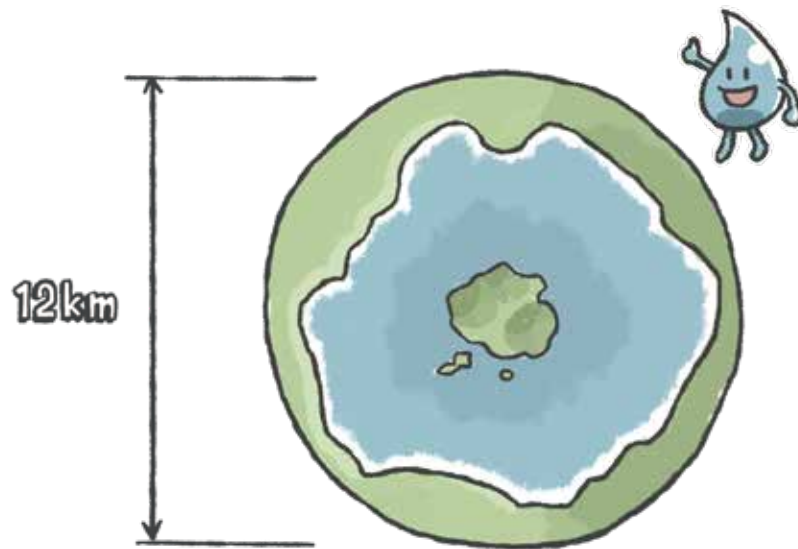


# Water's Journey

Considering the Water Environment  
from the Perspective of UNESCO Global Geopark's Practices



Toya-Usu UNESCO Global Geopark



This is Toya Caldera,  
measuring approximately 12 km  
in diameter.

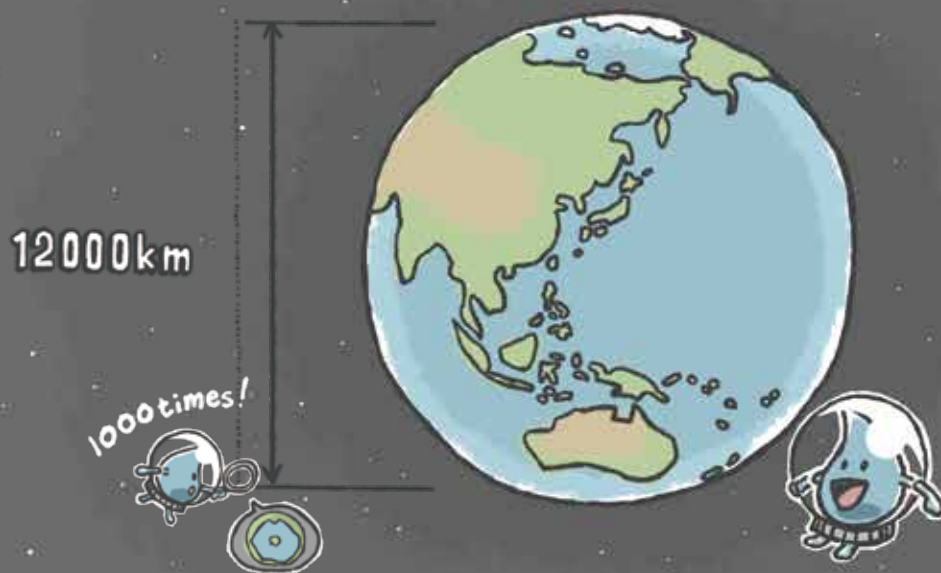
The terrain like a frying pan was formed  
when the area sank after  
a massive eruption in ancient times.

Lake Toya in the caldera's center is a vast water reservoir.  
It is an important place for local people  
and the symbol of Toya-Usu UNESCO Global Geopark.

The lake water circulates slowly and eventually flows  
through Sobetsu Waterfall on the southeastern end,  
going down the Osaru River into the sea.

**Tidbit:**

Lake Toya has approximately 8.2 km<sup>3</sup> of water, making it the third largest lake in Japan. The largest is Lake Biwa and the second largest is Lake Shikotsu.



This is the planet earth;  
its diameter is approximately 1,000 times  
that of Toya Caldera.

The water of Lake Toya  
rides sea tides and  
travels around the world.

Part of the water evaporates and rises to the sky,  
turning into rain and snow  
that falls around the world.

The water travels  
from Lake Toya to countries around the world.

Currently, areas in more than 40 countries have been certified as UNESCO Global Geoparks. The following pages describe the waterside highlights of four geoparks and activities to preserve their environment for the future.

#### Tidbit:

Even though the diameter of the earth is 1000 times that of Lake Toya, the total amount of water on the earth is more than 160 million times that of Lake Toya. It is said that there is about 1.35 billion km<sup>3</sup> of water on the earth.



# Toya-Usu (Japan)

This geopark is famous for its volcanic landscapes, such as Mt. Usu and Lake Toya, and Jomon archeological sites. You can enjoy hot springs and seafood from Funka Bay here. The remains of eruption disasters are used to provide disaster mitigation education. Climate: Subarctic; Area: 1,064 km<sup>2</sup>

# Batur (Indonesia)

This geopark features an active volcano and a beautiful caldera lake. In addition to the overwhelming power of the volcano, the region has numerous cultural attractions, such as traditional music and dance, and is also known for agriculture. Climate: Tropical; Area: 371 km<sup>2</sup>

# Leiqiong (China)

This geopark is dotted with maars formed due to explosions caused by contact between lava and groundwater. The agricultural scenery, including walking paths around the crater and pineapple fields using the volcanic terrain, is also attractive. Climate: Subtropical – tropical; Area: 3,050 km<sup>2</sup>

# North Pennines (United Kingdom)

This geopark is known for magnificent waterfalls and a world-famous zinc mine site. The peat area of the plateau, where glaciated terrain remains, is an important habitat for rare birds, small mammals, and alpine plants. Climate: Temperate; Area: 1,938 km<sup>2</sup>

## Tidbit:

The Toya-Usu UNESCO Global Geopark's "Toya" is derived from the Ainu words "to" (of the lake) and "ya" (shore). Tozai Ezosansen Chiri Torishirabezu, a map created by Takeshiro Matsuura, an explorer in the Edo period (1603-1868), also indicates "Toya" on the lake shore.



### Waterside highlights

Lake Toya,  
Nakajima Island,  
Sobetsu Waterfall,  
Cape Arutori,  
Sankai Waterfall,  
and Kamuichashi.



### Waterside highlights

Lake Batur (caldera lake) and terraced rice fields using pyroclastic plateau.



### Waterside highlights

Huguangyan (maar-type crater lake), Boshe Port, sea cliffs, and a columnar joint seashore.



### Waterside highlights

Valley created by a river flowing through hills, and High Force and Low Force waterfalls.



### Tidbit:

The Batur UNESCO Global Geopark also has a place called “Toya.” This means “holy water” or “the world of God” in the local language.

# Toya-Usu



Water environment problem at  
Toya-Usu UGGp

## Increased Signal Crayfish

Signal crayfish were introduced to Japan as food. Since they were first identified at Lake Toya in 2005, their habitat has gradually expanded, and the impact on native species is of great concern.

# Batur



Water environment problem at  
Batur UGGp

## Plastic Waste Dumping

An estimated 8 million tons of plastic waste is dumped into the sea annually around the world, which raises strong concerns about the deterioration of the environment, including the marine ecosystem, adverse effects on fisheries and landscapes.

# Leiqiong



Water environment problem at  
Leiqiong UGGp

## Deterioration of Water Quality

In the Meishe River, which flows through the urban area of Haikou City, where the geopark is located, water quality deterioration due to the influx of domestic wastewater was once a major problem.

# North Pennines



Water environment problem at  
North Pennines UGGp

## Peatland Drying and Runoff

Destruction of peatlands due to climate change is said to be a serious crisis that will accelerate global warming. When peatlands are destroyed by changes in rainfall, large amounts of carbon dioxide are released to the atmosphere.

### Tidbit:

Peat is muddy charcoal made from piles of dead plants in wetlands. Although peat is distributed over only 3% of the earth's surface area, it is said to store more than twice as much carbon as all the forests around the world. The same problem is also a growing concern in Hokkaido, where peatlands are widely distributed.



The following measures are being taken

The signal crayfish are trapped with baskets and caught by divers. Events and educational activities for residents are held, calling for cooperation with continuous measures.



The following measures are being taken

The international conference on geoparks held in Indonesia (Lombok) in September 2019 featured exhibitions and plays on the theme of plastic waste. Bamboo straws have been commercialized to promote the reduction of plastic waste.



The following measures are being taken

The introduction of a system to filter the inflow water with step-like artificial planting and lava has greatly improved the water quality of the Meishe River. The dirty river has been reborn as a waterside park.



The following measures are being taken

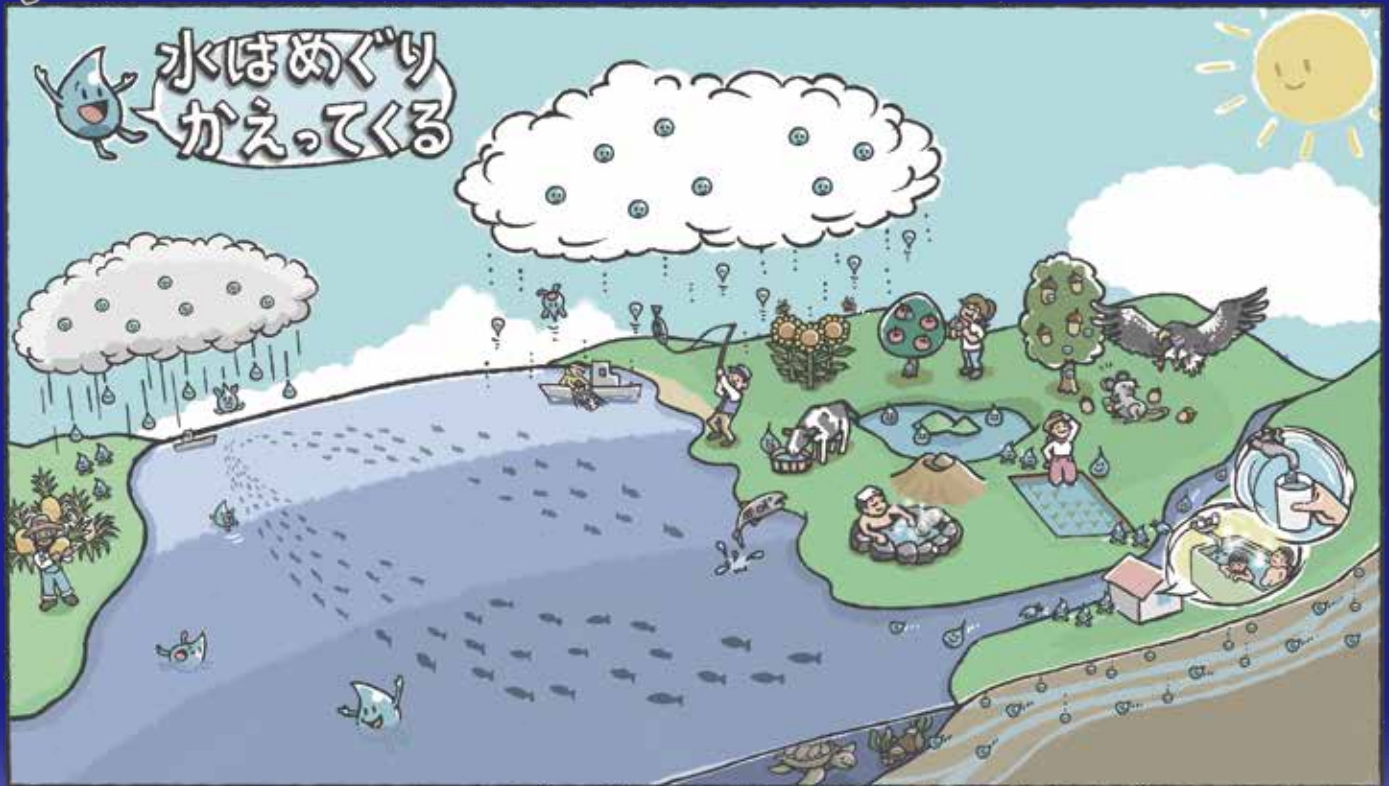
A dam has been made in the peatland using natural materials to prevent spills and to supply adequate water. Native species also have been sown and planted to restore the grassland ecosystem.



#### Tidbit:

Leiqiong UNESCO Global Geopark spans Leizhou Peninsula (Zhanjiang City, Guangdong Province) at the southernmost tip of mainland China and Qiong Prefecture (Haikou City, Hainan Province) on Hainan Island, which is called the Hawaii of China.

# Water travels and returns to you.



Water travels  
from Lake Toya to countries around the world and  
from countries around the world to Lake Toya.

Everywhere on earth, in the sky and on the land,  
water connects people's lives and all living things,  
and returns to you.

Regional water is the world's water.  
What can you do now to make water something  
to be prouder of and to preserve it for the future?

For example,



*Pick up trash and save water.  
Do not litter or dump waste in water.  
Use plastic products repeatedly and recycle. Learn about  
waterside creatures and how water circulates.*