

Science and Human Society II

(Geology, Mineral, and Environment in the Human Society)

Geologic map

The geologic maps have been used in the Mineral prospecting and Civil engineering.

1 Drawn of geology and mapping

2 The geologic maps in Japan

3 How to make a geologic map and How to understand a geologic map

- Modern geology has developed in late 18th century at UK and Germany, and colored geologic maps have been published.
- Under Lyman and Naumann, the geological mapping was started in Japan.
- Owing to recent IT developing, the geologic map is becoming readable in PC and smartphone.

1. Drawn of geology and geological mapping

William Smith found principles of geology through mining and civil engineering works. That is, Law of superposition and Law of strata identified by fossils.

- Strata underlying other strata must be older if there has been neither overthrust nor inversion.
- Strata can be determined equivalent to other strata based on fossil.

Smith published the first complete geologic map of England and Wales.



1815 The Geologic Map of England and Wales

By Smith, W. (1769–1839)

A geologic map presents
nature and distribution of rock
units and occurrence of
mineral deposits and fossil
localities.



1878 Institute of Geology, the Department of the Interior

1881 Geologic mapping at 1:400,000 scale started

1882 Geological Survey of Japan was established

1885 Geological Survey started to publish Geological Map in 1:200,000 scale

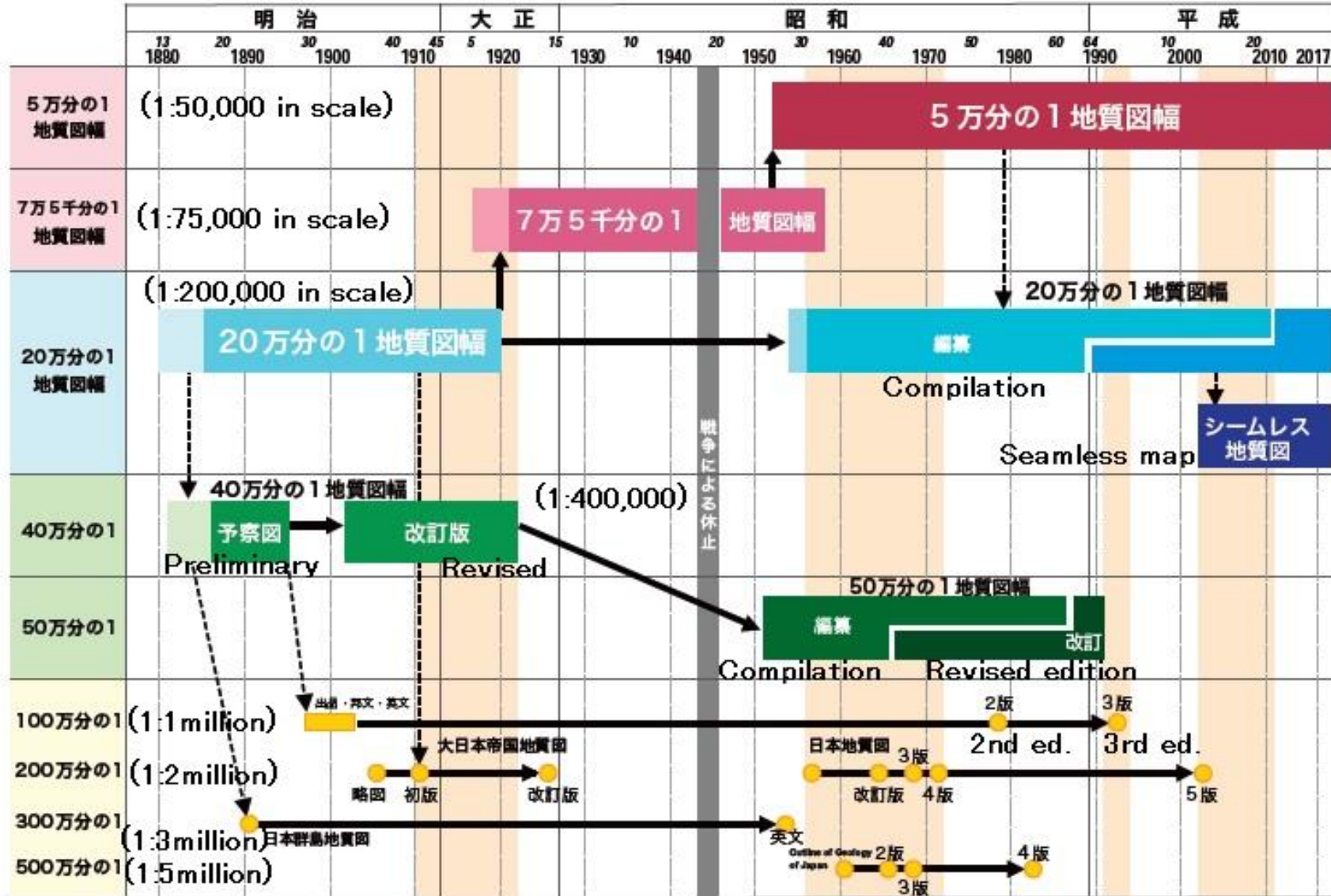
1895 Geologic maps at 1:400,000 scale were perfectly published

1899 Geological Survey of Japan published Geological Map of Japan in 1:1 million scale (right figure)



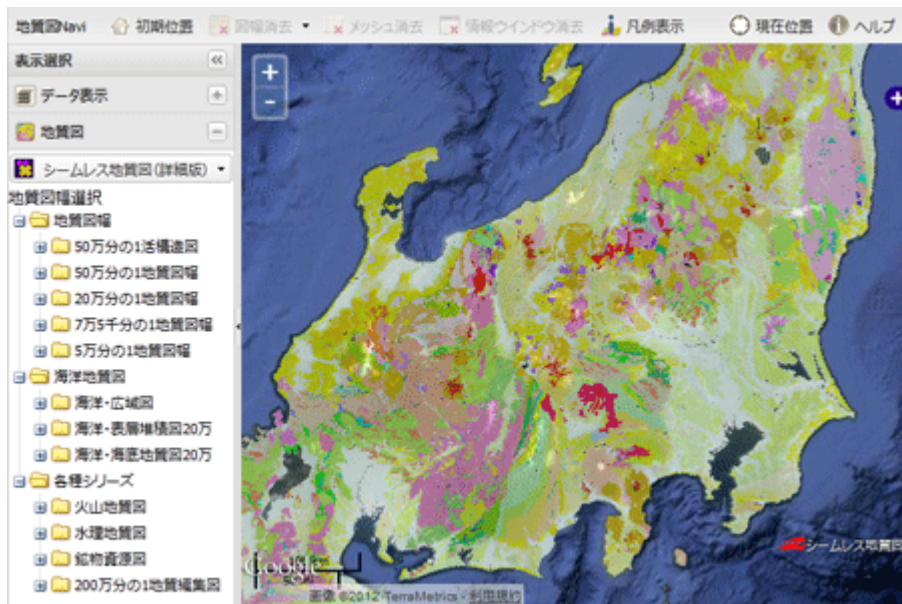
History of Geologic Maps in Japan

地質図の歴史 History of Geologic Map

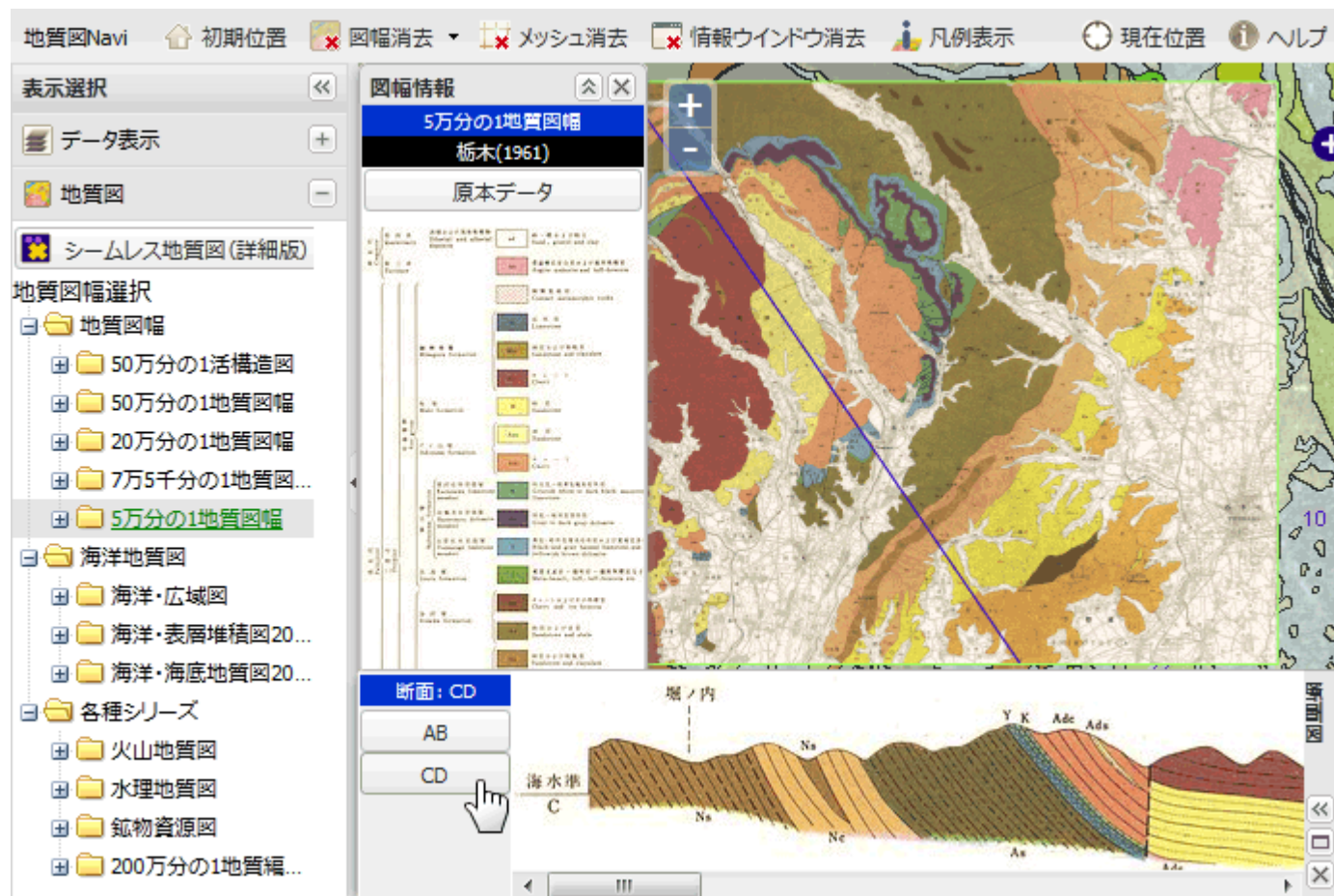


Geologic Map Navi [地質図Navi - 産総研 \(gsj.jp\)](http://gsj.jp) (<https://gbank.gsj.jp/geonavi/>)

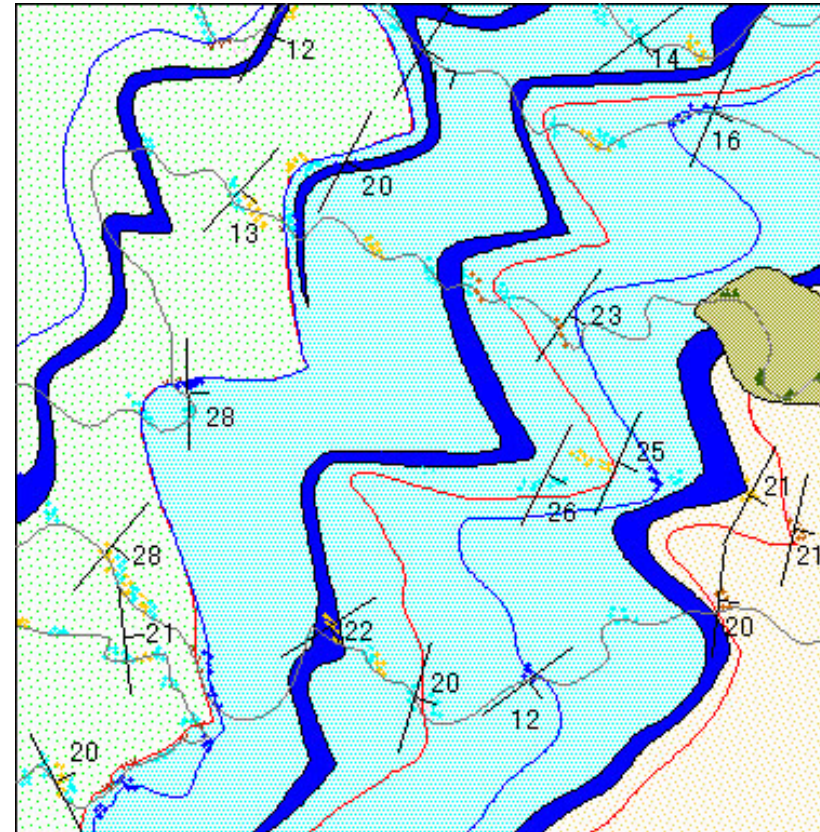
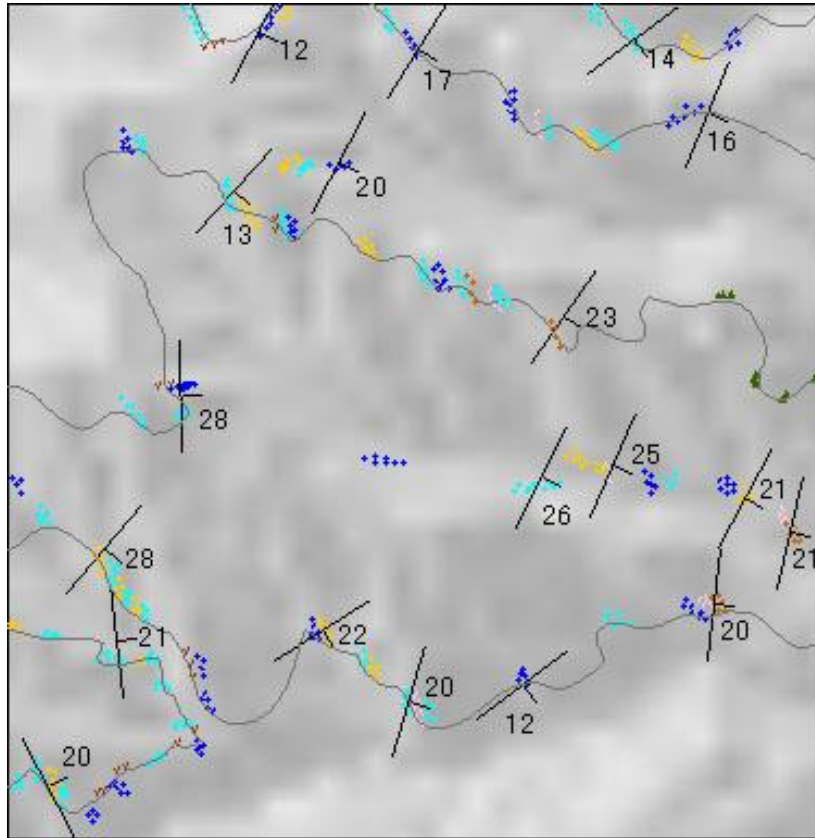
Geological information is accessible in Smart Phone.
Geology at any positions can be known.



National Institute of Advanced Industrial Science and Technology, Geological Survey of Japan | 2012



3. Making a geologic map



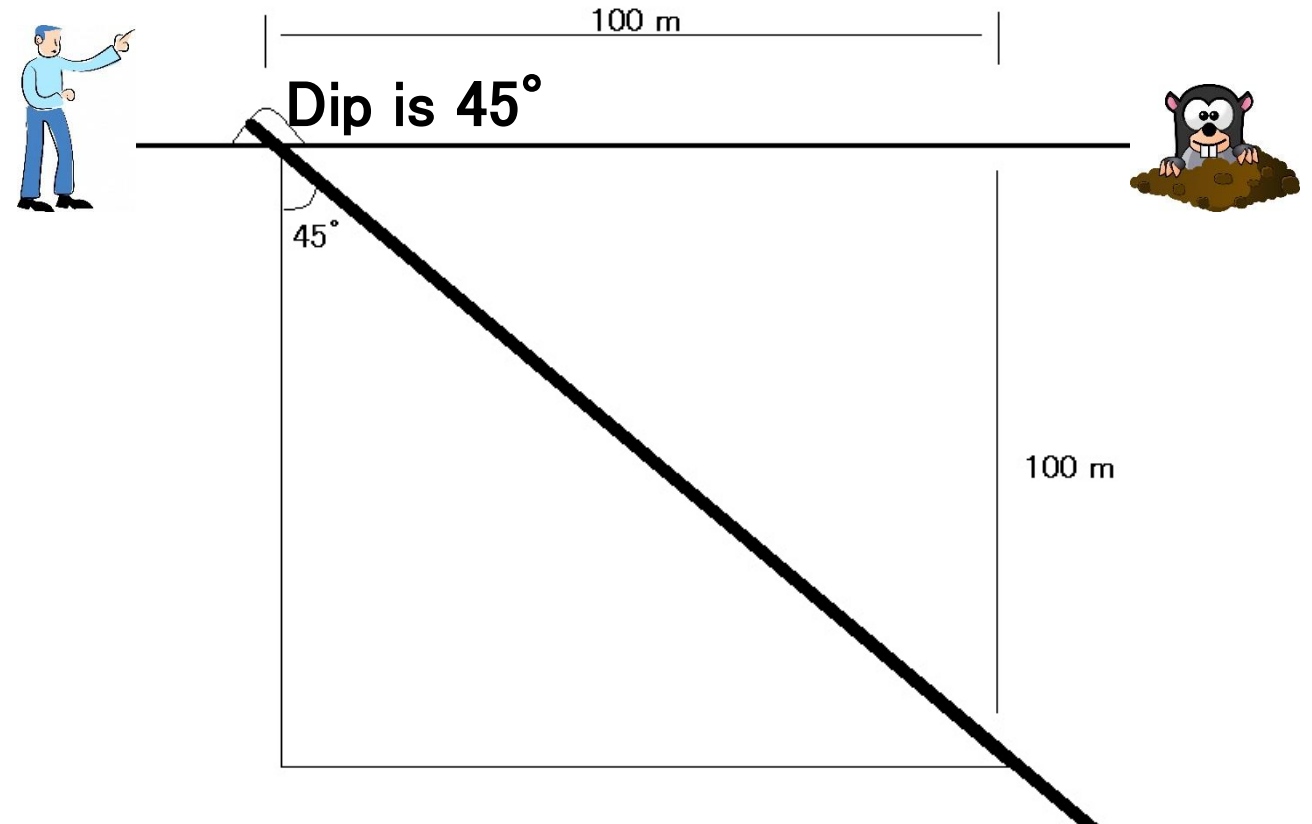
A geologist makes a geologic map based on field work data.

Problem

A person found coal layer on surface. The layer is dipping 45 degree. At the place going 100 m ahead dipping direction, how depth may coal layer appear?

$$\tan 45^\circ = 1$$

$$100\text{m} \times \tan 45 = 100\text{m}$$



Geologic map around Inuyama

Cenozoic

Quaternary

Holocene H: Alluvium deposits

Pleistocene Q3: Terrace deposits

Neogene

Pliocene N3cg: Gravel

Miocene N1ss: Sandstone and Mudstone

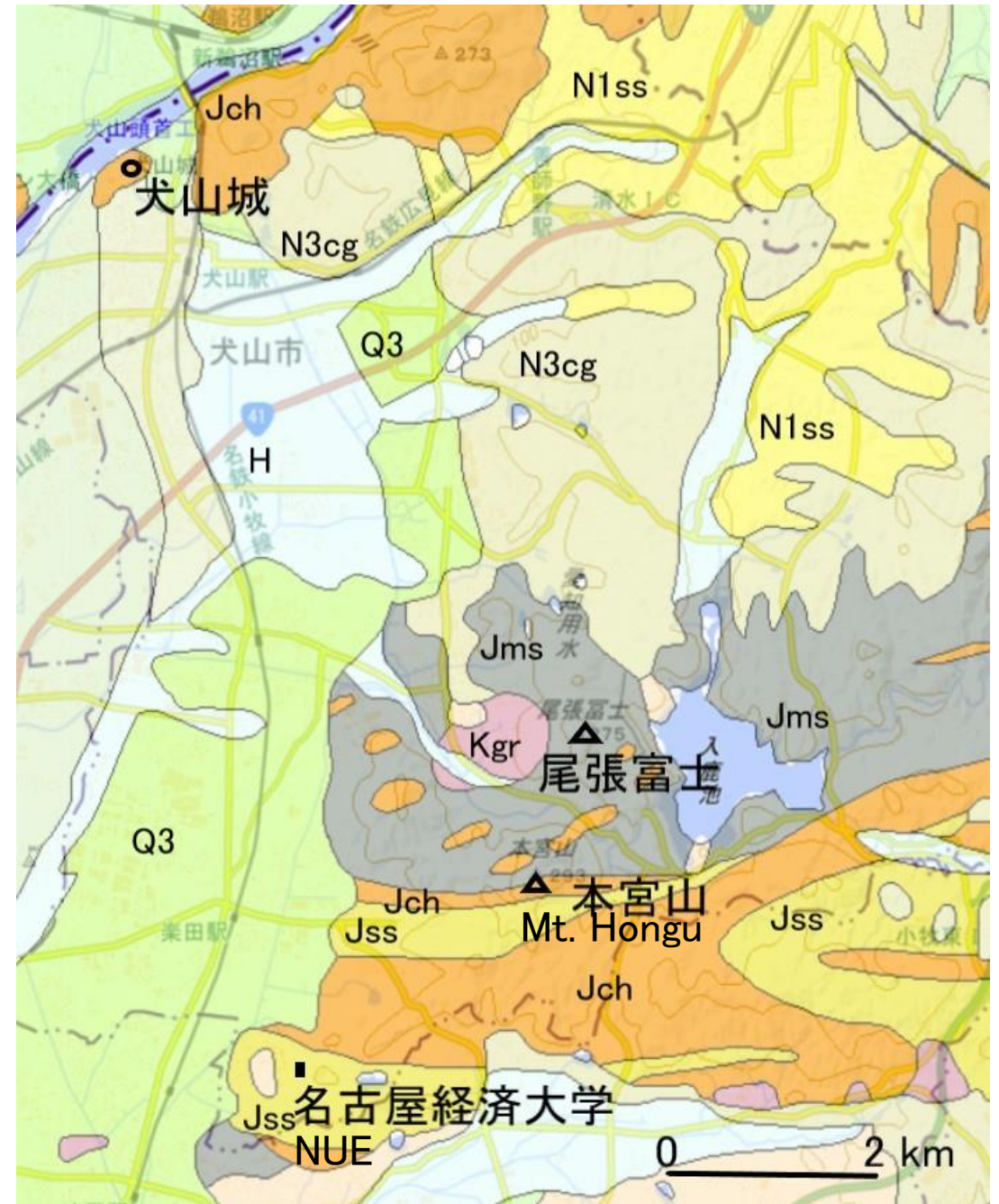
Mesozoic

Cretaceous Kgr: Granite

Jurassic Jms: Mudstone

Jss: Sandstone

Jch: Chert



Youtube on a geologic map.

Youtube : How to read a geologic map. 7min 56sec

<https://www.youtube.com/watch?v=-7-Mmws7kKw>

Youtube: Field studies: detailed geological mapping. 3min 16sec.

<https://www.youtube.com/watch?v=RZF0-vrgHYI>