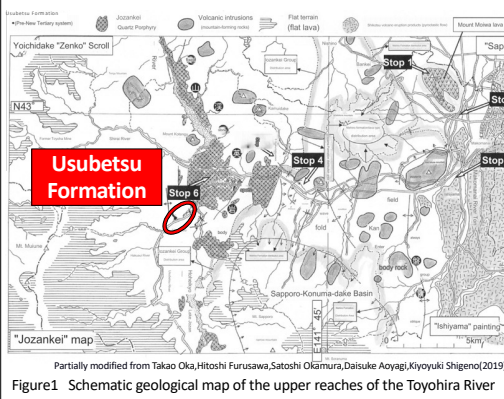




Dating of the Usubetsu Formation

Rian Matsunaga Hana Sato Naho Hanaoka Sapporo Asahigaoka Senior High School

Introduction



Many Cenozoic layers are distributed in Minami-ku, Sapporo, Hokkaido, Japan.

The Usubetsu Formation is believed to have originated in the Mesozoic era. However, little research has been done, and the information is relatively outdated and uncertain.

Is the Usubetsu Formation has really originated in the Mesozoic era?

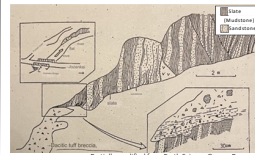


Figure2 Geological structure of the Usubetsu Formation



Figure3 Sandstone-mudstone alternation of the Matsumae Group

Geological structure of the Usubetsu Formation
It is made up of Sandstone-mudstone alternation.

There is no clues to estimate date.

The date of the Usubetsu Formation

Layers of the Matsumae Group in the Oshima Belt (Mesozoic era)
Resemble
Sandstone-mudstone alternation of the Usubetsu Formation

It has been considered the Mesozoic era, but with scant evidence.

Considering research methods

Radiometric dating → expensive
Facies and index fossils → not found



We want to use foraminifera fossils to estimate the age of the Usubetsu Formation.

Regarding Foraminifera



Foraminifera(Figure4)

- With a shell of CaCO_3
- A kind of protist
- About 0.1~1mm
- More than 35,000 species including fossils
- Two types exist: planktonic and benthic
- Used for facies and index fossils

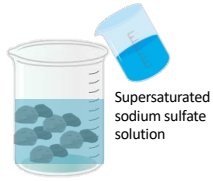
Research Methods

1. Sodium sulfate method ~To crush rocks~ (Figure5)

Crush sandstone and mudstone collected from the Usubetsu Formation into pieces ranging from 1 centimeter to several millimeters in size.



Fill the rocks with a boiled supersaturated sodium sulfate solution.



One week later



The sodium sulfate solution soaked into the rocks and crystallized, and they crushed the rocks.



Rinsed on a 250 mesh sieve and dried in a dryer at 50°C.



2. Naphtha method ~To detach foraminifera fossils~ (Figure6)

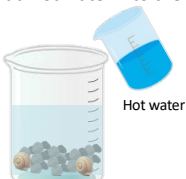
Add naphtha to the dried rocks.



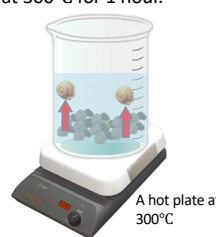
One hour later



Remove naphtha from them, and add hot water into them.



Heat them on a hot plate at 300°C for 1 hour.



Rinsed on a 250 mesh sieve and dried in a dryer at 50°C.



Results

Sandstones

Crushed rocks



Can we crush the rocks by repeating sodium sulfate method?

Mudstones

Crushed rocks



We observed milky white objects.(Fig7)



Figure7 A milky white object

Future Outlook

Sandstone → We'd like to crush the rocks.

Mudstone → We'd like to identify the milky white objects.

The sodium sulfate method takes too much time → We'd like to consider ways to do it in a short time.

Acknowledgements

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