, Peregrine Falcon
- Marshes, streams & rice fields**  
Plant species include: Rabbitear Iris, Baikamo (Ranunculus nipponicus), Eastern Skunk Cabbage  
Animal species include: Oriental White Stork, Japanese Killifish, Four-spot Midget
- Coastline of the Sea of Japan**  
Plant species include: Marbled Rockfish, Red-spotted Grouper, Largescale Blackfish  
Animal species include: Oval Squid, Swordtip Squid, Horse Mackerel
- Mountains & highlands**  
Plant species include: Japanese Beech Tree, Mongolian Oak, Japanese Judas Tree, Horse Chestnut  
Animal species include: Asiatic Black Bear, Golden Eagle, Abe's Salamander
- Offshore of the Sea of Japan**  
Animal species include: Snow Crab, Red Snow Crab, Sailfin Sandfish, Firefly Squid, Japanese Amberjack, Bluefin Tuna

Veronica Ornata

Evergreen Broad-leaved Forests

Oriental White Stork

School of Horse Mackerel

Abe's Salamander

Snow Crab

## Geo-gourmet

Various foods owe their great taste to the characteristic climate of the San'in region.

### Snow crab & red snow crab

★ Find out what's "Geo" about crabs here!

The Sea of Japan is a huge depression formed after the separation of the Japanese archipelago from the Asian continent. Its center is very deep, but the depth of the channels connecting it to the neighboring seas are shallow (around 50-140m). Therefore, the exchange of seawater is limited to the surface of the ocean's layers, meaning "the Sea of Japan proper water" exists in deep waters. Thanks to this oxygen-rich cold seawater, coldwater fish and shellfish, such as crabs, can live in the Sea of Japan.

Another feature of the Sea of Japan is its complicated submarine topography. Thanks to this, two kinds of crabs are enjoyed in this area, namely, the snow crab and the red snow crab. Snow crabs live at a depth between 100-500m, and red snow crabs live at a depth between 500-2500m. Each type of crab has its own unique taste. The complexities of the submarine topography bring about a variety of marine resources as well as the habitat isolation of each crab.

Submarine topography for the Sea of Japan

Snow Crab

Red Snow Crab

### Japanese black cattle (Tajima cattle & Impaku cattle)

★ Find out what's "Geo" about Japanese black cattle here!

Japanese black cattle are raised in and around the San'in Kaigan Geopark area. Because each inland village was surrounded by steep mountains, it was difficult to mate cattle from neighboring valleys. As breeding was limited to separate valleys for a long time, excellent pedigrees unique to each valley were established. By cross-breeding such varieties, an even better bloodline of Tajima Cattle has been developed. The area has other factors ideal for the production of high quality cattle. For example, cold winters and sheds and pastures at different altitudes are ideal for making cattle with good marbling.

☆ Tajima Cattle is the breeding cattle for Kobe Beef and Matsusaka Beef!

Cross-breeding across different valleys is difficult

## Vegetables grown in Sand Dunes

★ Find out what's "Geo" about vegetables in sand dunes!

In sand dunes, the grains of sand are almost uniform in size and hardness, so root crops can grow large and straight. Using this, sweet potatoes and Chinese yams are produced in this region. Watermelons and melons are also grown in sand dunes because of good drainage and easy control of water and fertilizers. With people's endeavors and the technological development, the Tottori Sand Dunes have become one of the most eminent Chinese shallot producing areas in Japan since they were successfully cultivated there in 1914.

Chinese shallot field

Melons grown in sand dunes in Kyotango City

### Variety of geo-gourmet

#### Bounty of the sea

- Firefly Squid coastal areas**  
The fishery yield of firefly squid is the highest in Japan. Firefly squid caught in the San'in region feature a sweet, elegant flavor.
- Sandfish coastal areas**  
The San'in region, as well as Akita Prefecture, is a major production area. Fatty young sandfish are mainly caught and landed.
- White squid (Swordtip squid) coastal areas**  
Cut up alive to be served as fresh sashimi. With its crunchy texture, the clear, white body is sweet and delicious.

### Riches of the soil

- Rice various locations**  
Brand-name rice with unique characteristics are developed, including Tango Rice, Muraoka Rice, Tanada (rice terraces) Rice and Stork-friendly Rice.
- Fruits & vegetables grown in highlands various locations**  
Many kinds of fruits and vegetables, such as pears, peaches, cabbages and Japanese white radishes, are grown on sunny hills and mountain slopes.

## Unique climate and peoples' lives

Various cultures and industries that have supported and developed the local communities were established under the unique climate of the San'in region. They are also utilized as tourist attractions.

### Hot springs

A large number of hot springs in the San'in Kaigan Geopark have long been utilized as therapeutic bath resorts. There are many faults, or fractures and discontinuities of the ground caused by the movement of the earth. The faults function as conduits to bring water up from deep underground. The heated underground water rises up as hot springs to the surface of the earth through the faults.

Hot springs

Hot water rises up to the surface of the earth through faults

Groundwaters is heated up by geothermal energy

### Ria coasts - Ports to wait out storms

When the sea level rises, its complicated geographical features (mountains and valleys) create coastlines called ria coasts. These coasts are good natural harbors, as they block seasonal winds from the Sea of Japan. They also flourished as ports for Kitamaebune (commercial ships) to wait out storms long ago.

Coves as natural good harbors

Seasonal winds

Calm downwind

When the sea level rises, valleys sink into the sea and ridges become capes. Capes act as wind breakers and coves become ports to wait out storms.

### Weather, climate & benefits of the Sea of Japan

The San'in region is a rainy and snowy area. The locals' phrase "Don't forget to bring an umbrella with you even if you forget your lunch box" expresses this situation well. In winter, there is a lot of snowfall caused by the northwest seasonal winds from Siberia. The snow in the mountains is over one meter in depth. This is because the moisture-laden seasonal winds from the Tsushima warm current on the surface of the Sea of Japan blow against the mountains, climb upward and form snow. People's lives in the San'in region are greatly affected by the climate. On the other hand, deep in the Sea of Japan, the cold "Sea of Japan proper water" exists. Thanks to the Tsushima warm current and the cold proper water, the harvest from the Sea of Japan includes both coldwater fish and shellfish (crabs, etc.) and warmwater fish and shellfish (yellowtails, etc.).

Evaporation

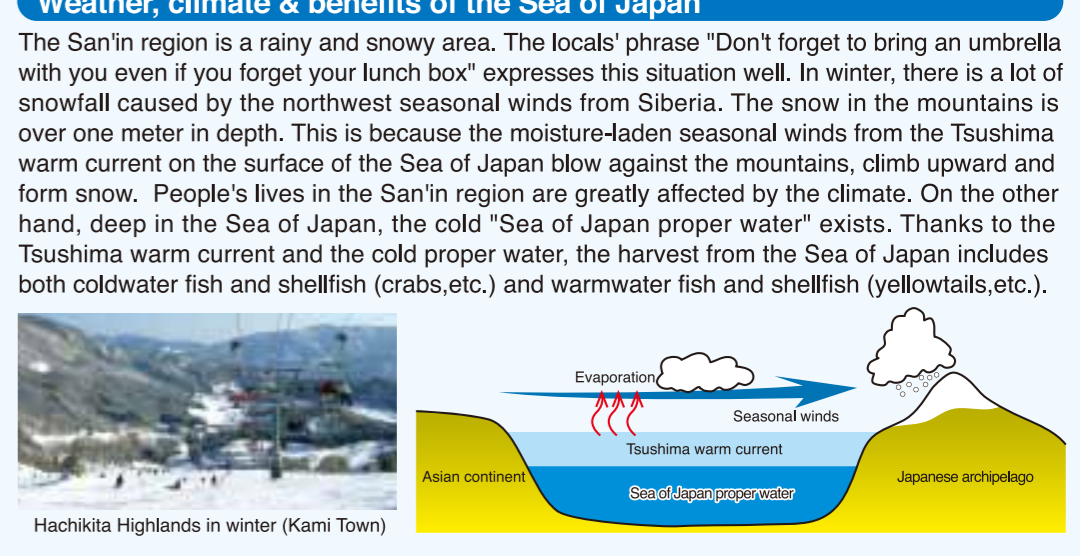
Seasonal winds

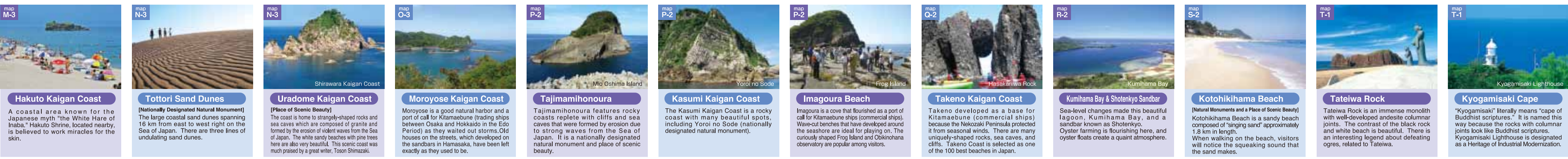
Tsushima warm current

Sea of Japan proper water

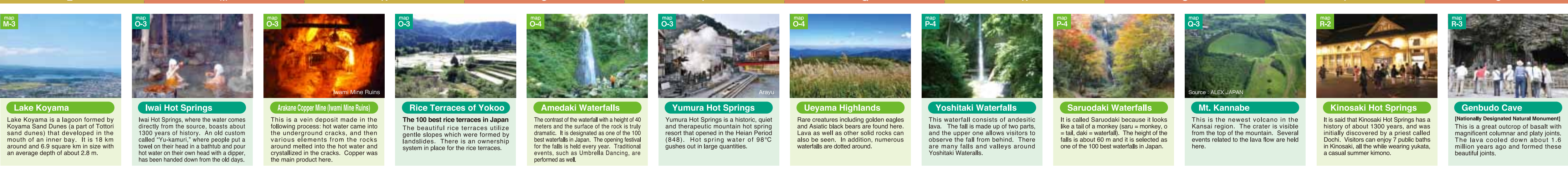
Asian continent

Japanese archipelago





map M-3 Hakuto Kaigan Coast  
 map N-3 Tottori Sand Dunes  
 map N-3 Uradome Kaigan Coast  
 map O-3 Moroyose Kaigan Coast  
 map P-2 Tajimamihonoura  
 map P-2 Kasumi Kaigan Coast  
 map P-2 Imagoura Beach  
 map Q-2 Takeno Kaigan Coast  
 map R-2 Kumihama Bay & Shotenkyo Sandbar  
 map S-2 Kotohikihama Beach  
 map T-1 Tateiwa Rock  
 map T-1 Kyogamisaki Cape



map M-3 Lake Koyama  
 map O-3 Iwai Hot Springs  
 map O-3 Arakane Copper Mine (Iwai Mine Ruins)  
 map O-3 Rice Terraces of Yokoo  
 map O-4 Amedaki Waterfalls  
 map O-3 Yumura Hot Springs  
 map O-4 Ueyama Highlands  
 map P-4 Yoshitaki Waterfalls  
 map P-4 Saruodaki Waterfalls  
 map O-3 Mt. Kannabe  
 map R-2 Kinosaki Hot Springs  
 map R-3 Genbudo Cave