HOKKAIDO UNIVERSITY

Proposal to collaborative research on geodiversity and geopark establishment in Finland: For understanding characteristics of landscape and nature, and conserving landscape and nature in the northern region

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11 September 2012, 5th Joint Finnish-Japanese Symposium, University of Oulu

Background: Collaboration attempted

Landscape & land use changes:

- Protected area management
- Geodiversity & geoconservation
- Sustainable tourism management
- etc.

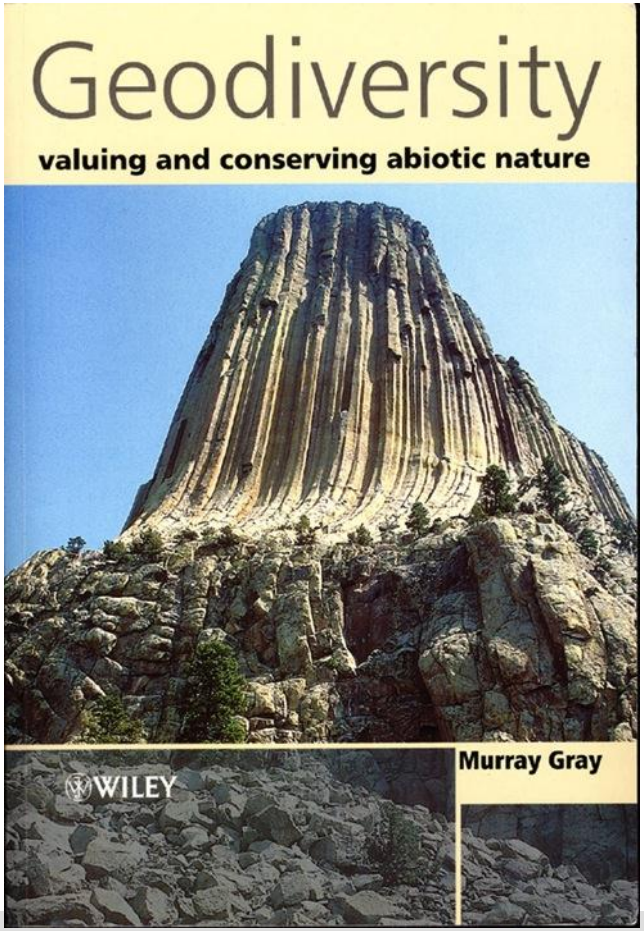
June 2006
September 2008

Dr. Pirkko SIIKAMAKI has stayed HU, Nov. – Dec. 2009

Failure!

Geodiversity

Notion developed in Tasmania, Australia in the 1990s.



Gray (2004):

"Geodiversity" is used as a shortened form of "geological and geomorphological diversity" and as the abiotic equivalent of biodiversity.

Current status in geodiversity in Japan

Ministry of the Environment: Addressing "Revised national strategy on biodiversity"

Biodiversity conservation

species A, sp. B, sp. C ····

Landform A, B, C, geology A, B, C, soil A, B, C as habitat

Biodiversity stands on geodiversity

Researchers' Group (2010 -)

Biodiversity conservation

species A, sp. B, sp. C ····

Landform A, B, C, geology A, B, C, soil A, B, C as habitat

&

Landform X, Y, Z, geology X, Y, Z, soil X, Y, Z independent from bio

Biodiversity stands on geodiversity, and geodiversity has value independent from biodiversity

Geodiversity issues in Hokkaido

Increasing importance of geodiversity in Japan:
Geologically active and complicated
(volcanic and tectonic hazards)

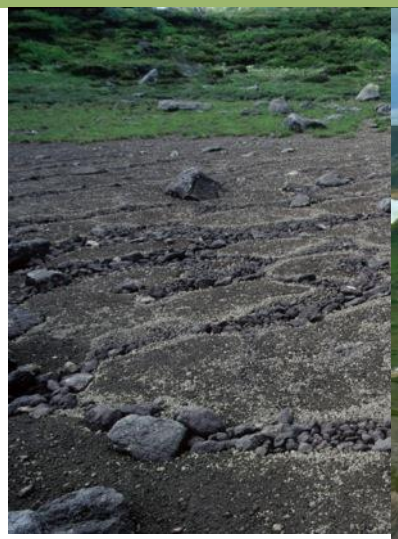
Destruction of geodiversity:

Coastal landforms: construction of ports caused the changes in sedimentation and erosion, so most of the original landforms have been disappeared.

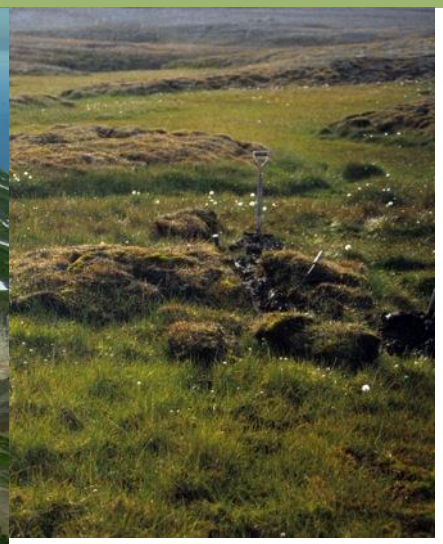
Wetland: in the past 70 years since 1928, 70% of wetlands were disappeared. About 99.8% of peat land was lost around Sapporo, Ishikari.

Periglacial landforms: some landforms have been lost and are disturbed by human walk in mountain areas.

Destruction of periglacial landforms in Hokkaido



Patterned ground



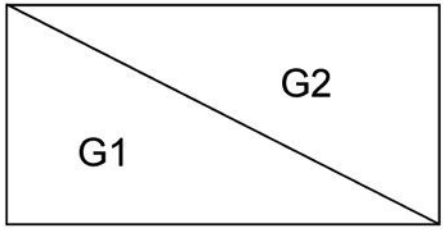
suzan NP)

Fossil periglacial

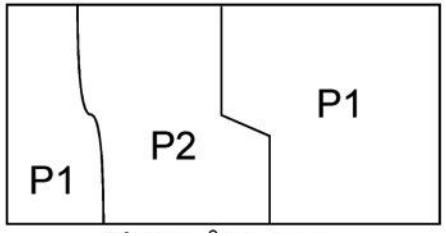
Destruction of periglacial landforms, Daisetsuzan National Park

Identification of geosites to be conserved

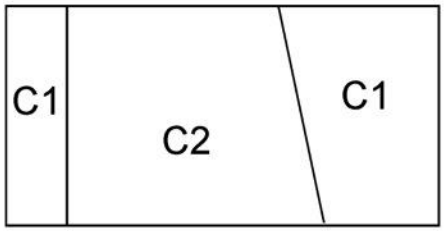
Base maps



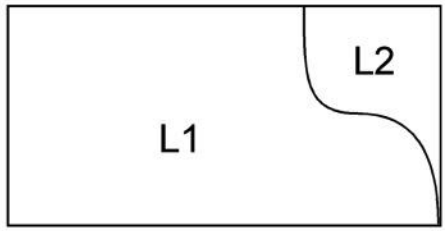
Geology



Geomorphic process



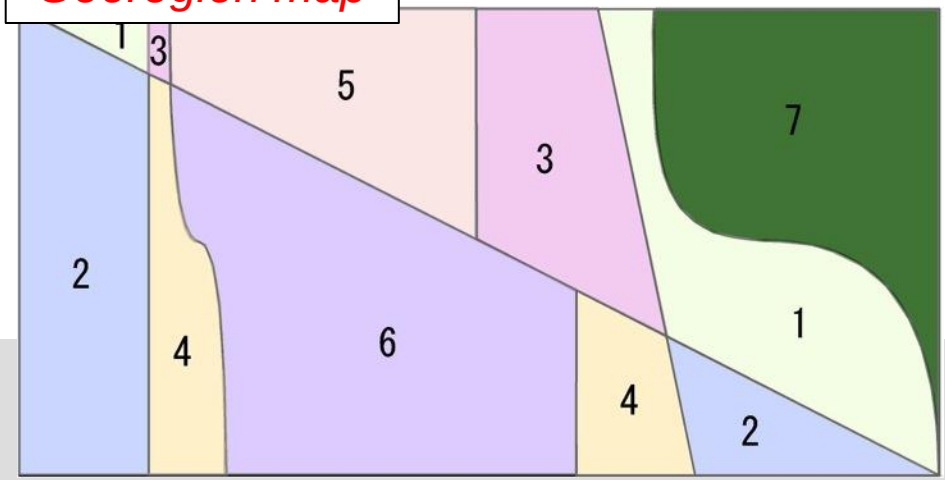
Soil



Landform

(1) Layering the base maps
(2) Classifying homogeneous areas to make a 'georegion map'

Georegion map



+ vegetation map, wildlife map, etc.

Geoparks

1997: Preparation started

2001: UNESCO decided to support

2004: Global Geoparks Network (GGN)

2007: NGO Japanese Geoparks Network

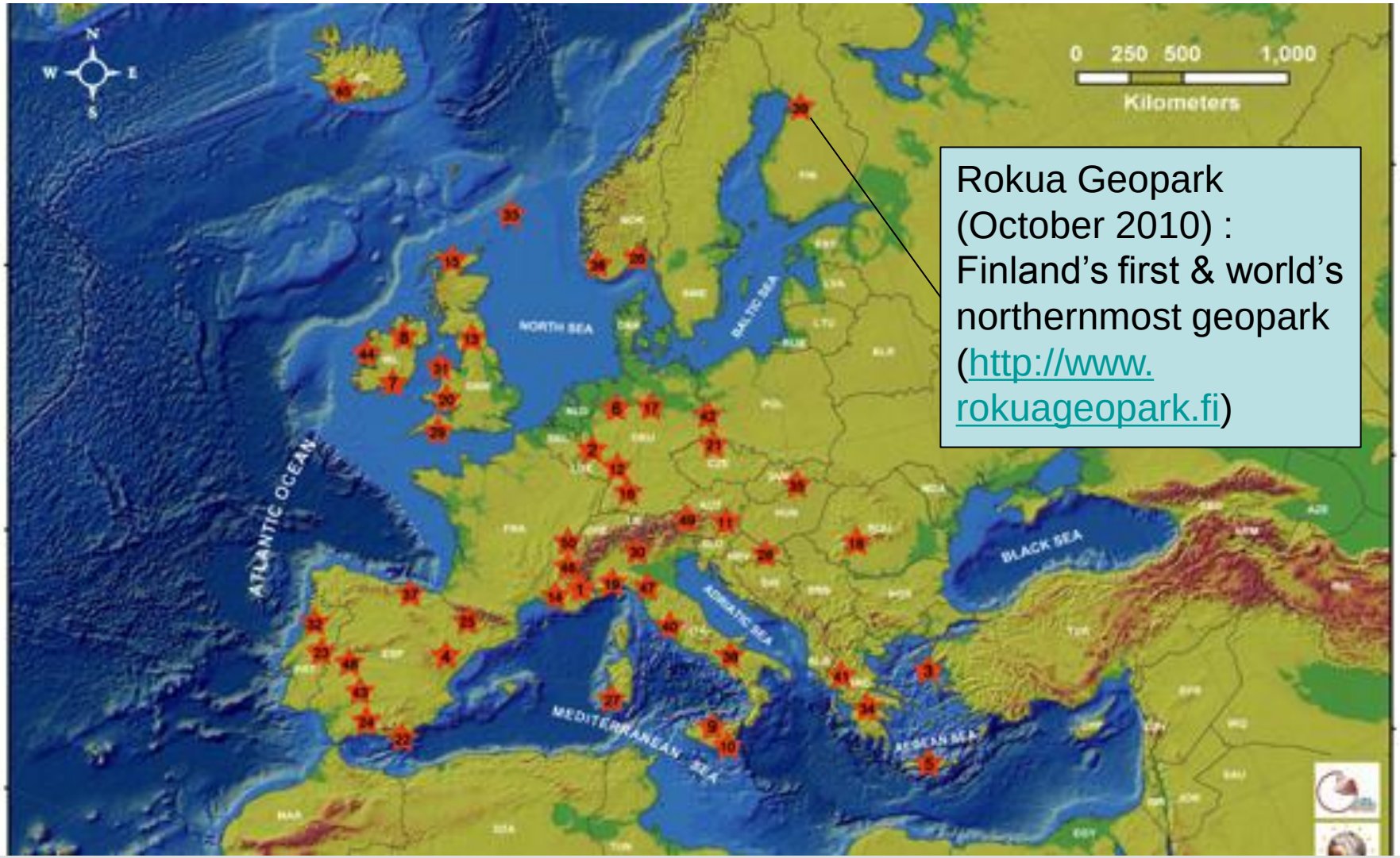
2009: Japan Geoparks Network (JGN)

Geopark:
area with geological, archaeological, ecological, and cultural significance,
Developing ‘geotourism’, which provides sustainable local development,
Improving education of geology, earth science, geography,
International networking.

Global geoparks

2012: 88 Global geoparks (26 in China, 50 in Europe, 5 in Japan) in 27 countries and areas

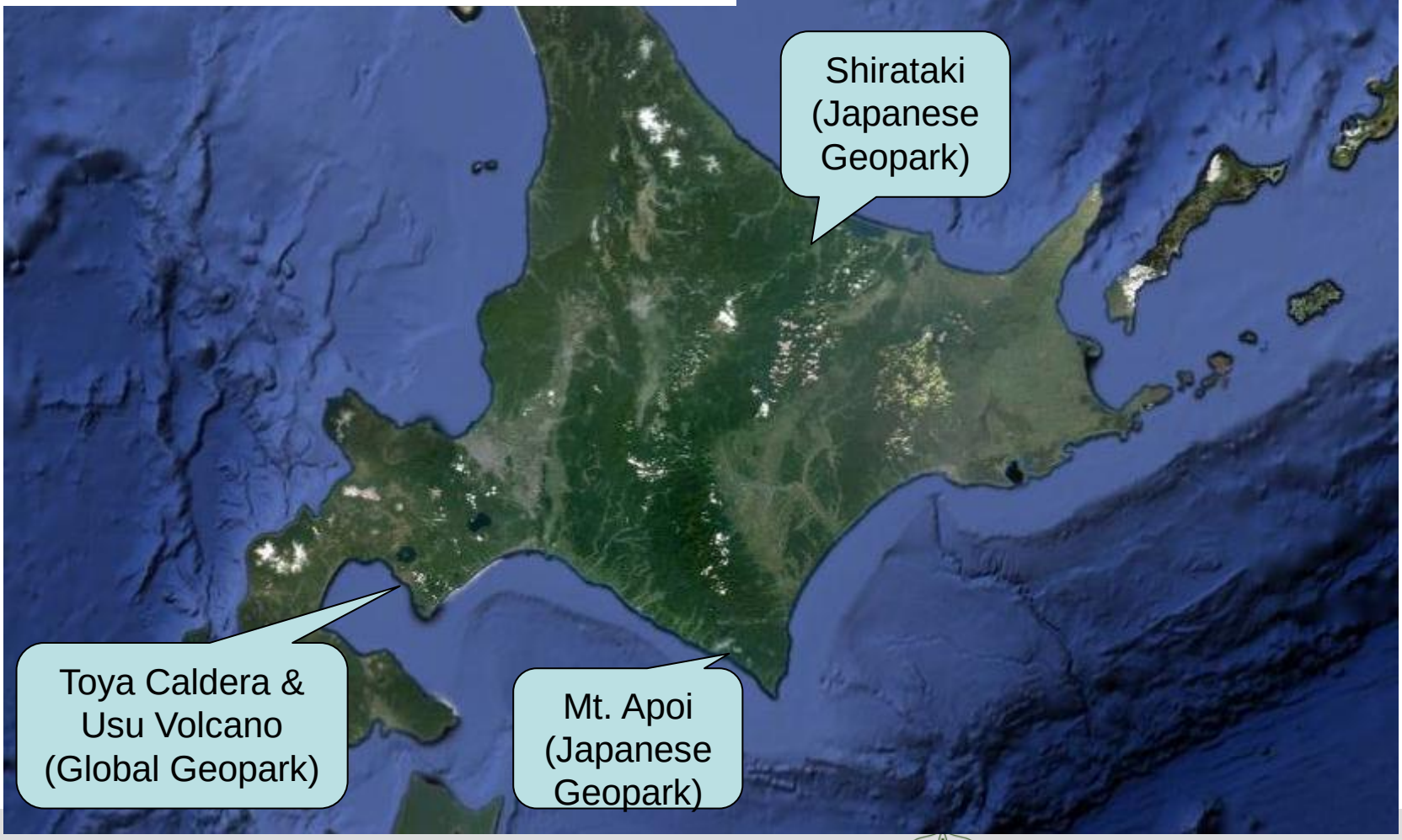
Geoparks in Europe (50 European geoparks as of May 2012)



Rokua Geopark (October 2010) : Finland's first & world's northernmost geopark (http://www.rokuageopark.fi)

Geoparks in Hokkaido

2 Japanese geoparks (among 15 in Japan)
1 Global geopark (among 5 in Japan)

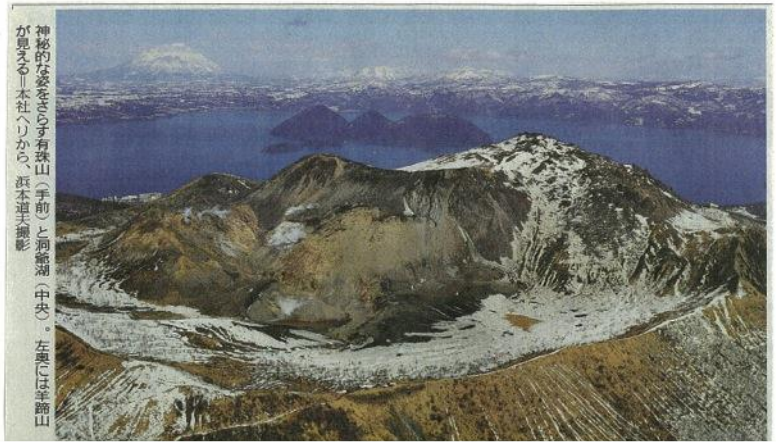


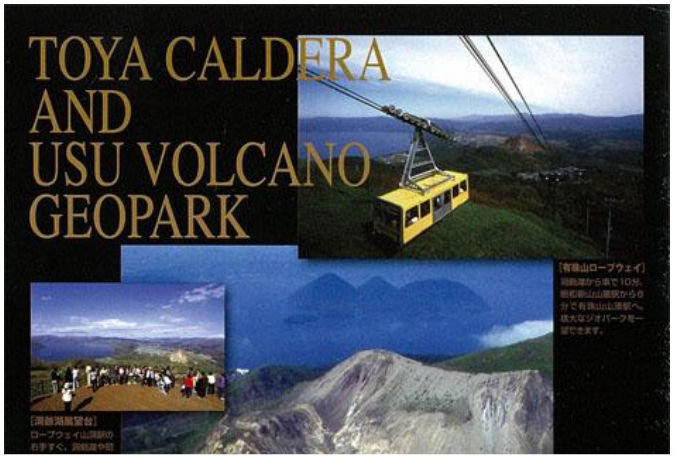
Toya Caldera and Usu Volcano Geopark (Global Geopark)

Showa Sinzan: formed by the eruption in 1944 – 45 in the eastern foot of Mt. Usu.

Toya Caldera and Usu Volcano Geopark (Global Geopark)

21.4.7 (火)
北海道新聞 22面

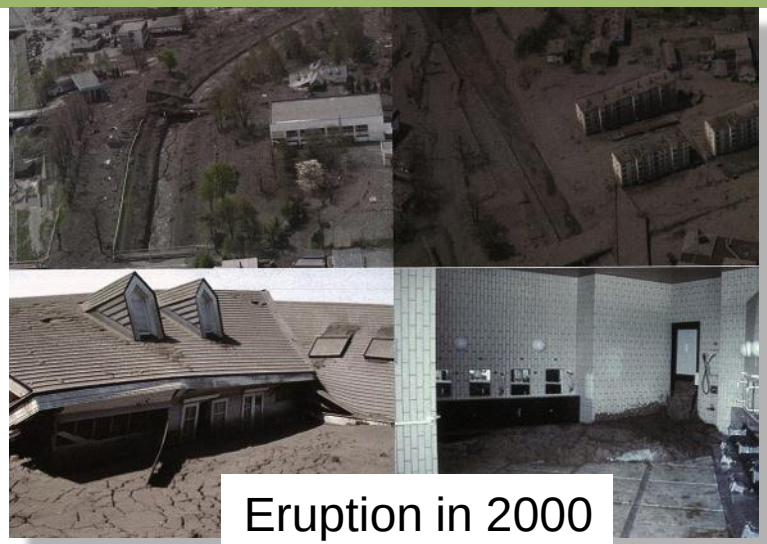




Usu Volcano (Ca. 700 m):
110,000 years ago, big eruptions made the base of the area with Toya caldera Lake. Mt. Usu started its activities 20,000 year ago.
The 1910 eruption: developed hot spring town, good for agriculture (vegetables, fruits, beans for Japanese sweets, etc.)

Hokkaido Newspaper, 7 April 2009)

Toya Caldera and Usu Volcano Geopark (Global Geopark)



Eruption in 2000

Geotour: volcanism & hazard issues

3.3 million tourists in 2002

Geotour: vegetation recovery after the 1977-78 eruption

Toya Caldera and Usu Volcano Geopark (Global Geopark)

Nearshore area: the pyroclastic flow formed sandy ocean floors, and the collapse of Mt. Usu formed rocky ocean floors: various fish and shellfish such as octopus, plaice, scallop & crab

Arutori Cape

Mt. Apoi (810 m), Hidaka Range ‘Japanese Geopark’ (domestic)

Mt. Apoi (Japanese Geopark)

Hidaka Range: collision of two plates.

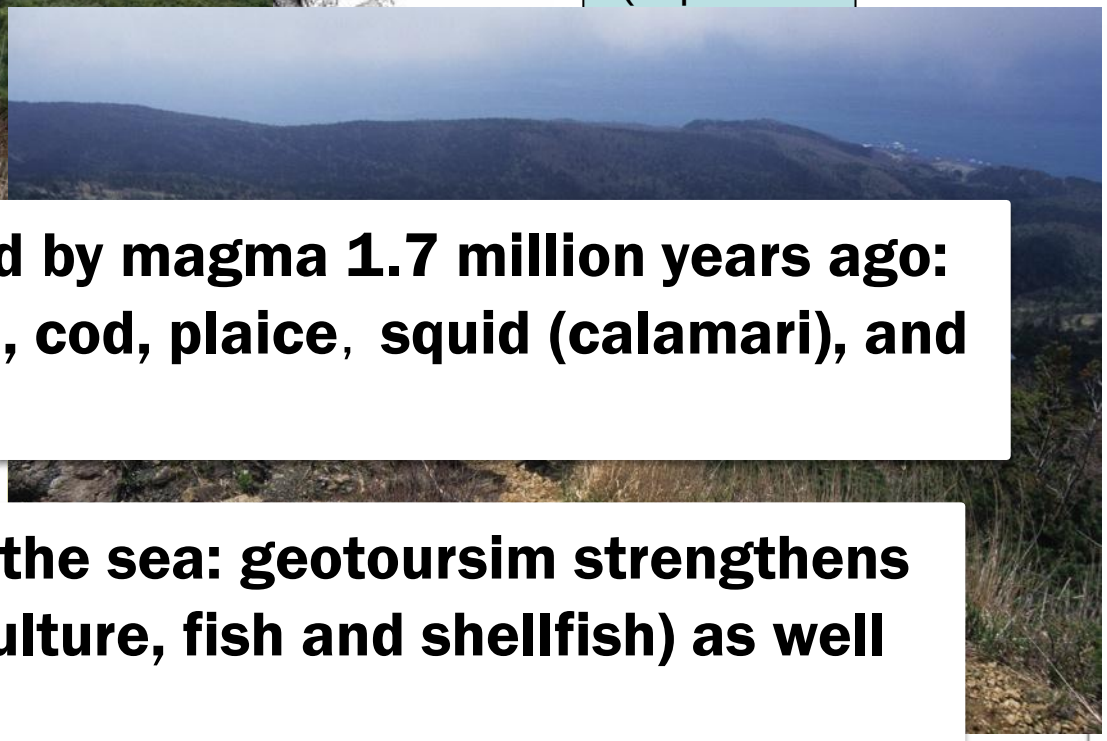
Mt. Apoi: composed of Horoman peridotite.
Home for various indigenous alpine plant species (e.g. *Callianthemum miyabeanum*)

Provision of educational opportunity

Sam
‘*Mt. A*

Mt. Apoi, Hidaka Range ‘Japanese Geopark’ (domestic)

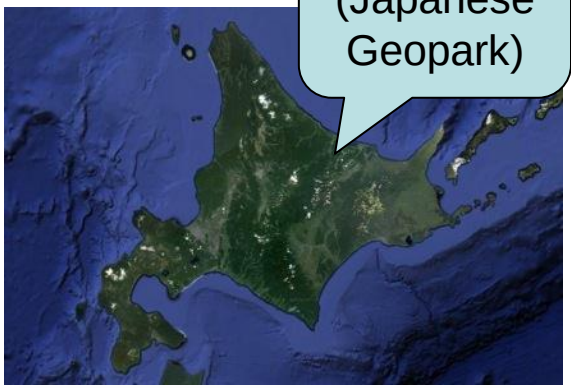
Mt. Apoi
(Japanese



Rocky ocean bed formed by magma 1.7 million years ago: good habitat for salmon, cod, plaice, squid (calamari), and kelp

From the mountain to the sea: geotoursim strengthens local industries (agriculture, fish and shellfish) as well as geoconservation

Shirataki (Japanese Geopark)

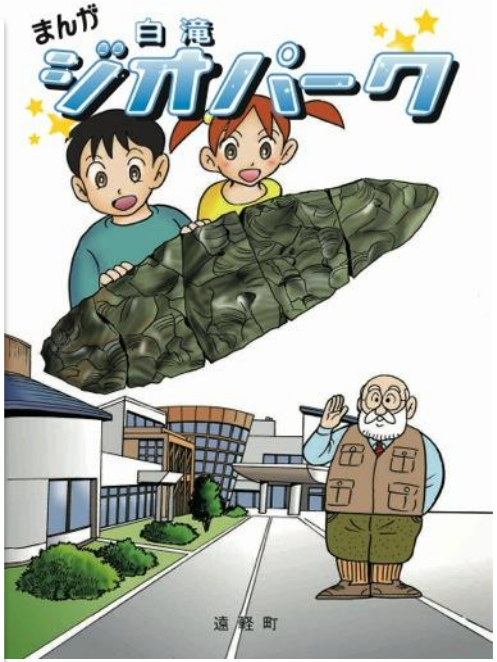


20 million years ago: Continental plate collision

2.2 million years ago: Rhyolitic magma eruption formed obsidian

25 - 16 thousand years ago: Palaeolithic people had used the obsidian in their life (in the forms of barracking and knife)

Today, we can experience palaeolithic life; can make barracking and knife; and can learn about the earth history by *manga*



Further possible geosites & geoparks in Hokkaido

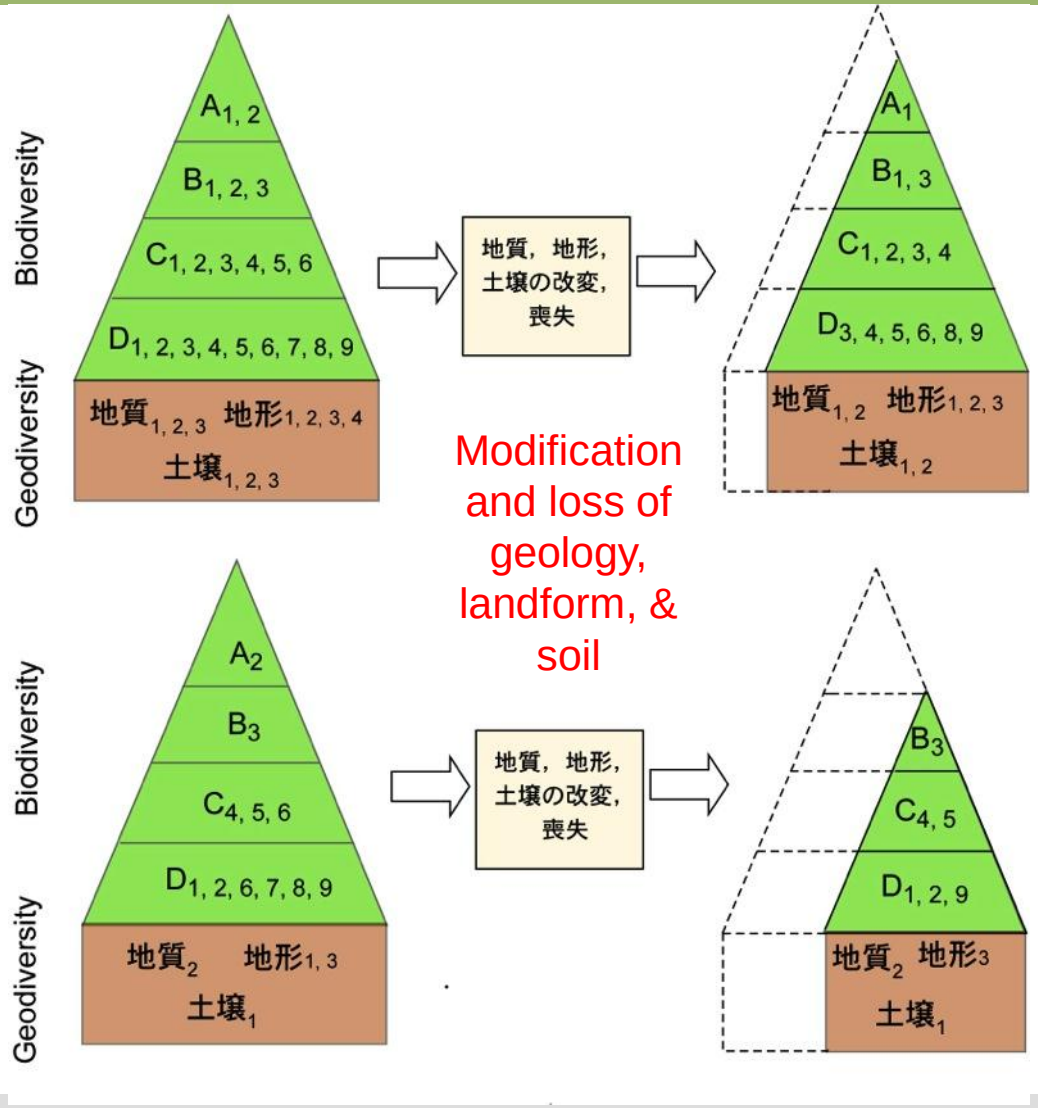
- Geological Society of Japan & Japanese Geographical Association: selecting more sites
- Local communities: nominating more geoparks

Some reasons to propose geodiversity & geopark studies

- Rich nature in both countries (some similarities and dissimilarities of the northern region; dissimilarities of the stable Finland and active Hokkaido. These require comparative studies)
- History of interaction between minority people and land/nature
- Great potentials but less development of geoparks & geosites in Finland, and more possibilities and necessity in development in Hokkaido (both need research)

Some reasons to propose geodiversity & geopark studies

Important countries in terms of northern biodiversity, so that conserving geodiversity (geoconservation) is essential in both countries



Some reasons to propose geodiversity & geopark studies

Through Finnish-Japanese efforts:

1. New viewpoints will be added to the current natural park use and management, and basis of the current park management system will be strengthened.
2. It is expected to develop a wider framework to understand characteristics of northern landscape/nature, to strengthen education on nature conservation (biodiversity conservation & geoconservation) in the Northern region.

Inclusion of aspects of geodivesity is suggested in the landscape studies, ecological studies, and protected area studies.

Gray (2005): Geodiversity: A new paradigm for the Earth and Environmental Sciences. *Global Environmental Res.*, 10: 127-.

Geodiversity can play:

1. As a basis for valuing abiotic nature,
2. As a resource in modern society,
3. As a basis for geoconservation,
4. As an integrating concept for the geosciences,
5. As an integrating concept for nature conservation, and,
6. As a part of integrated and sustainable land management.