

# Natural History of Hokkaido as revealed in soils

Re-edited for 2019, Part 1

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# Map of Japan/Hokkaido, Amsterdam Yan Yansonius (1658)



Same map showing the eastern part of Hokkaido. Tokachi is designated as “Tacapsy”, while Hidaka mountains as “Snowy mountains”.



# Explanation of the map

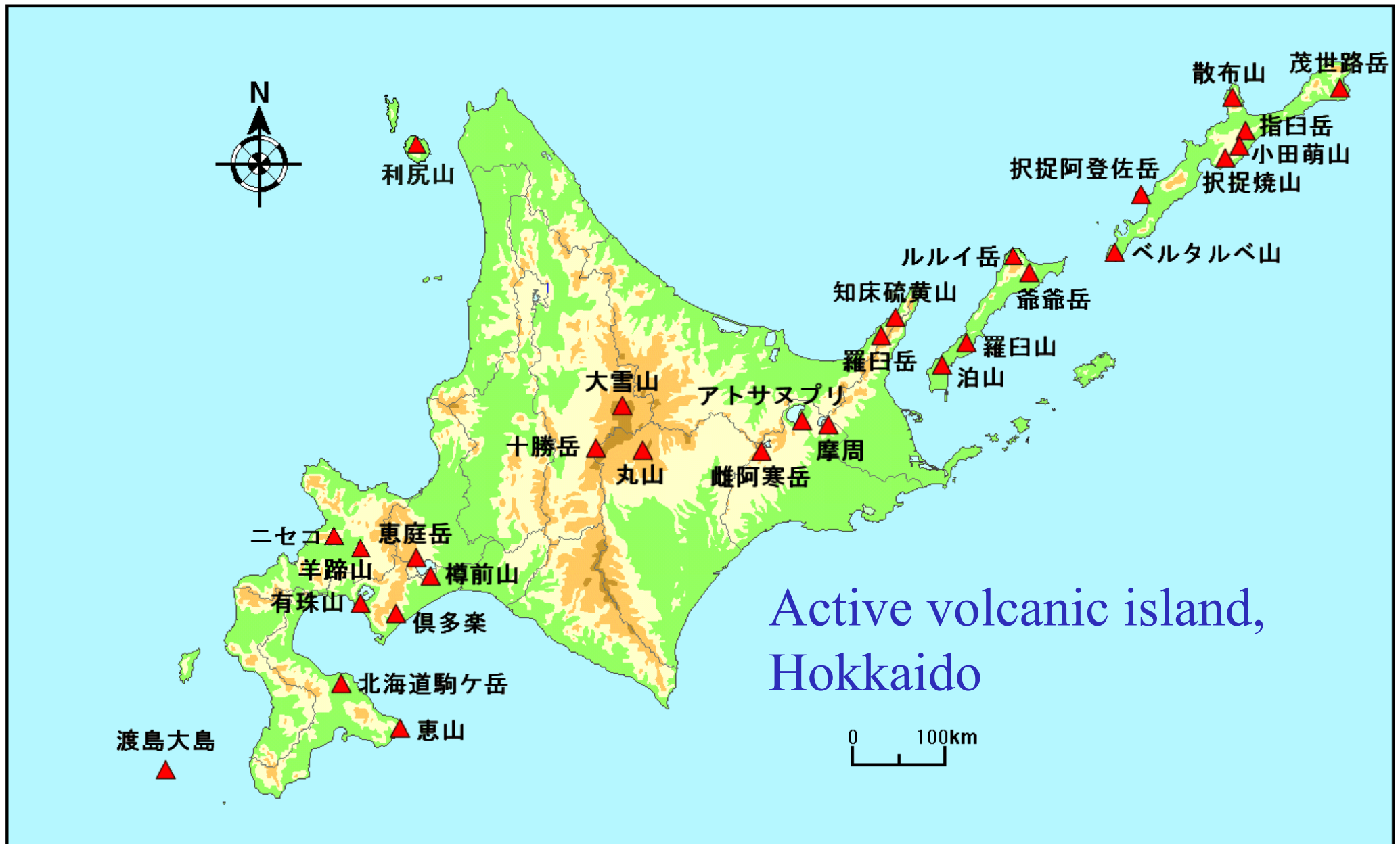
ヤン・ヤンソニウス

## 日本・エゾおよび周辺諸島図

アムステルダム 1658年 銅版 手彩色（「新地図帳」より）

オランダの航海者フリースの1643年のエゾ地周辺航海の成果を十分に利用したもっとも初期の地図の一つである。オルテリウス／テイセイラ型の日本図の北方にフリースのエゾ地図を追加しているが、津軽海峡が著しく広いのは、北海道南部と東北地方北部が欠けているためである。

- Hokkaido had been the most unknown part in the world. Even the people in the main island of Japan did not know the detail of Hokkaido 300 years ago. But native people lived here since more than 20,000 years ago and a special culture has been cultivated.



# Active volcanoes in Japan

# Komagatake (near Hakodate)



# Komagatake





# Esan



# Usu-zan





Tarumae-san (from Shikotsu lake)

# Meakan&Akan-Fuji



**Eruption site**

# Kussharo-lake



# Mashu-lake













# Mashu-lake

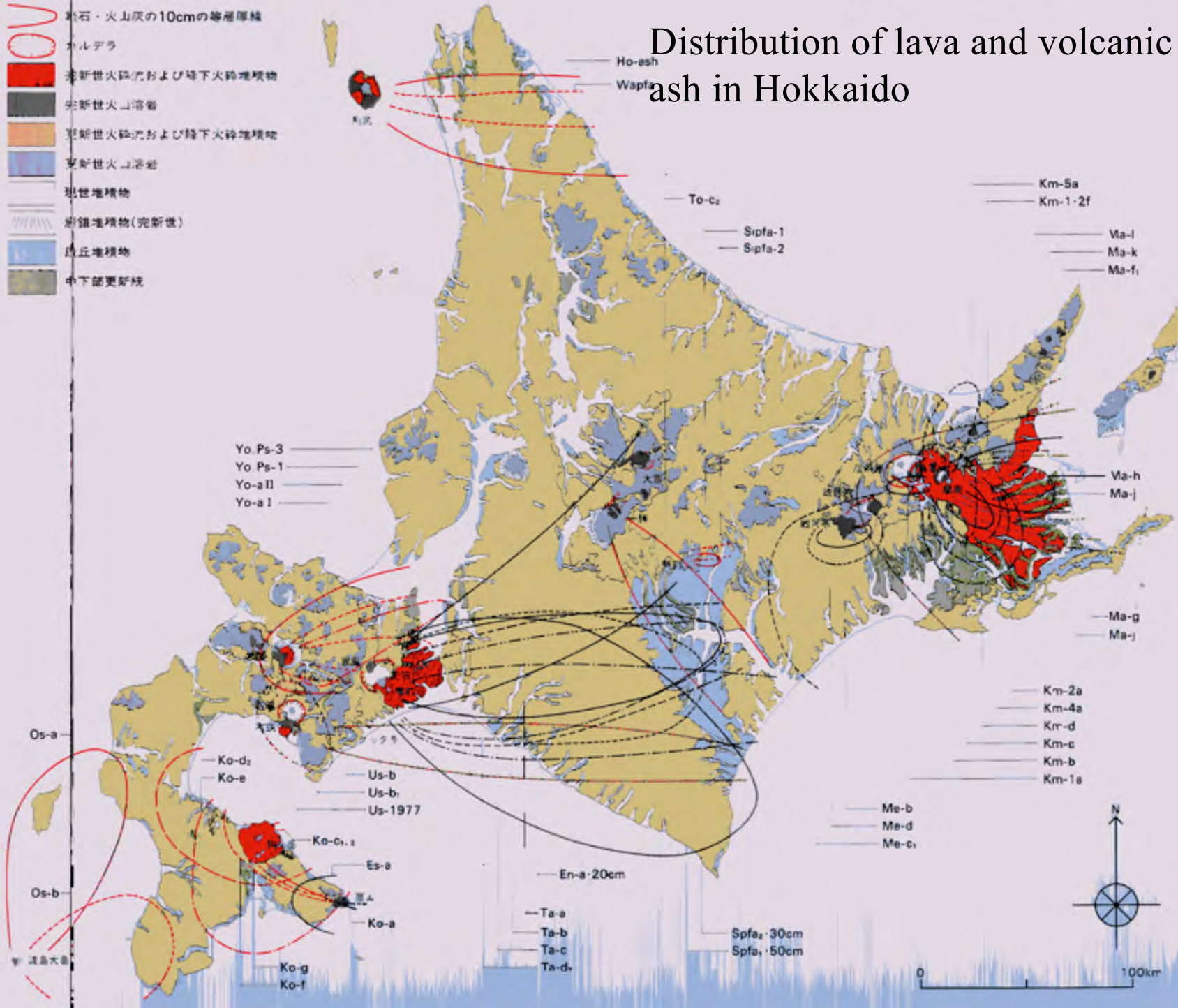


図1—北海道における主要な軽石・火山灰の分布

（主に北海道火山命名委員会(1982)の分布図による）

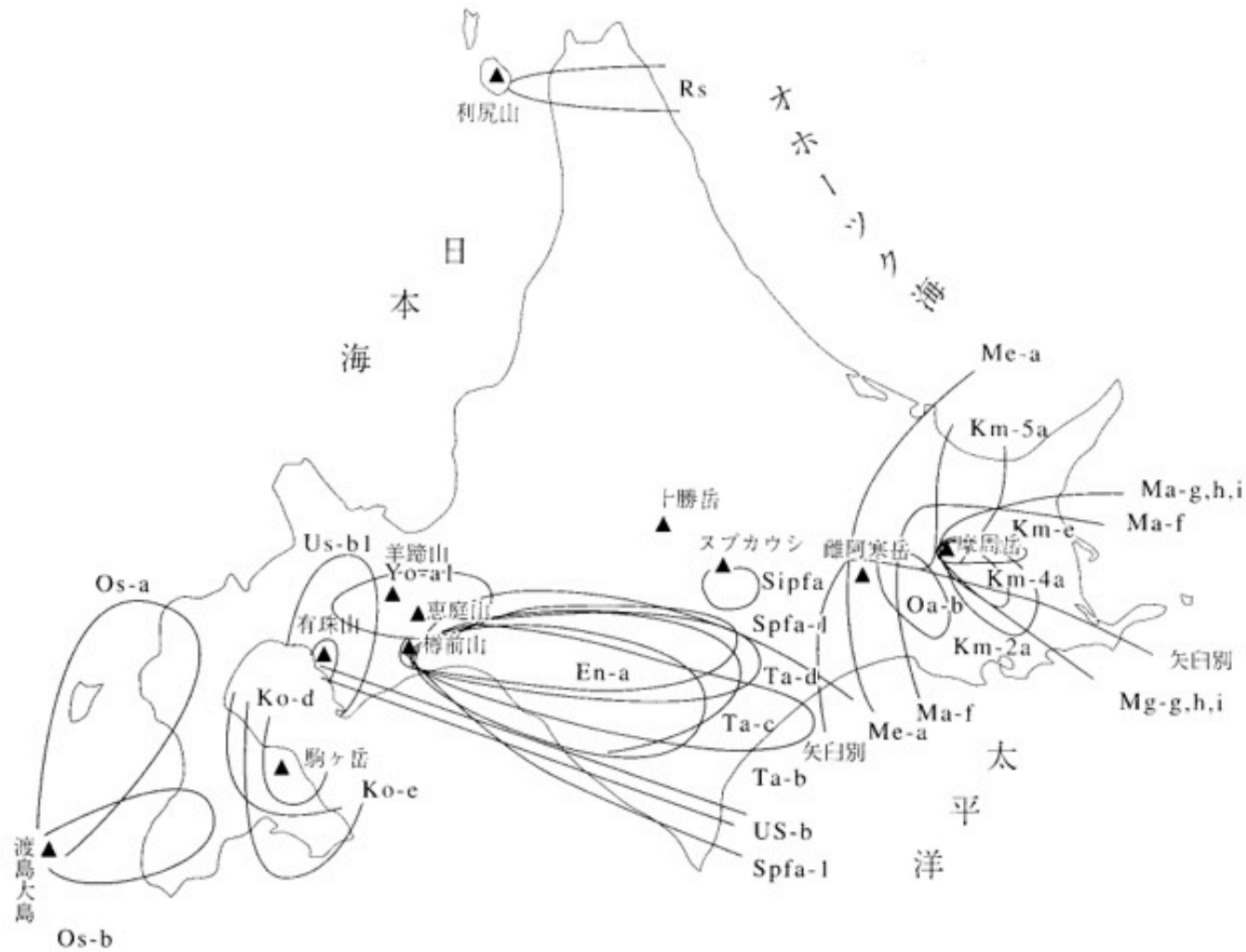
-  軽石・火山灰の10cmの等厚厚線
-  ホルデラ
-  中新世火砕流および降下火砕堆積物
-  中新世火山溶岩
-  更新世火砕流および降下火砕堆積物
-  更新世火山溶岩
-  現世堆積物
-  湖積堆積物(完新世)
-  扇丘堆積物
-  中下部更新統

# Distribution of lava and volcanic ash in Hokkaido





# Distribution of Volcanic ashes in Hokkaido



図一 北海道における火山灰の分布

Kikuchi(1999)

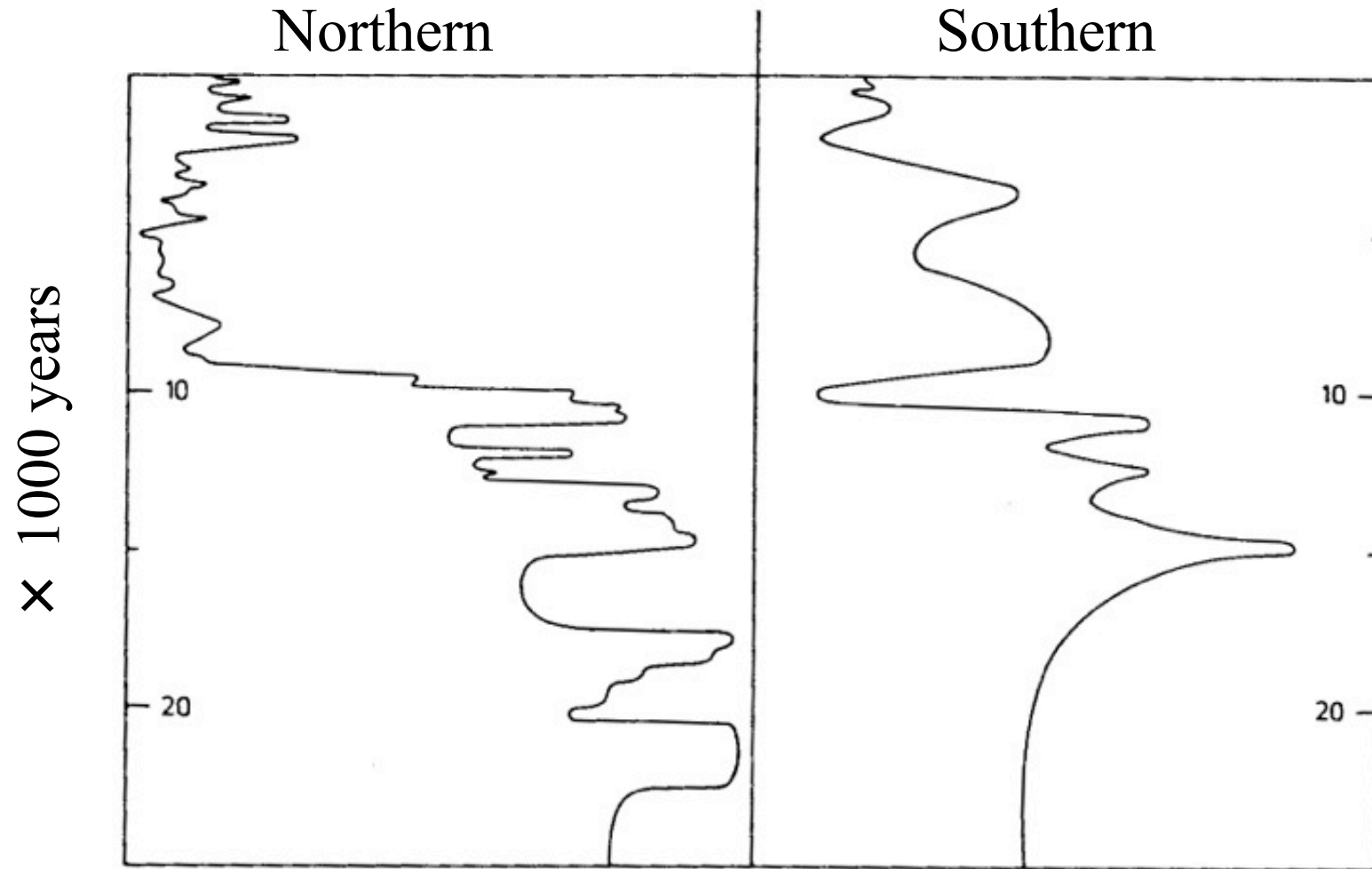
# Major volcanic ashes fallen in Tokachi plain

Tarumae a (Ta-a)	1739 AD	
Komagatake c <sub>2</sub> (Ko-c <sub>2</sub> )	1694 AD	
Tarumae b (Ta-b)	1667 AD	(Rebellion of Ainu people led by Shakushain)
Usu b (Us-b)	1663 AD	(Southern Tokachi plain)
Tarumae c (Ta-c)	ca BC1000	(Wide distribution)
Tokachi c <sub>2</sub> (To-c <sub>2</sub> )	3000-4000 BP	(Cold again)
Tarumae d (Ta-d)	8940 ± 160 BP	(Rising sea level)
Eniwa soft loam	11,940 ± 240 BP	
Eniwa Ball shaped loam	15,010 ± 400 BP	(Warming again)
Eniwa a (En-a)	17,000-19,000 BP	(Glacial maximum)
Shikotsu 1 (Spfa-1)	39,000-41,000 BP	(Sub-interglacial)

# Climate change in last 40,000 years

- Getweidel Sub-interglacial period (44,000 ~ 29,000BP) warm
- Glacial maximum in Wurm (25,000 ~ 16,500BP) coldest
- Late-glacial period (16,500 ~ 10,000BP) getting warm
- Holocene (After 10,000BP)
- 8,500BP Raise in sea water level (transgression)
- 6000BP Highest sea water level
- 5000 ~ 4000BP Cool climate again. Regression of sea level
- 4000 ~ 2000BP Warming again
- After 2000BP Cooling

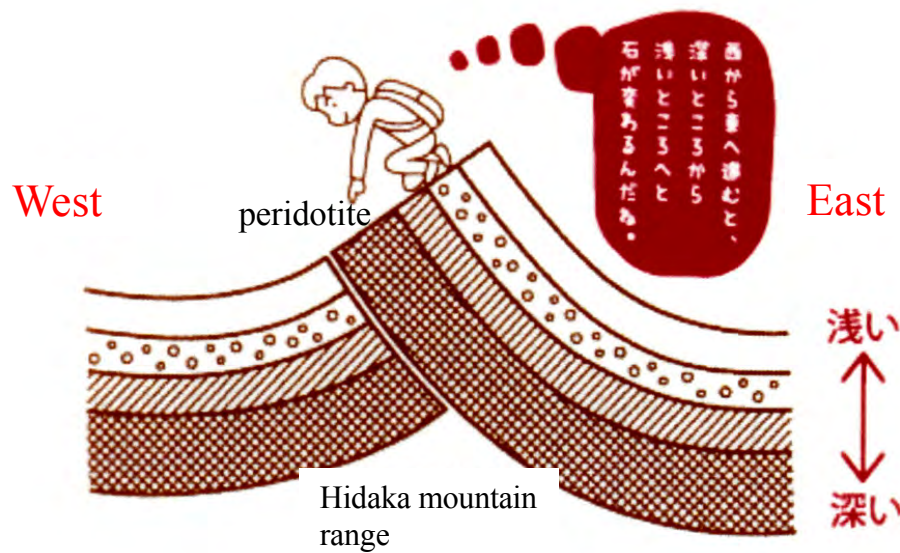
# Advance (cold climate) and retreat (warm climate) of glacier in last 20,000 years in northern and southern hemisphere)



Retreat(warm) ← → Advance (cold)

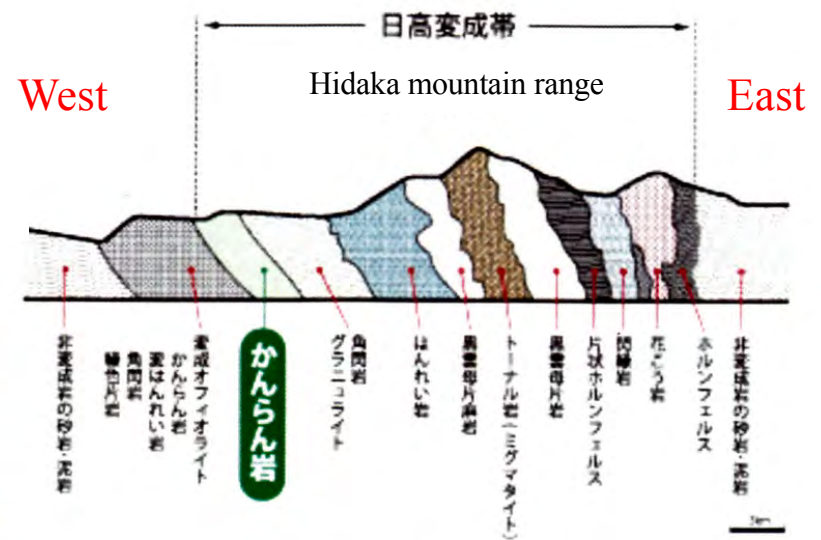
# 13 million years ago (Neogene period), Hidaka mountain range started to lift up due to the collision of two tectonic plates.

2. 衝突によって生まれた日高山脈とアポイ岳 | 「アポイ岳ジオパーク」公式サイトー北海道様似町を丸ごと楽しむ大地の公園



Eurasian plate

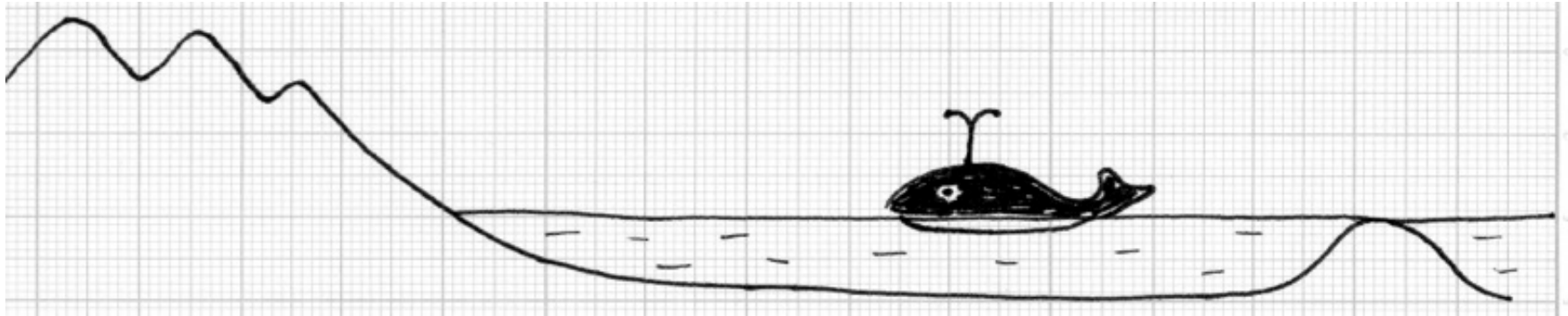
North American plate



Transect of Hidaka mountain range

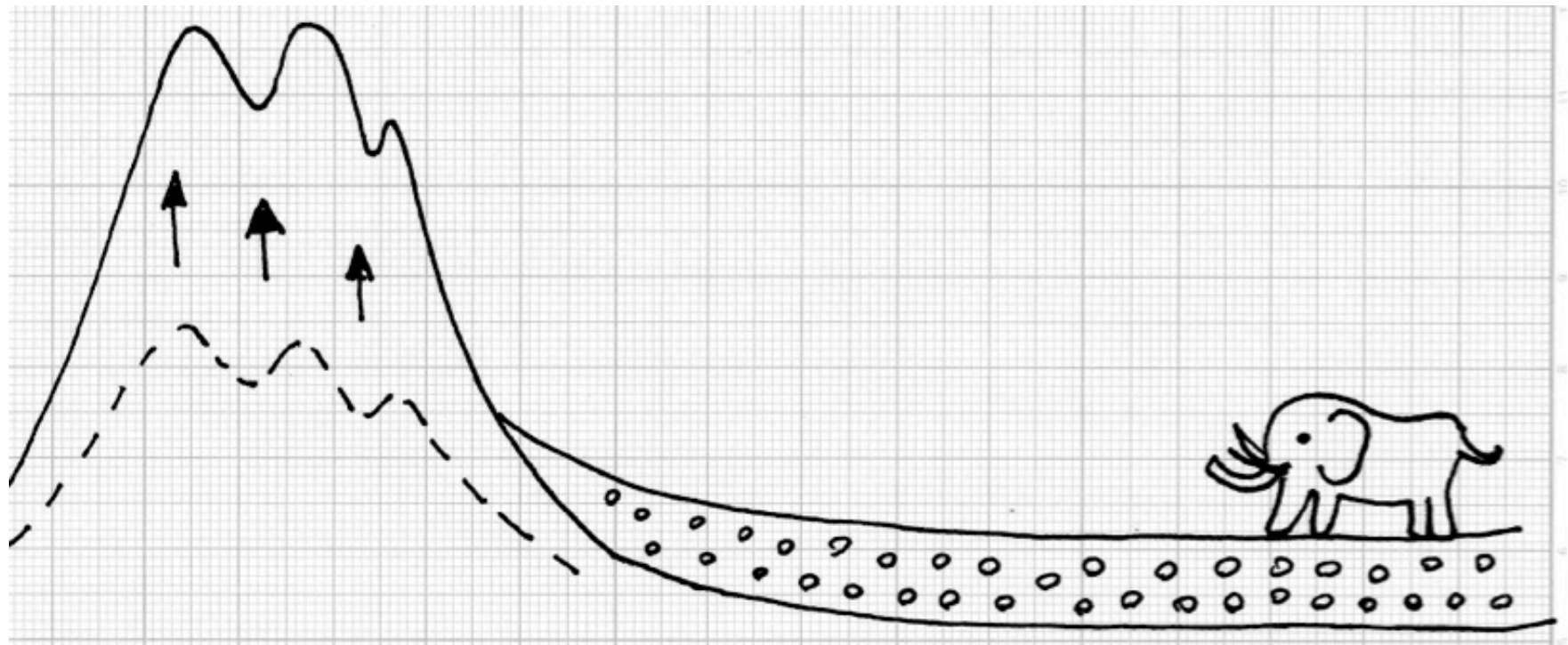
# Early stage of Pleistocene (1640000 ~ 78000 years BP)

Tokachi plain was a bay connected to ocean



# Middle stage of Pleistocene (780,000 ~ 130,000 years BP)

Hidaka mountain range uplifted, and enormous amount of soil and gravel accumulated in plain.

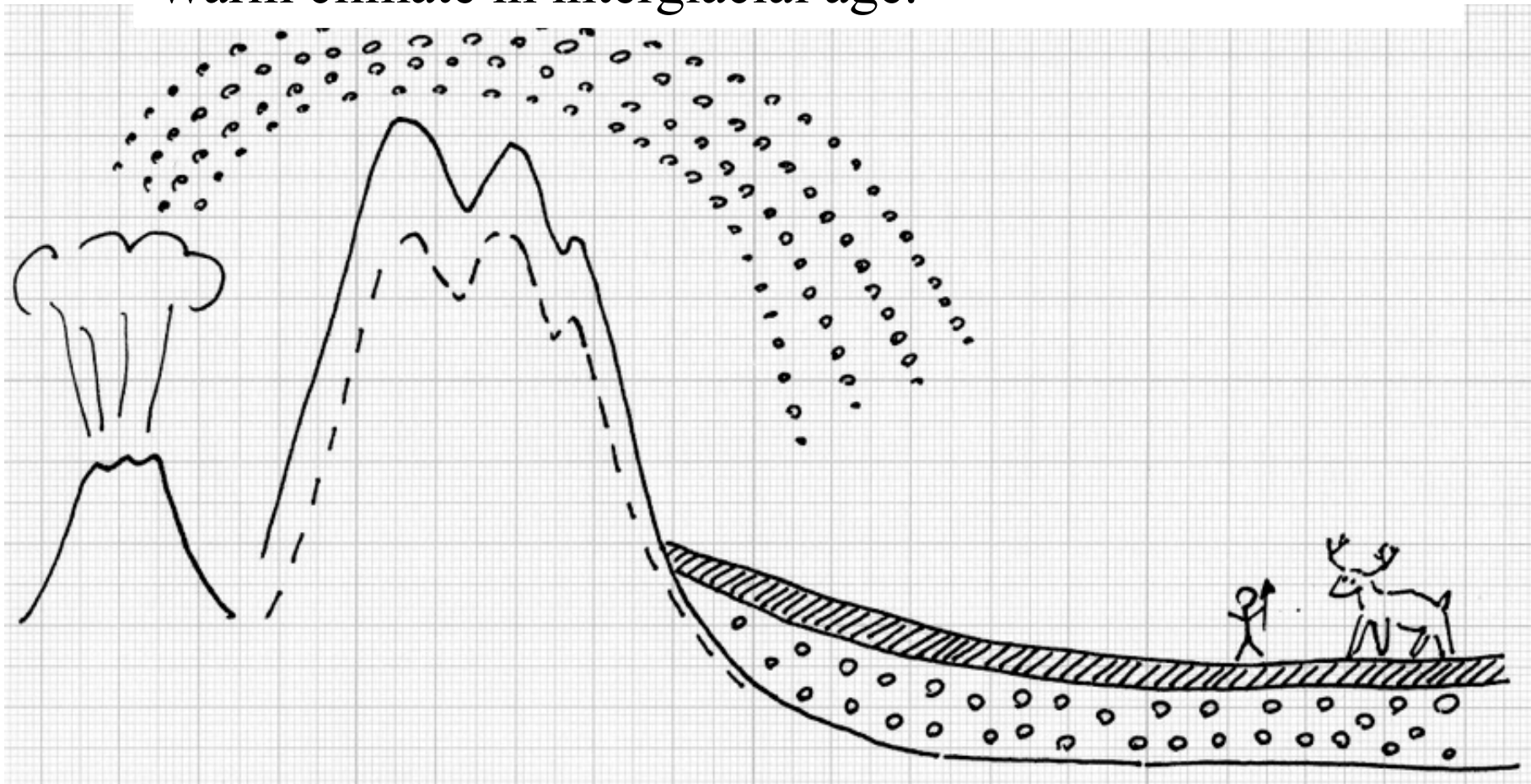


# Late stage of Pleistocene

(130,000 ~ 40,000 years BP)

Volcanic ashes fell (from Mt. Kuttara and Shikotsu).

Warm climate in interglacial age.

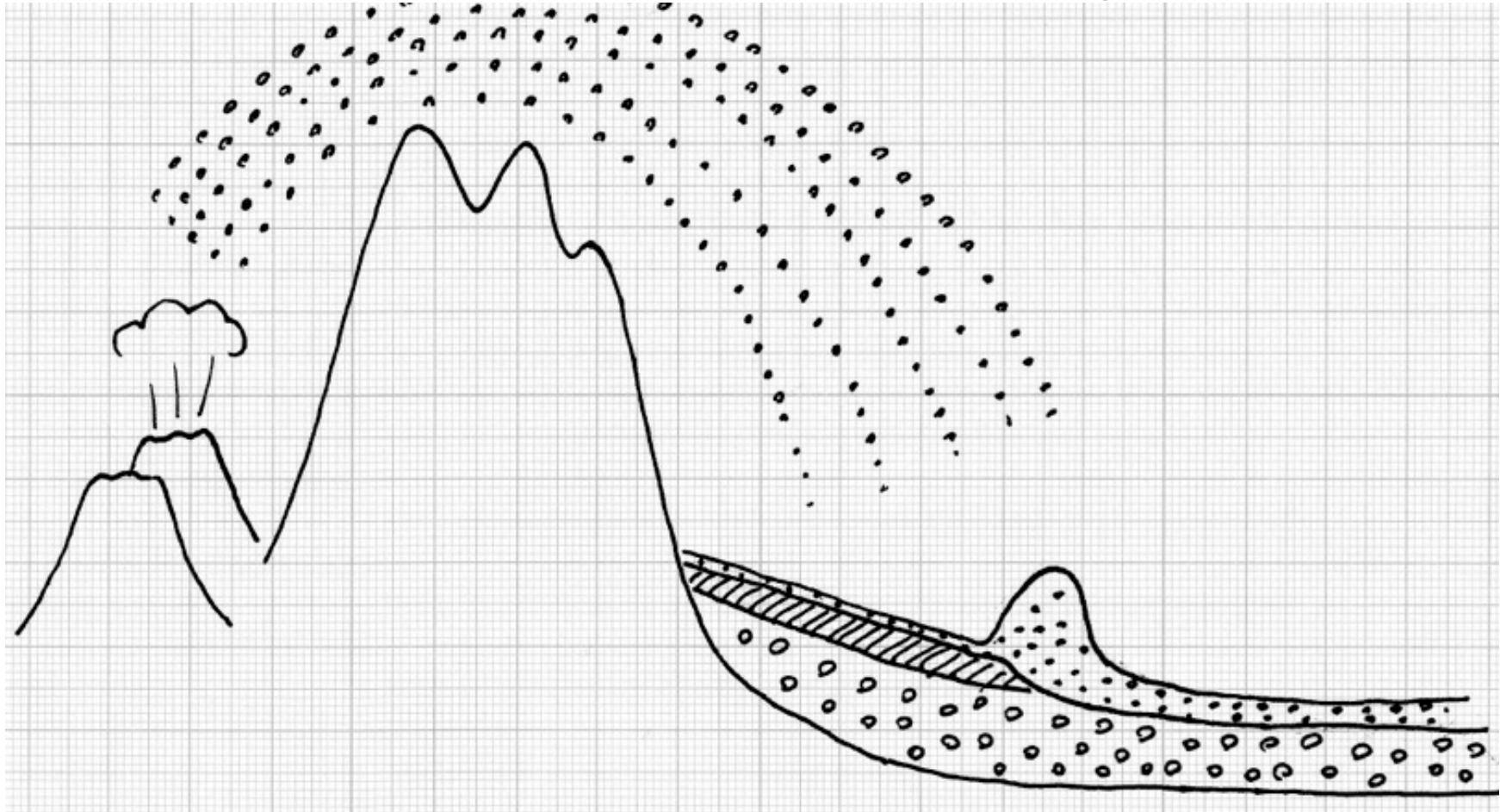




# Last stage of Pleistocene

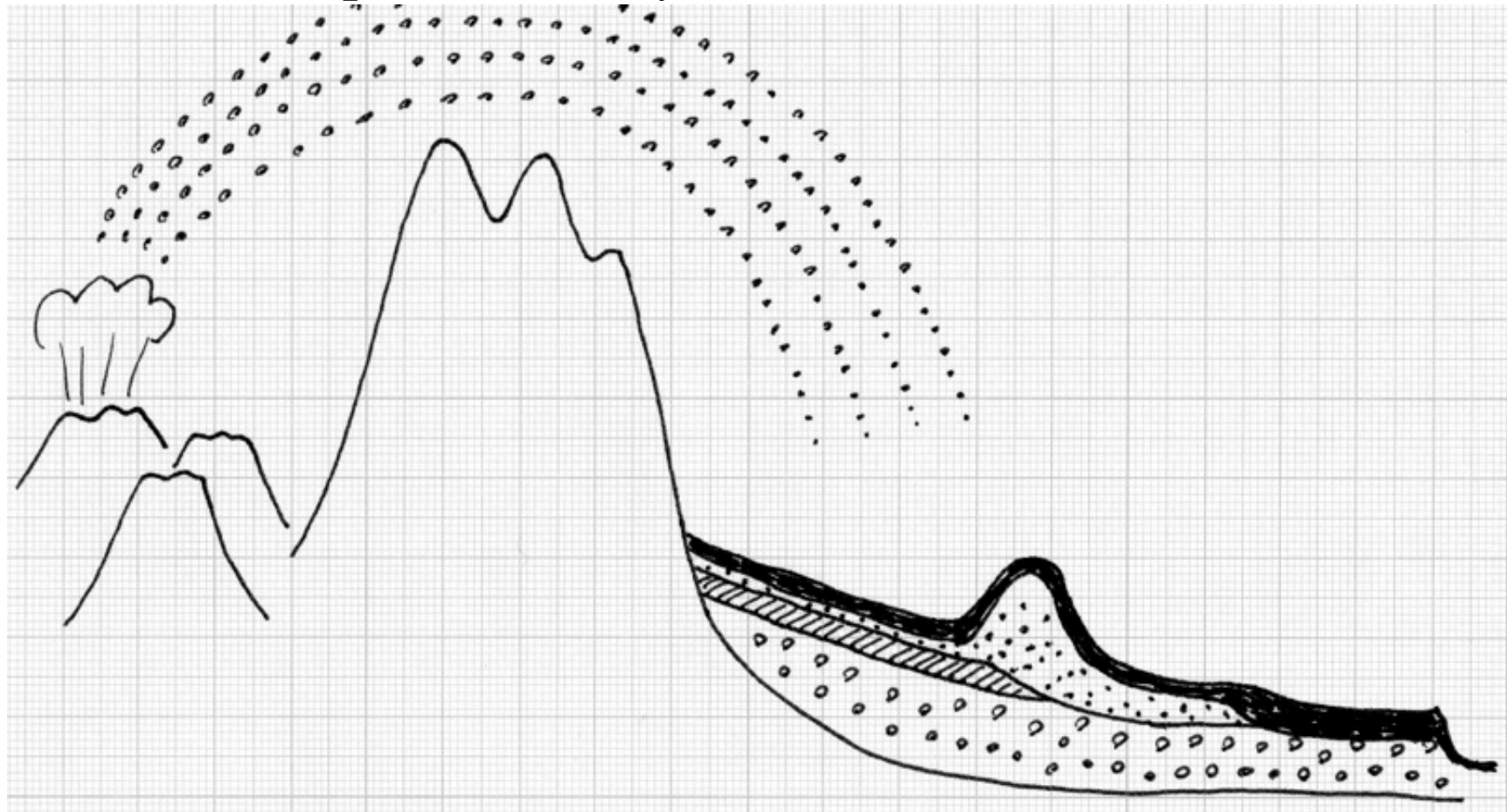
(40,000 ~ 10,000 years BP)

Terrace was eroded and new volcanic ashes falled (Eniwa-a). Ancient sand dune was formed. Glacial age.

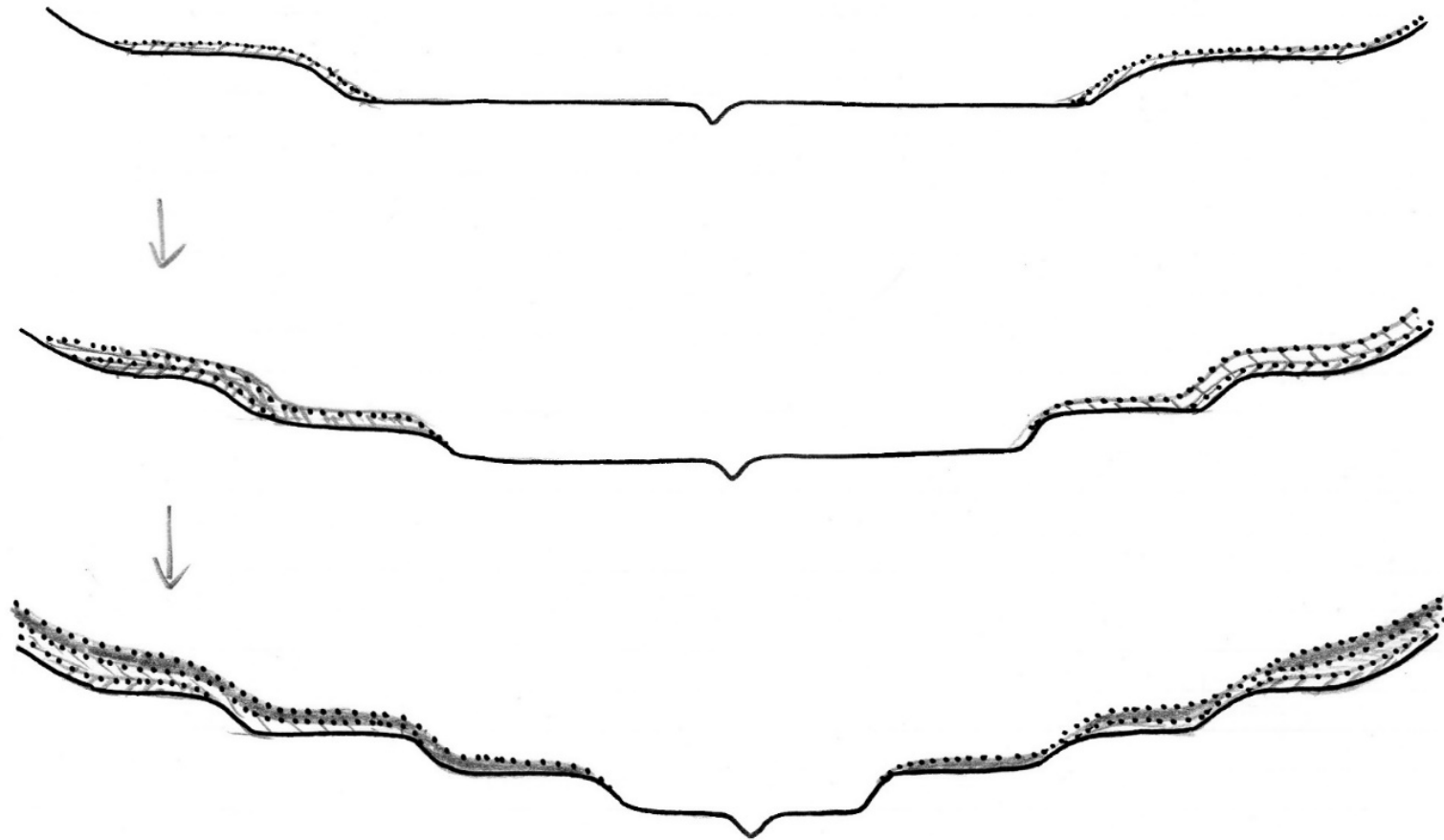


# Holocene epoch (<10,000 years BP)

Climate warming. Progress and retreat of sea. Fall of new volcanic ashes. Erosion of terrace and formation of alluvial plain. Activity of mankind is recorded.



How terraces were formed and volcanic ashes were accumulated. Recently, contribution of yellow dust from China is also considered remarkable.



# How terraces were formed

- When mountains were raised,
- Soils eroded from hills were accumulated in plain, and cliffs along the terraces were formed.
- In the glacial period, the sea retreated and wide plain were formed. Erosion of hills proceeded in accordance.
- In the interglacial period, accumulation of sediments occurred preferentially.
- When volcanoes erupted, the plain was covered with volcanic ash. However, the volcanic ash on the lower terrace is removed due to erosion.
- In the higher terrace, old volcanic ashes were remained.

# Activity of people in Tokachi

- 120,000 BP Fossil of Nauman Elefant and primitive stoneware
- 21,500 BP Fine stone ware for hunting below Eniwa-a volcanic ash (17,000 BP) at Kawanishi C site.
- 19,300 BP Obsidian knife shaped stone ware below Eniwa-a volcanic ash (17,000 BP) at Kami-shihoro.
- 14,000 BP Earthenware showing the evidence of cooking fish (Taisho, Obihiro)
- 9000BP Fine stone blade culture in Kami-itaira below Tarumae-d volcanic ash (9000BP)
- 6000BP Earthenware in Yachiyo. Trace of Oldest House and Village in Tokachi

# Activity of people in Tokachi (continued)

- BC5000 Active fishery (Archaeological remain in Urahoro town)
- BC4000 Jomon designed earthen ware in Furumai
- BC3000 Spitz-based earthen ware in Memuro
- BC2000 Flat-based earthenware in Satsunai
- BC1000 Pipe-shaped earthenware
- BC 200 Ironware
- AD1300 Start of Agriculture Tokachi-buto

# Peat layer from which a Fossil of Nauman Elefant was found

