



Current Status of Deep Geological Repository Program in Japan

U.S. Nuclear Waste Technical Review Board Meeting

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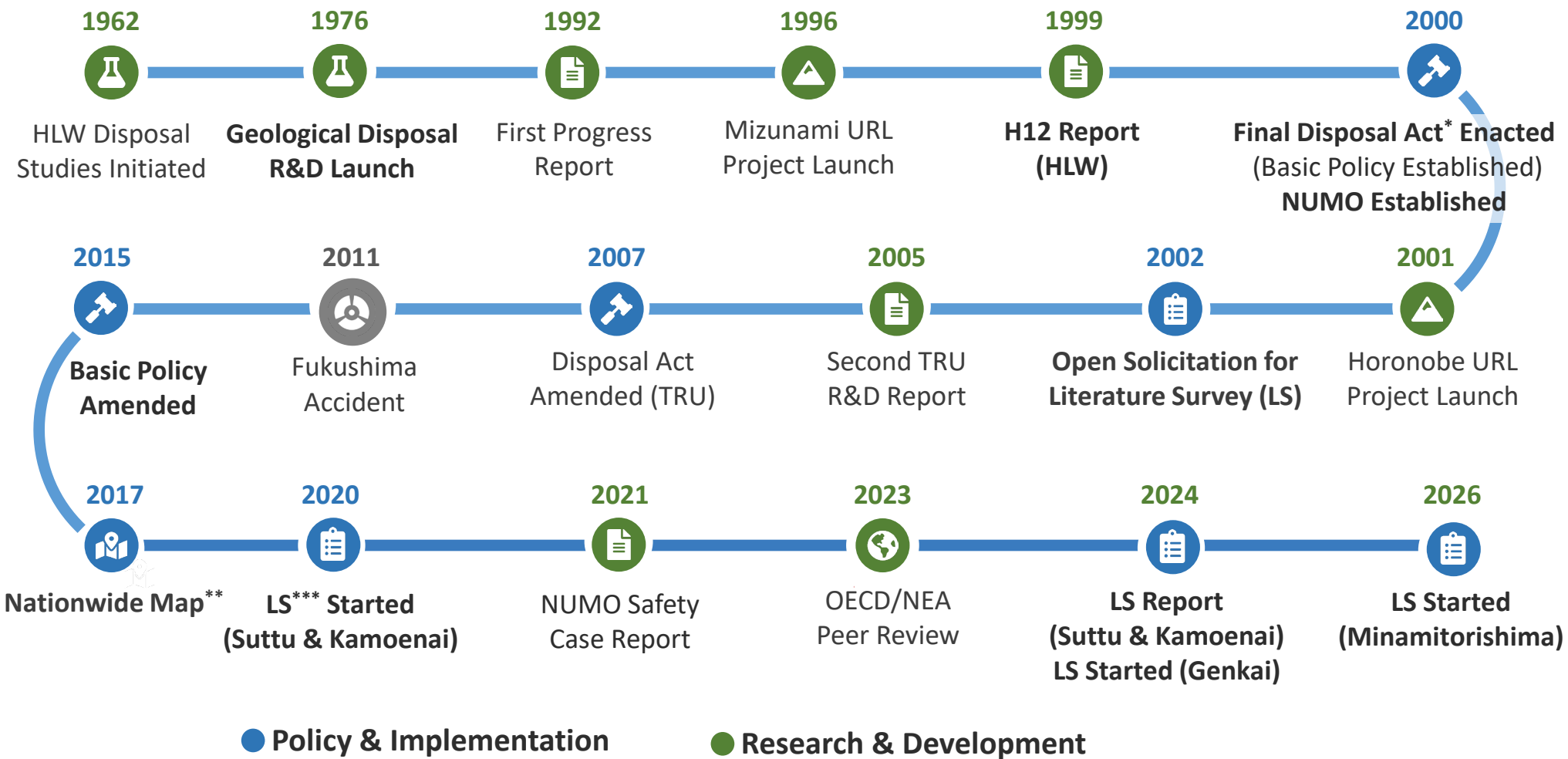
- Background information
- Site selection process
 - Activities before the Literature Survey (LS)
 - Status of the Literature Survey
- Lessons learned
- Further actions



- Background information
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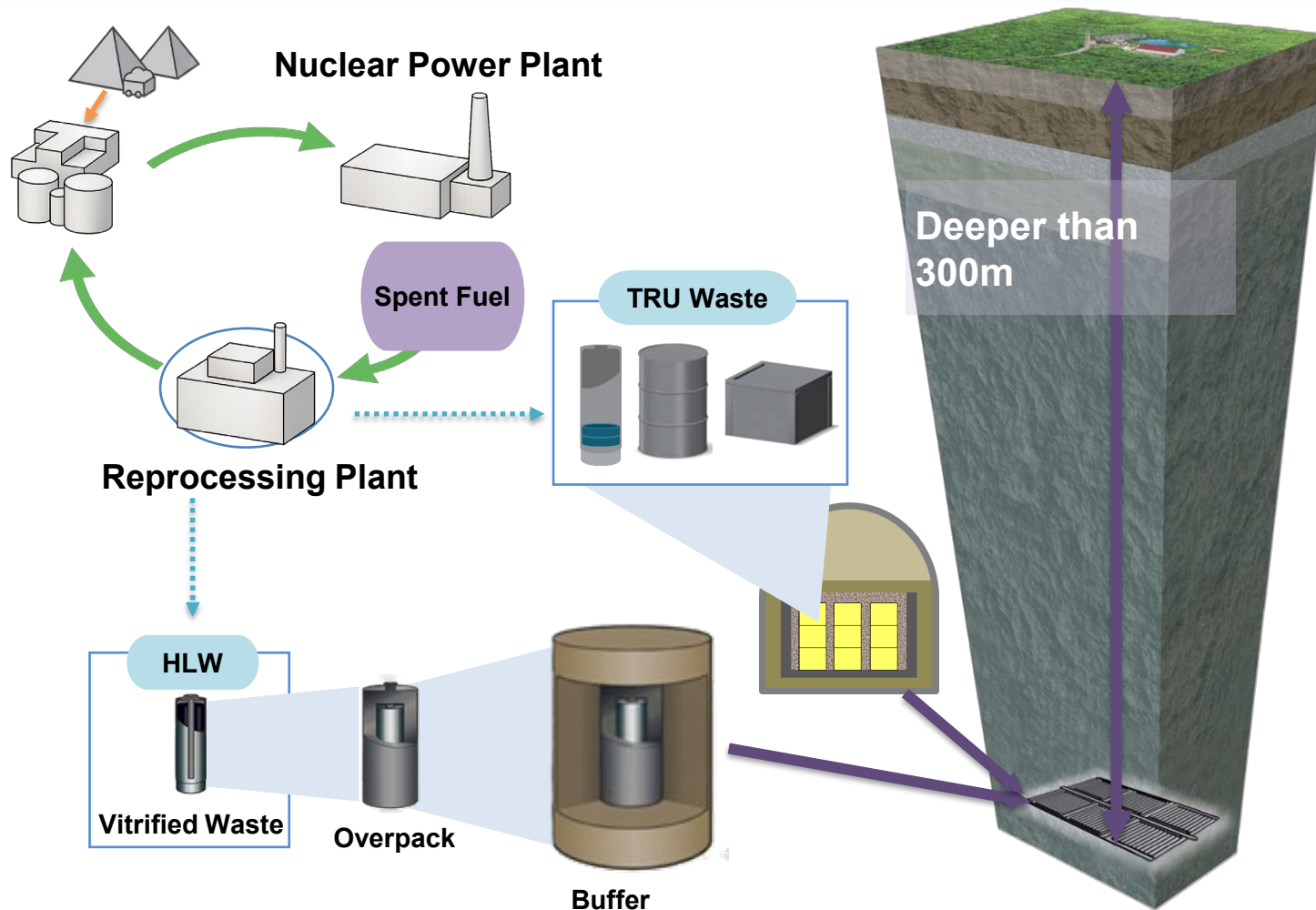


Timeline of Japan's Geological Disposal Program



* Final Disposal Act: Designated Radioactive Waste Final Disposal Act
 ** Nationwide Map: Nationwide Map of "Scientific Features" relevant for geological disposal
 *** LS: Literature Survey

The concept of geological disposal in Japan



- Radioactive waste from nuclear power generation includes **high-level waste(HLW)** and **TRU waste**.
- The wastes are disposed of at depths greater than 300 m in a stable geological setting, protected by a **multi-barrier system** of natural rock and engineered barriers.

Inventory of HLW and TRU waste

High-level waste (vitrified waste)

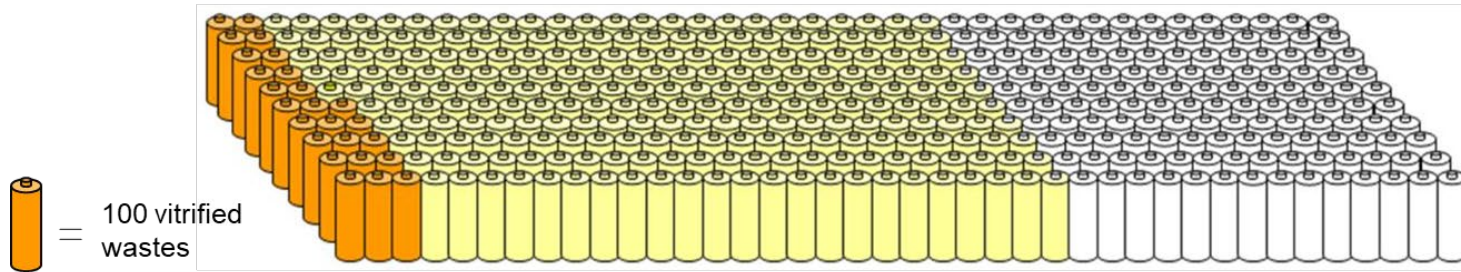
Vitrified waste
Ca. 2,500

Conversion of the total amount of spent fuel into the number of vitrified waste packages

Ca. 28,000 (As of March 2026)

Increase depending on the use of nuclear power

NUMO plans the disposal facility for more than 40,000 vitrified wastes



1,830 canisters returned from UK and France to Rokkasho
346 canisters produced at JNFL Rokkasho Reprocessing Plant
354 canisters produced at JAEA Tokai Reprocessing Plant

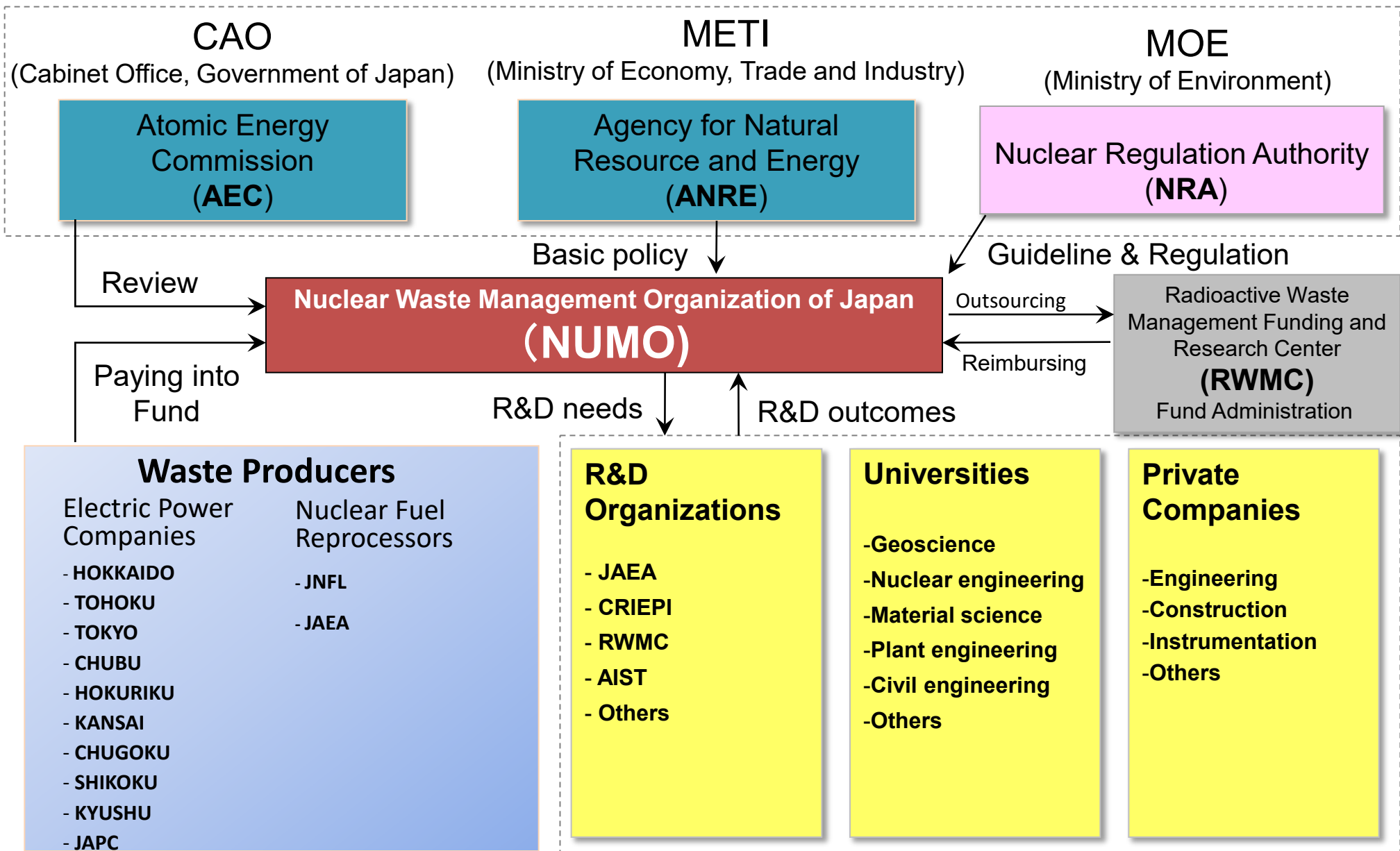
TRU waste for geological disposal

The expected volume is ca. 19,000 m³.

TRU waste Group	1	2	3	4	
				Low	High
Description	Iodine adsorbent Adsorbent to remove radioactive iodine	Hull & endpieces Sectioning & compression	Concentrated solution, etc. Nitric acid solution waste Dried pellet	Organic waste Rubber gloves (incineration / compression) Non-combustible waste Tools Metal pipes	
Waste package image (e.g.)	 Drum (200Liter)	 Canister	 Drum (200Liter)	 Container	 Drum (200Liter)
Expected volume (m³)	319	5,792	5,228	5,436	1,309

The expected volume was calculated in 2005 and will be reviewed and revised reflecting the operational status of reprocessing and MOX fuel fabrication facilities.

Organizational structure of Japanese geological disposal program



- Nuclear Regulation Authority (NRA) is the regulatory body in Japan.
 - The ‘Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors’ stipulates the licensing and safety regulation of geological disposal facilities, covering their design, construction, operation, and closure, while the overall disposal program framework is governed by the Final Disposal Act.
 - Safety regulatory standard will be developed by NRA.
 - For site selection, NRA submitted the “Matters that should be considered for safety assurance in case of selecting areas an outline inspection area and other sites for the final disposal of specified radioactive waste” (Considerations) in 2022.

Considerations determined by NRA

Relevant events and processes	Requirement
Fault etc.	<p>Avoid the following faults, etc.</p> <ol style="list-style-type: none"> (1) Active faults that are considered the epicenter among faults and other features whose activity after the Late Pleistocene (about 120,000 to 130,000 years ago or later) cannot be denied. (2) Areas damaged by the activity of the active faults in (1) as above. (3) Landslide surfaces with displacement as well as faults where permanent displacement occurs in association with seismic activity among faults that cannot be denied to have been active since the Late Pleistocene (about 120,000 to 130,000 years ago or later). (4) Major faults other than those listed in (1) and (3) as above.
Volcanic phenomena	<p>Avoid the following place.</p> <ol style="list-style-type: none"> (1) Places where there is a history of volcanic activity such as volcanic passages and veins during the Quaternary period (from the present to about 2.58 million years ago) that may result in the destruction of man-made barriers due to magma intrusion. (2) Places within about 15 kilometers from the active center of volcanoes active during the Quaternary period. (3) Places where no active volcanoes existed during the Quaternary period but where new volcanoes may occur.
Erosion	<ul style="list-style-type: none"> • Ensure deeper depths than medium depth disposal.
Mining of mineral resources etc.	<ul style="list-style-type: none"> • Ensure (1) that there are no records indicating the presence of mineral deposits of mineral resources whose quantity and grade are sufficient to permit drilling for resource utilization, and (2) that the geothermal gradient is not significantly high.

→ These “considerations” were taken into account in the “Evaluation Guidelines for Literature Survey Stage” (see p25)



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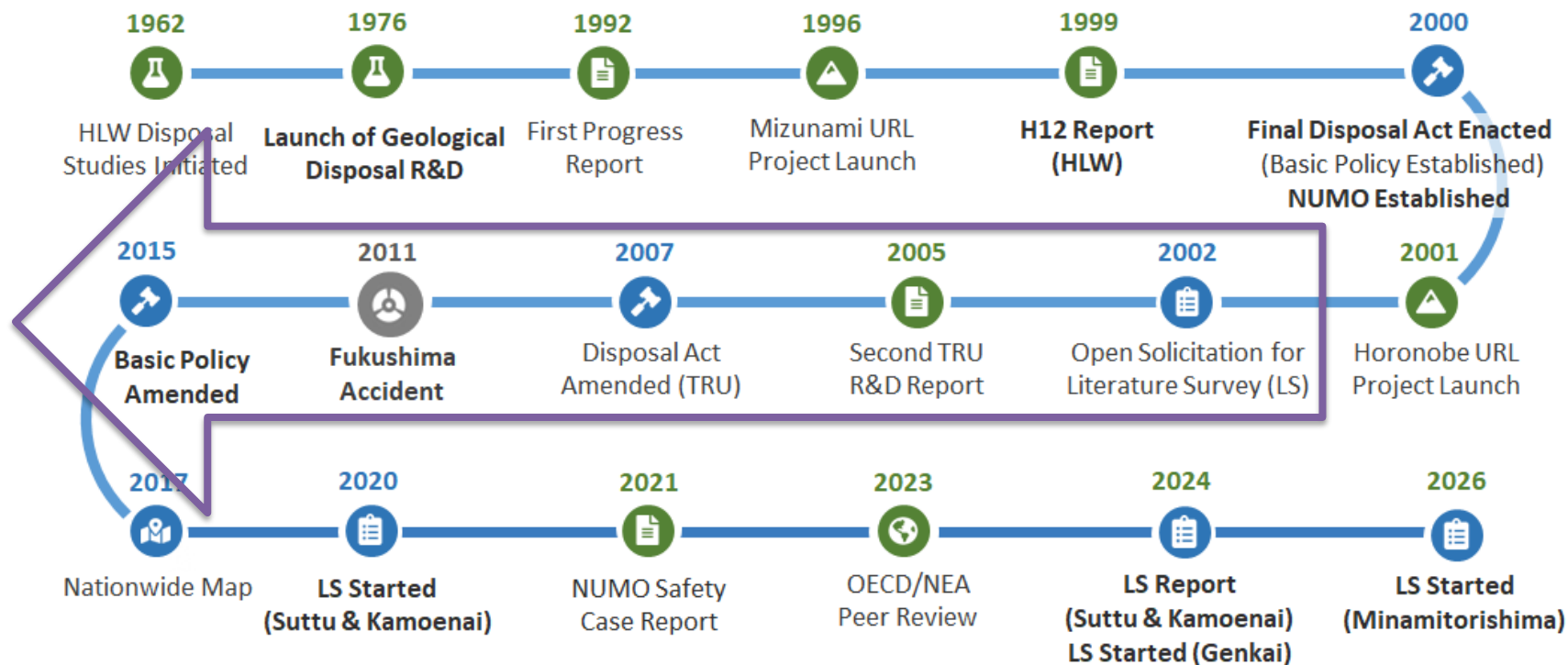
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Progress in the first decade or so

- Selection of HLW disposal sites has not advanced significantly over the past 10 years since the establishment of a legal system for final disposal of radioactive waste.



- The Advisory Committee for Natural Resources and Energy established two expert working groups in 2013, the Radioactive Wastes Working Group and the Geological Disposal Technology Working Group, to re-examine policies for waste management and geological disposal.



- Based on their deliberations, the Government revised the 'Basic Policy on Final Disposal of Designated Radioactive Wastes' in May 2015.
 - Clarification of the current generation's responsibilities and assurance flexibility for future generations for decision-making.
 - The need to foster both nationwide and regional understanding of the issues involved.
 - **The Government's leading role:**
 - **Identification of scientifically more suitable regions**
 - **Proposals to encourage understanding and cooperation among relevant local governments**
 - Supporting relevant regions.
 - Improving the implementation.

Newly added process

- In accordance with the amendment to the Basic Policy, a new process was added to the legally defined site selection process specified in the Final Disposal Act, consists of three phases of investigation:

New Three Pathways



Nationwide Dialogue



Application by municipalities or Proposal by government



Legal Process for Site Selection of Repository

We are here ▼



Literature Survey
Desk-based,
no field investigation



Consent Required



Preliminary Investigation
Field investigation
(Borehole, etc.)



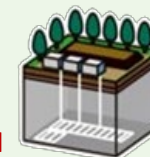
Consent Required



Detailed Investigation
Underground facility



Consent Required



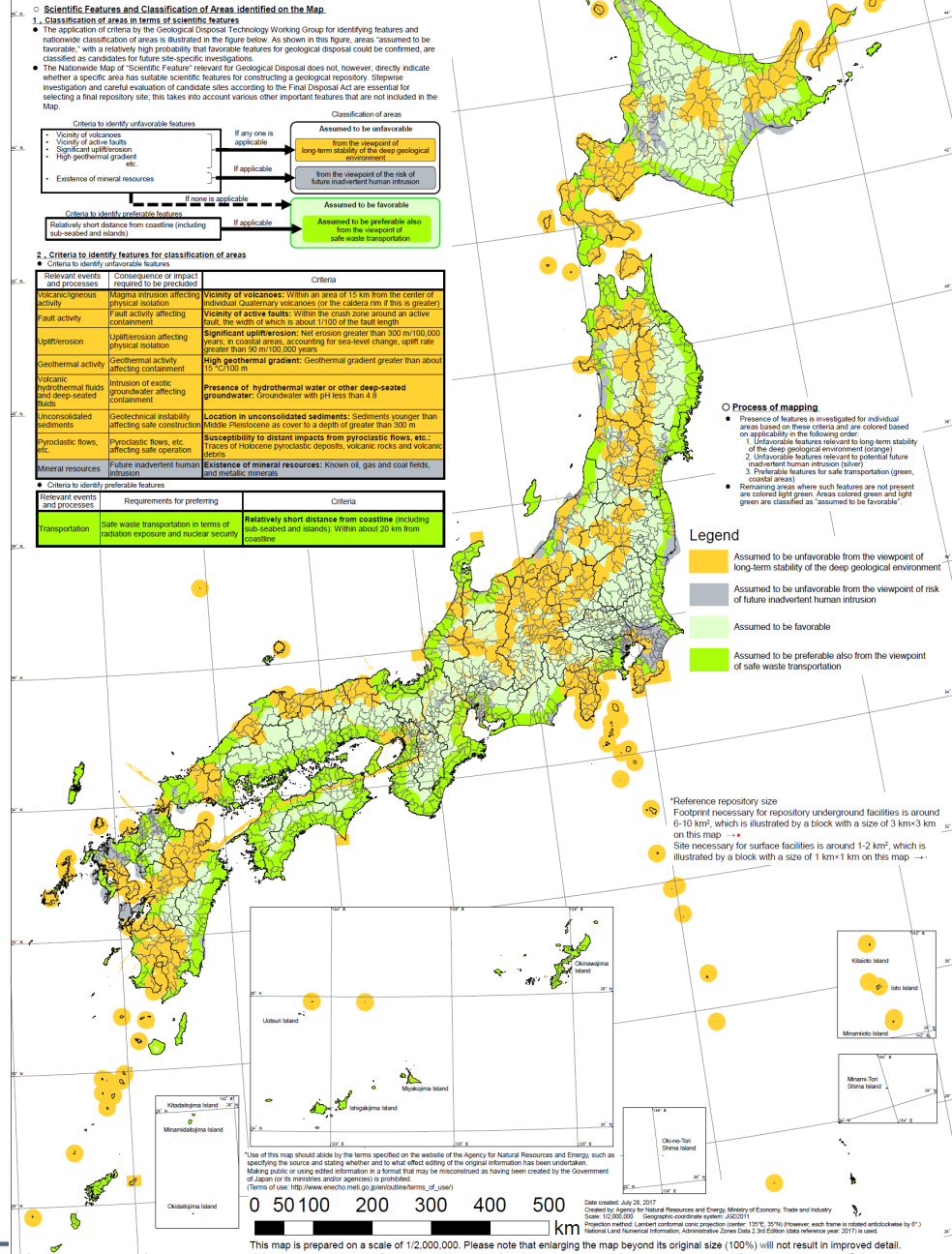
Facility Construction

- METI will determine the acceptability of sites selected for investigation, taking account of opinions of the prefectural governor and the mayor of the municipality with jurisdiction over the site.

The Nationwide Map

- The scientific characteristics of across Japan have been summarized to contribute to the selection of suitable sites and to provide an opportunity and materials for the general public to recognize and understand the need for final disposal and the significance of the project.
- The requirements and criteria for scientific features of suitable regions from geoscientific and technical viewpoints were discussed.
- As a result of these discussions, the requirements and criteria for assessing site characteristics based on current knowledge prior to initiation of site investigation was published in the report on the scientific features relevant for geological disposal.
- Based on the scientific feature and criteria, areas are classified into four color-coded categories.
- These requirements and criteria led to publication of the ‘nationwide map of “scientific features” relevant for geological disposal’ in July 2017.

Nationwide Map of “Scientific Features” relevant for Geological Disposal



Classification of areas by scientific features

Criteria to identify unfavorable features

- Vicinity of volcanoes
- Vicinity of active faults
- Significant uplift/erosion
- High geothermal gradient, etc.
- Existence of mineral resources

If any one is applicable

If applicable

If none is applicable

Classification of areas

Assumed to be unfavorable

from the viewpoint of long-term stability of the deep geological environment

from the viewpoint of future inadvertent human intrusion

Assumed to be favorable

Assumed to be preferable
Also from the viewpoint of safe waste transportation

Criteria to identify preferable features

Relatively short distance from coastline (including sub-seabed and islands)

If applicable

- Areas “Assumed to be favorable”, with a relatively high probability that favorable features for geological disposal could be confirmed, are classified as candidates for future site-specific investigations.
- The map does not, however, directly indicate whether a specific area has suitable scientific features for constructing a geological repository.
- Stepwise investigation and careful evaluation of candidate sites according to the Final Disposal Act are essential for selecting a final repository site; this takes into account various other important features that are not included in the Map.

Examples of the criteria to identify features for classification of areas

- Geological environment characteristics and their long-term stability favorable to geological disposal

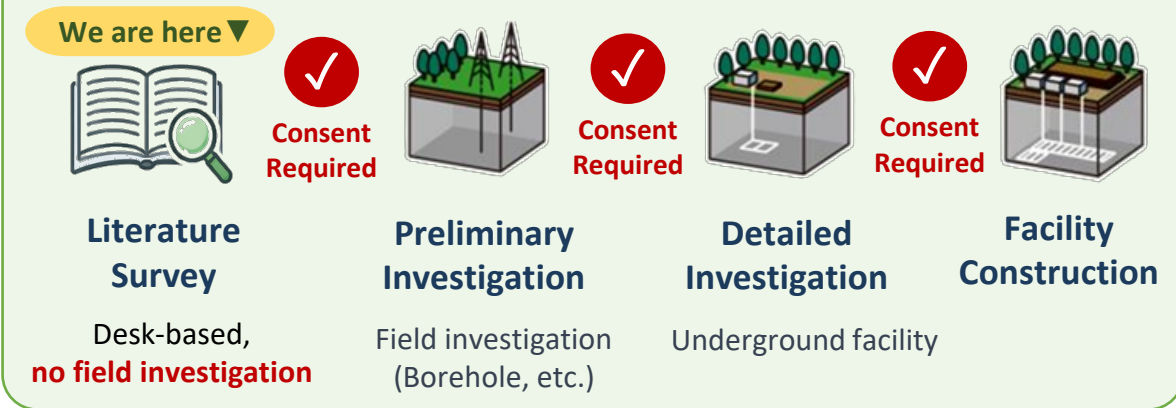
Relevant events and processes	Consequence or impact required to be precluded	Criteria to identify unfavorable features
Volcanic/igneous activity	Magma intrusion affecting physical isolation	Vicinity of volcanoes: Within an area of 15 km from the center of individual Quaternary volcanoes (or the caldera rim if this is greater)
Fault movement	Fault movement affecting containment	Vicinity of active faults: Within the fracture zone around an active fault, the width of which is about 1/100 of the fault length
Uplift/erosion	Uplift/erosion affecting physical isolation	Significant uplift/erosion: Net erosion greater than 300 m / 100,000 years; in coastal areas, accounting for sea-level change, uplift rate greater than 90 m / 100,000 years
Geothermal activity	Geothermal activity affecting containment	High geothermal gradient: Geothermal gradient greater than about 15°C / 100 m
Volcanic thermal fluids and deep-seated fluids	Intrusion of exotic groundwater affecting containment	Presence of hydrothermal water or other deep-seated groundwater: Groundwater with pH less than 4.8
Mineral resources	Future inadvertent human intrusion	Existence of mineral resources: Known oil, gas and coal fields, metallic minerals

Newly added process - Intensive dialogue -

New Three Pathways



Legal Process for Site Selection of Repository



- Following the publication of the Nationwide Map, the Government and NUMO have been carrying out intensive dialogue across Japan to promote understanding of the geological disposal project and the geological environment in Japan.



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Start of the Literature Survey

New Three Pathways



Nationwide
Map

Nationwide
Dialogue



Application
by municipalities
or
Proposal
by government



Legal Process for Site Selection of Repository

We are here ▼



Literature
Survey

Desk-based,
no field investigation



Consent
Required

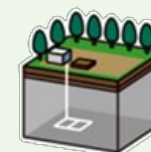


Preliminary
Investigation

Field investigation
(Borehole, etc.)



Consent
Required

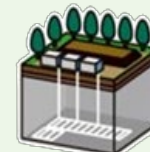


Detailed
Investigation

Underground facility



Consent
Required



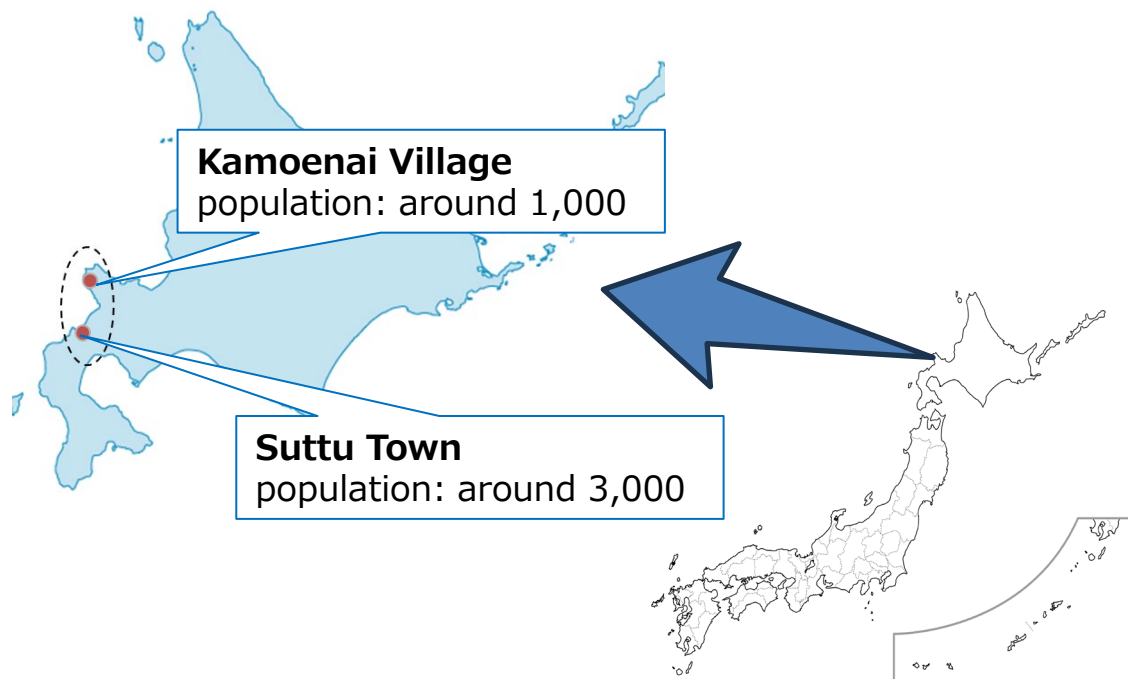
Facility
Construction

- NUMO initiated Literature Surveys in the following locations:
 - In November 2020: Suttu Town and Kamoenai Village in Hokkaido Prefecture
 - In June 2024: Genkai Town in Saga Prefecture
 - In May 2026: Minamitorishima Island, Ogasawara Village in Tokyo Metropolis

Initiation of first site selection process

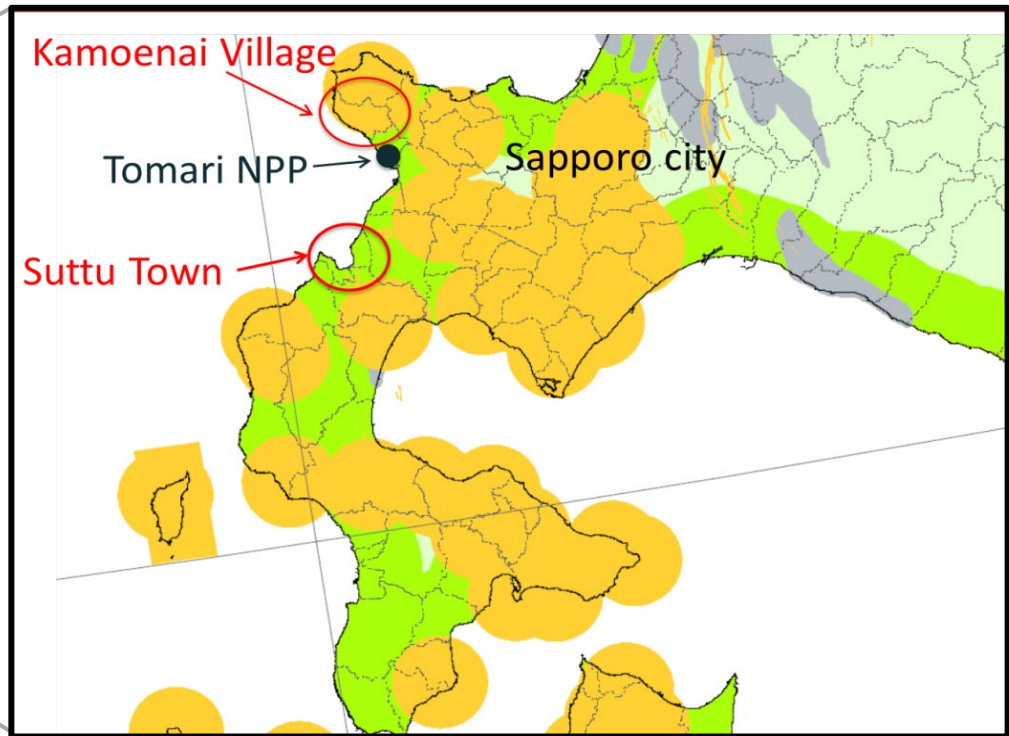
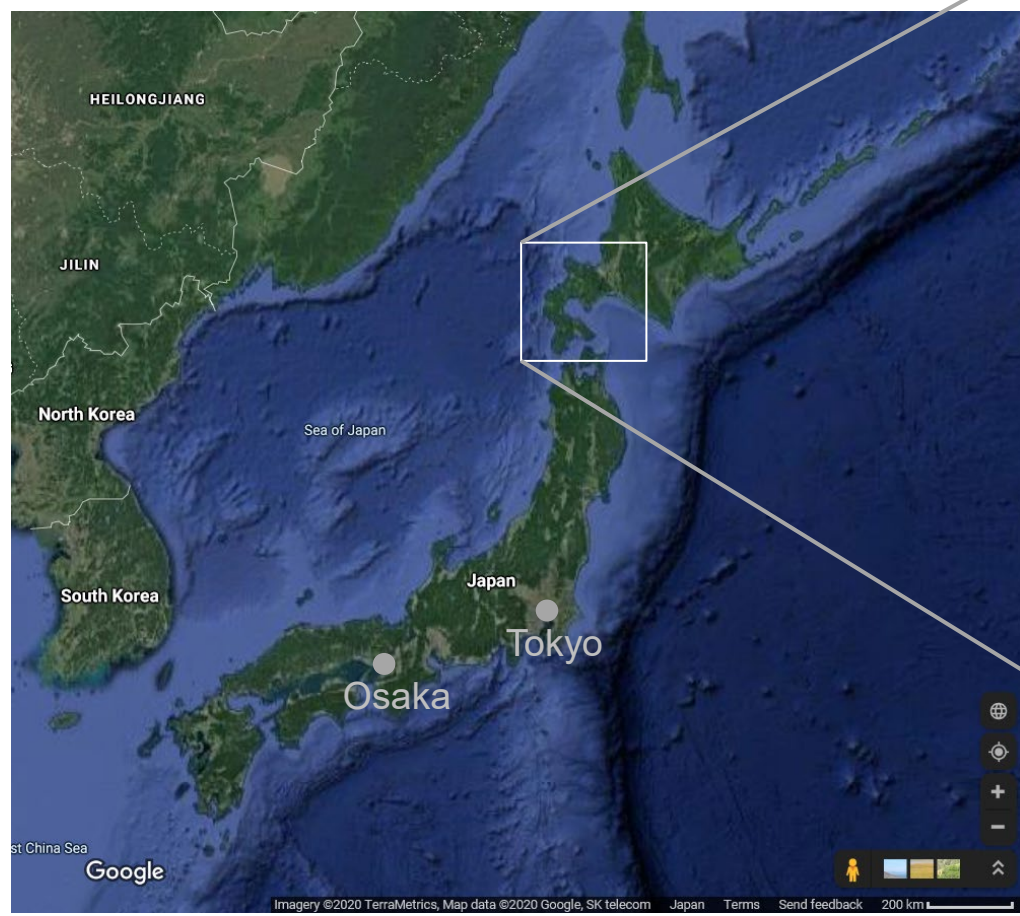
In November 2020, NUMO initiated the Literature Survey for Suttu Town and Kamoenai Village in Hokkaido Prefecture.

- **Kamoenai Village** made the decision to accept the offer from the Government for Literature Survey, after discussion among the village council and the residents.
- **Suttu Town** made the decision for the application of Literature Survey after discussion among the town council and the residents.





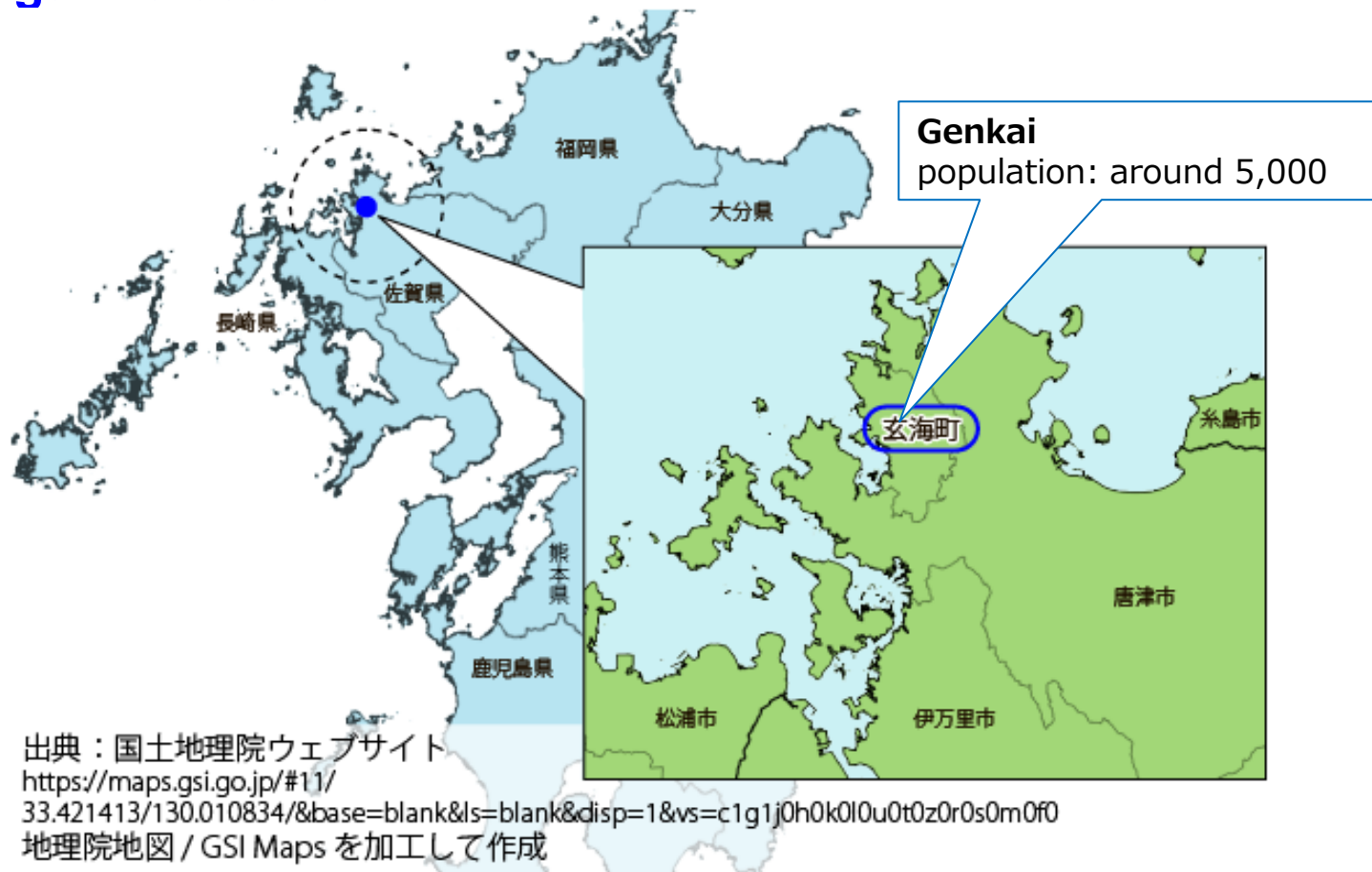
Location and geological features at Suttu and Kamoenai



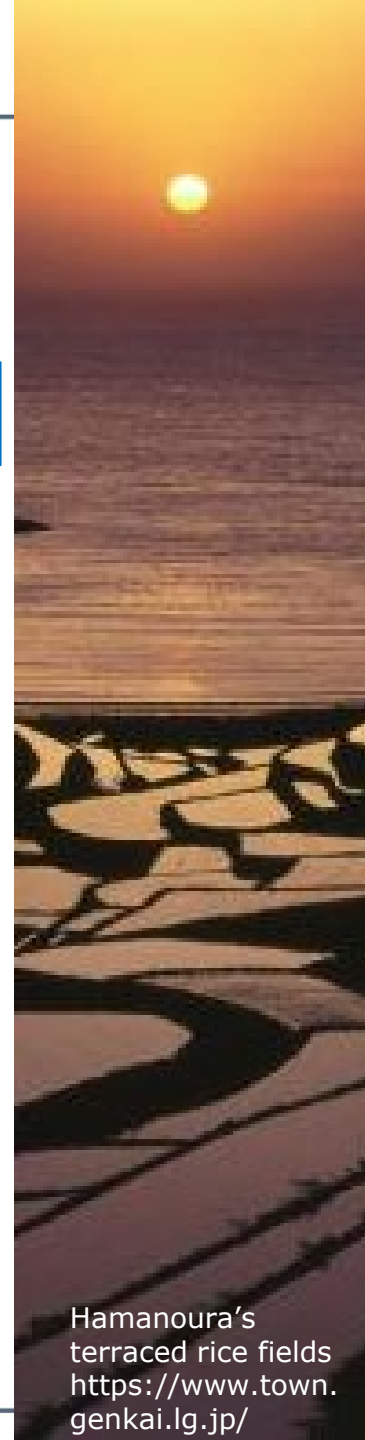
- Neogene volcanic rocks (Andesitic hyaloclastite)
- Volcano, active faults and mineral resources

Initiation of third site selection process

In June 2024, NUMO initiated the Literature Survey for Genkai Town, Saga Prefecture.

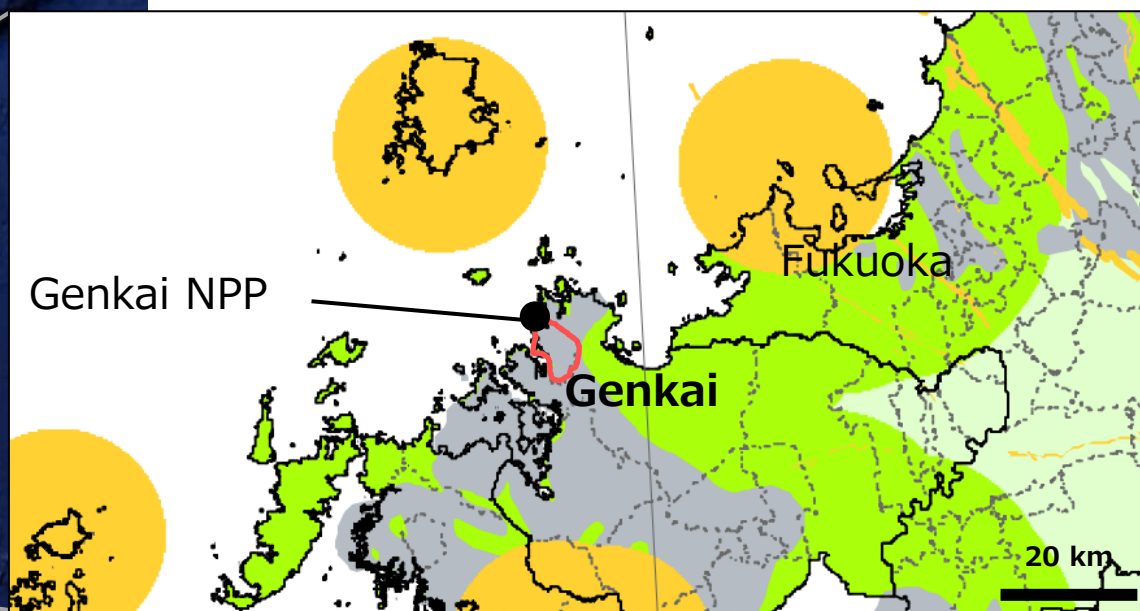


- **Genkai Town** made the decision to accept the offer from government for the Literature Survey, after discussion among the town council and the residents.



Hamanoura's
terraced rice fields
<https://www.town.genkai.lg.jp/>

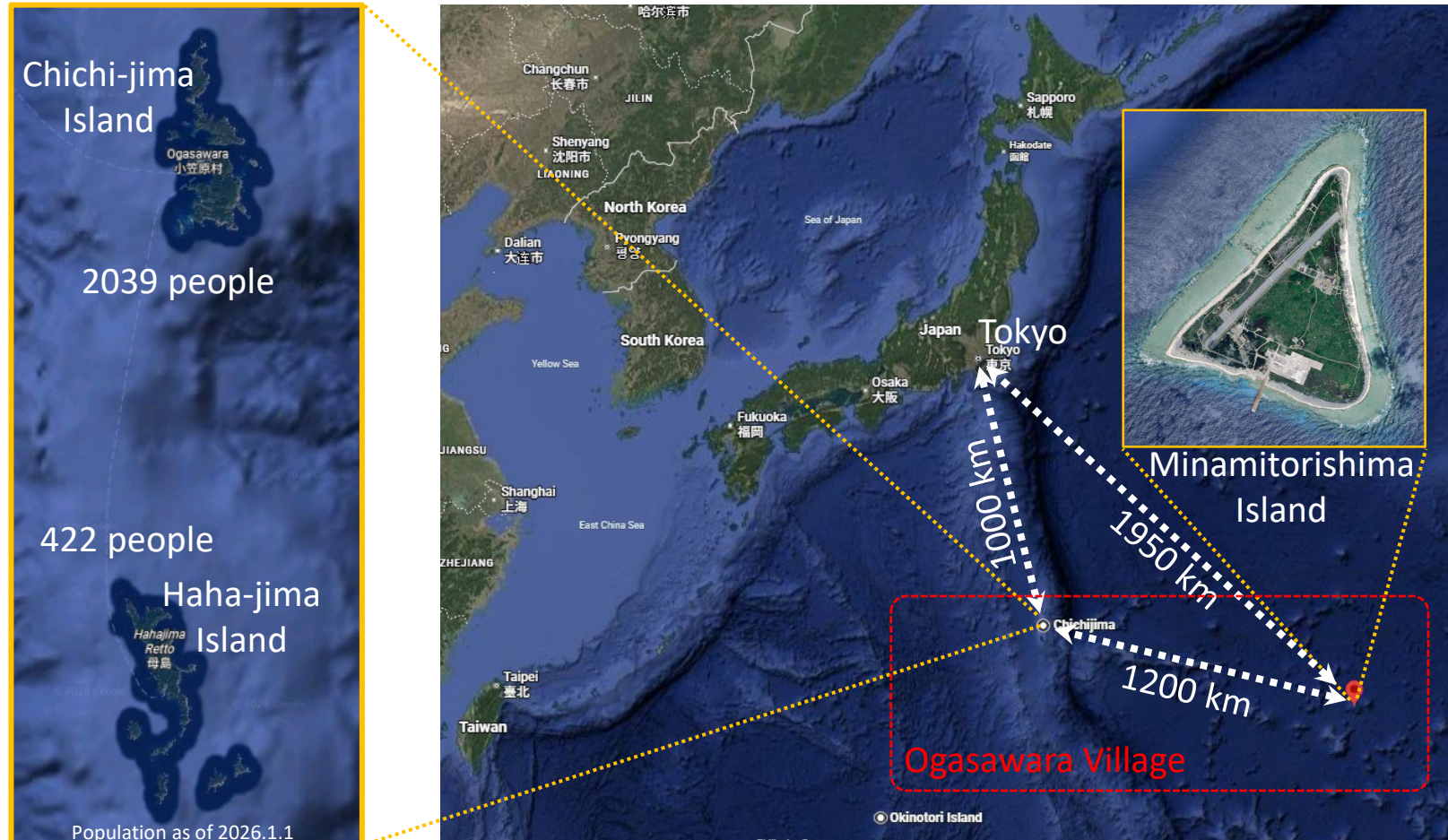
Location and geological features of Genkai



- Neogene sedimentary rocks
- Mineral resources

Initiation of fourth site selection process

May 20, 2026, NUMO initiated the Literature Survey for Minamitorishima Island (Marcus Island), Tokyo Metropolis



- **Mar 3, 2026:** METI Minister proposed the Literature Survey for Minamitorishima to the Ogasawara Village Mayor
- **Mar 14 & 21, 2026:** Briefing sessions were held at Chichi-jima and Haha-jima
- **Apr 13, 2026:** The Mayor announced his official view



The Literature Survey

- The Literature Survey is to be performed based on the ‘Evaluation Guideline for Literature Survey Stage’.
 - The criteria for Literature Survey Stage, as specified in the guideline, are based on the following inputs:
 - Legal requirement
 - The criteria to identify features for classification of area in the Nationwide Map
 - Considerations determined by NRA
- In parallel with conducting the desk-top study about the geological environment of applied areas based on publicly available information, NUMO supports the municipality in promoting activities to help local communities understand the importance, safety and process of DGR project and deliberate the future development of the areas and regional industries, including the significance of possible siting the DGR for the purpose.

- Legal requirement for selecting the Preliminary Investigation Area
 - There should be no record of significant movement in geological formations due to earthquake or fault activity, igneous activity, uplift, erosion and other natural phenomena.
 - The possibility of significant movement in the future due to earthquake or fault activity, igneous activity, uplift, erosion and other natural phenomena should be small.
 - There should be no record of unconsolidated Quaternary deposits at appropriate depths.
 - There should be no record of mineral resources that are economically valuable.

Outline of Legal requirement

	Literature Survey	Preliminary Investigation	Detailed Investigation
Requirements by the Final Disposal Act	No records of significant movement of geological formations, small probability in the future	No records of significant movement of geological formations	
		No detrimental conditions in terms of tunnel excavation or hydrological effects to the repository	Preferable physical, chemical and hydrological characteristics of host rock
Others by ministry ordinance	No records of <ul style="list-style-type: none"> • mineral resources • unconsolidated deposits at appropriate depths 	To be determined	To be determined

Exclusion

Suitability

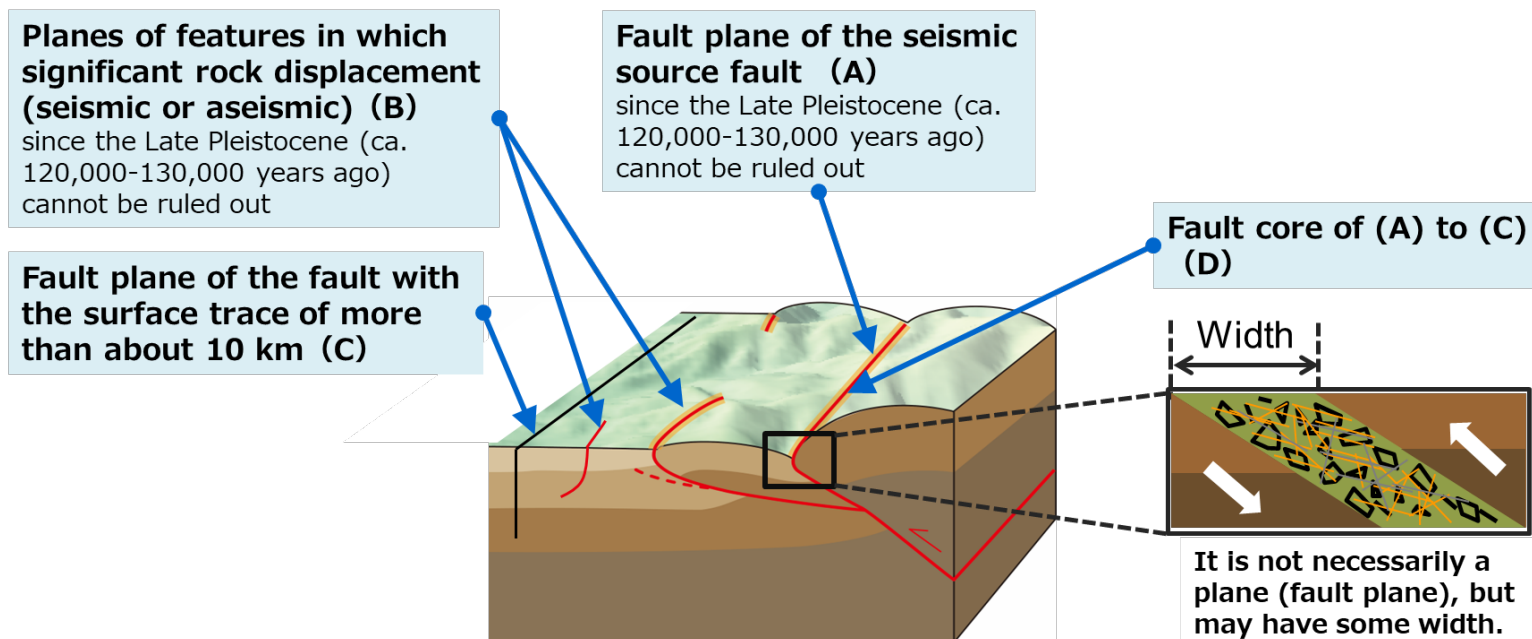
Criteria for the Literature Survey Stage (1/4)

Relevant events and processes	Criteria for exclusion
Fault etc.	<p>(A) Fault plane*¹ of the seismic source fault whose activities are later than the Late Pleistocene (ca. 120,000-130,000 years ago)</p> <p>(B) Fault plane of the subsidiary fault and landslide surface whose activities are later than the Late Pleistocene (ca. 120,000-130,000 years ago)</p> <p>(C) Fault plane of the fault*² with the surface extension of more than about 10 km</p> <p>(D) Fault core*³ of (A) to (C)</p>

*1 'Fault plane' is used to clarify the perspective of preventing damage to engineered barriers due to fault displacement.

*2 Although not an active fault, the possibility of future activity is considered from a long-term perspective.

*3 Parts of most of the fault displacement.



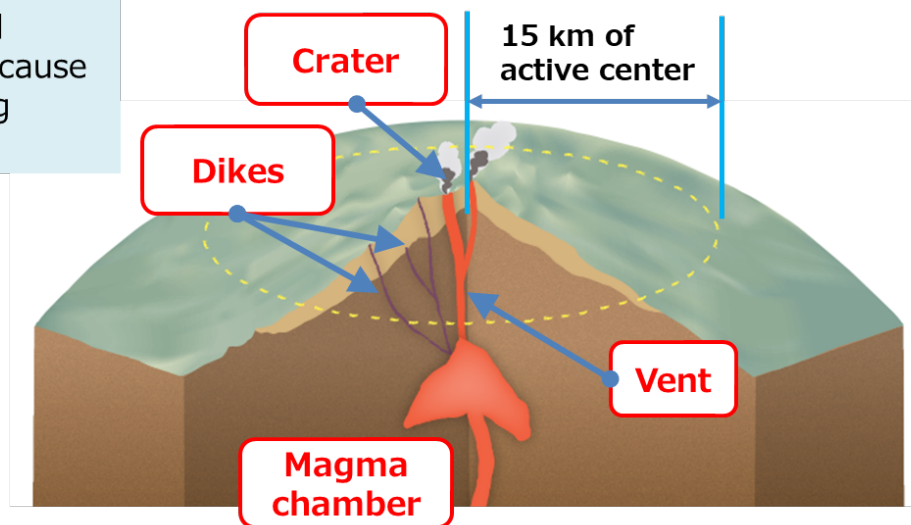
Criteria for the Literature Survey Stage (2/4)

Relevant events and processes	Criteria for exclusion
Magma intrusions and eruptions	<p>(A) Area indicating traces of vents, dikes, calderas, etc., associated with Quaternary (ca. 2.58 million years ago to the present) volcanic activity, such as magma intrusion and steam eruption, etc., causing the destruction of engineering barriers</p> <p>(B) Within ca. 15 km of the active center of the Quaternary volcano</p> <p>(C) Area with new volcanic occurrences where no Quaternary volcanoes existed</p>

Traces of vents, dikes, calderas, etc., associated with Quaternary (ca. 2.58 million years ago to the present) volcanic activity (A)

such as magma intrusion and steam eruption, which could cause the destruction of engineering barriers

Within ca. 15 km of the active center of the Quaternary volcano (B)

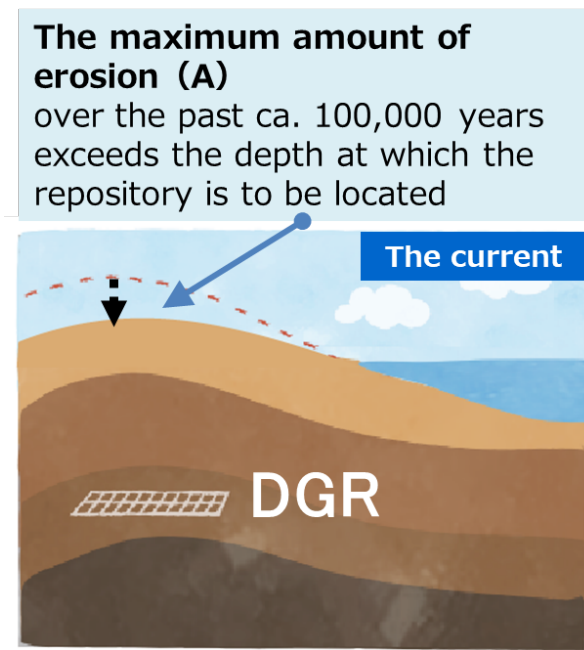


Locations where it is evident or highly probable that new volcanoes could form (C)

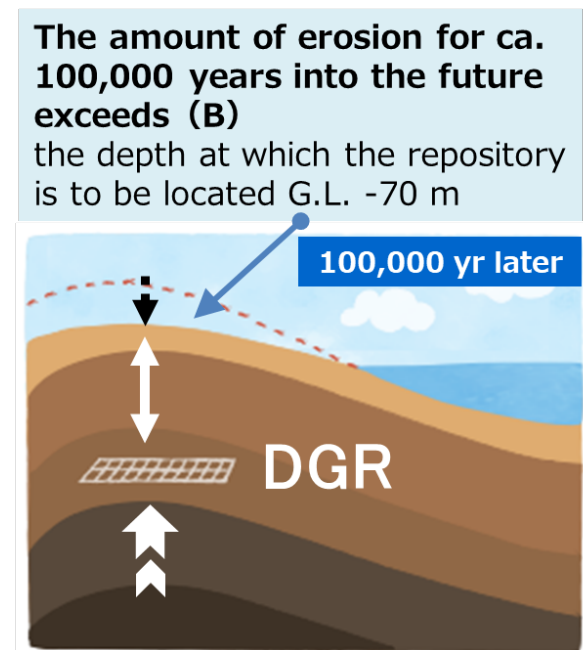
even in areas where no volcanoes were active during the Quaternary period

Criteria for the Literature Survey Stage (3/4)

Relevant events and processes	Criteria for exclusion
Erosion	<p>(A) Where the maximum amount of erosion over the past ca. 100,000 years exceeds the depth at which the repository is to be located.</p> <p>(B) Where the repository cannot secure a depth deeper than 70 m for ca. 100,000 years taking into account the decrease in depth due to erosion.</p>



In LS, the depth of the repository is assumed to be 300m.



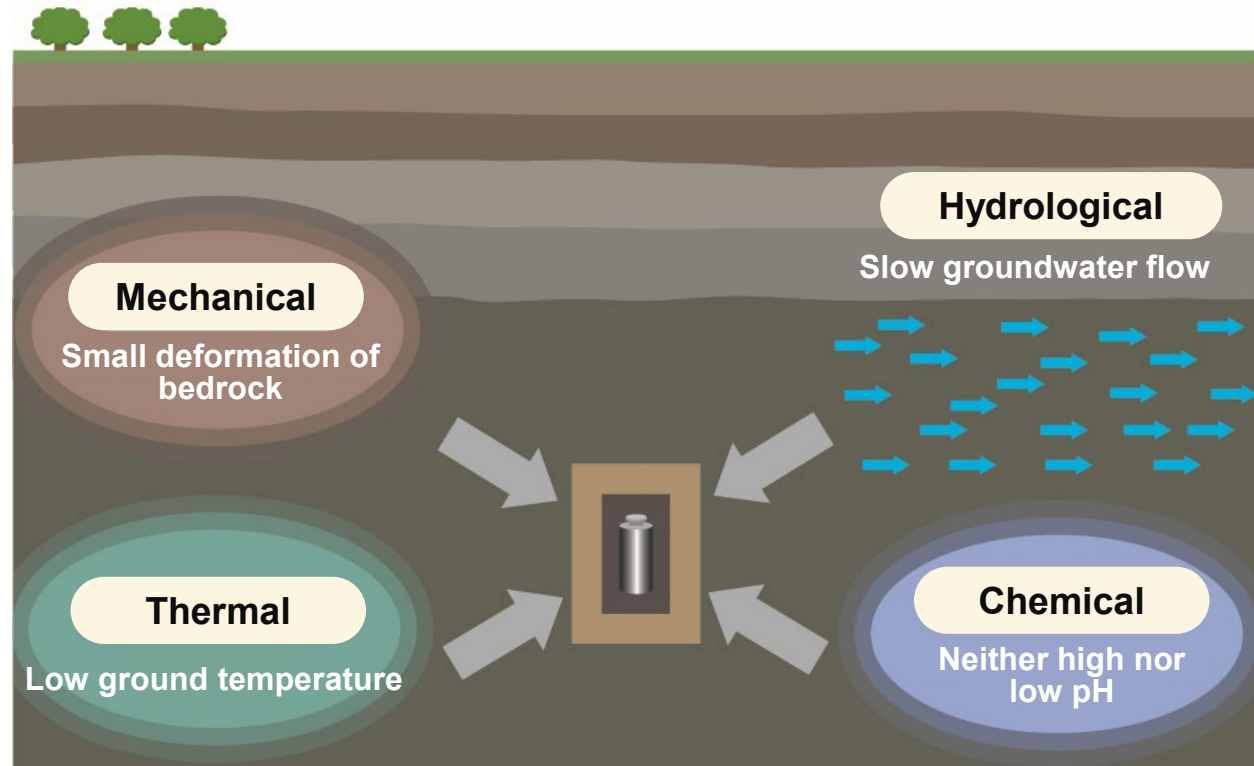
The depth of 70 m is based on the fact that, based on actual tunneling depths in Japan using the shield tunneling method, most construction depths are less than 70 m (NRA, 2016).

Criteria for the Literature Survey Stage (4/4)

Relevant events and processes	Criteria for exclusion
Unconsolidated geological formations	<ol style="list-style-type: none">1) Unconsolidated Quaternary sediments and,2) Unconsolidated or poorly consolidated sandy or gravelly soils, and volcanic products, such as volcanic ash, lapilli, pumice, etc.
Mineral resources	<ol style="list-style-type: none">1) Mineral deposits in mines, etc. that are currently in operation or have been in operation in recent years (including coal fields, oil fields, gas fields)2) Mineral deposits, etc., with mineable reserves that are economically and technically equivalent to similar mine types of currently operating or recently operated mineral deposits in mines, etc. in other regions
Geothermal resources	<ol style="list-style-type: none">1) Where geothermal gradients (rates of underground warming) have been recorded to exceed 100° C/km2) Where production wells for power generation are installed within a range of up to several kilometres around

Other aspects

- Geological environment characteristic
 - Favorable characteristics with respect to the containment function and feasibility of constructing underground facilities are confirmed.



- Socioeconomic condition
 - Existence of "clearly unsuitable places (areas that are not permitted in principle)" under laws and regulations related to land use are confirmed.

Status of the Literature Survey for Suttu and Kamoenai (1/2)

- Collecting the necessary documents and data such as geological map and technical papers specific to Suttu Town and Kamoenai Village have been completed.

	Suttu	Kamoenai
1 The Main Report	76	64
2 Detailed explanatory documents	994	840
Earthquakes and Active Faults	231	178
Volcanic Activity	164	148
Uplift and Erosion	159	139
Quaternary Unconsolidated Sediments	34	38
Mineral and Geothermal Resources	57	60
Topography, Geology, and Geological Structures	141	95
Geological Characteristics	119	105
Socio-Economic Considerations	13	13

Note: Totals include overlaps between main text and annexed explanatory documents.

- NUMO established the local office for communication in each municipality as a base for various outreach activities to the resident, including information dissemination, participation in local events, small group meetings, etc.
- NUMO and the municipality have jointly established the Place for Dialogue in each municipality, a meeting structure, comprising 20 or so residents of the municipality and an independent facilitator.



Status of the Literature Survey for Suttu and Kamoenai (2/2)

- The area has been evaluated from the viewpoint of the criteria specified in the 'Evaluation Guideline for Literature Survey Stage'.
- The Literature Survey Report was delivered to the Mayor of Suttu Town, the Mayor of Kamoenai Village, and the Governor of Hokkaido Prefecture in November 2024.
 - Confirmation of the existence of areas that meet the criteria to be excluded
 - Proposal of candidate areas for the Preliminary Investigation
 - Extraction of points to be confirmed in the Preliminary Investigation



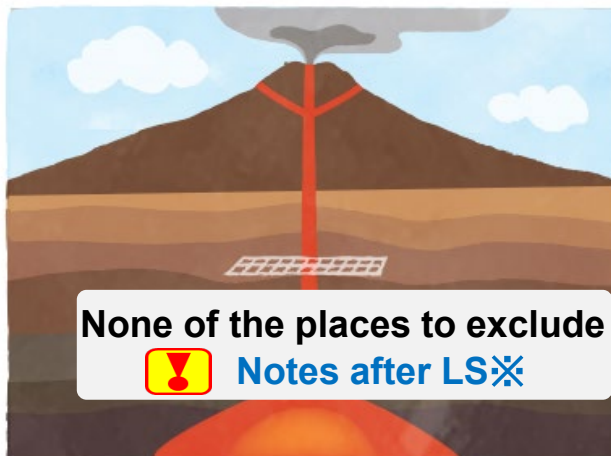


Result of the Literature Survey for Suttu (1/2)

1. Fault etc.

2. Magma intrusions and eruptions

3. Erosion



4. Unconsolidated geological formations

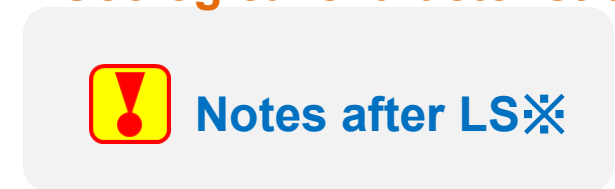


5. Mineral resources

6. Geothermal resources



7. Geological characteristics



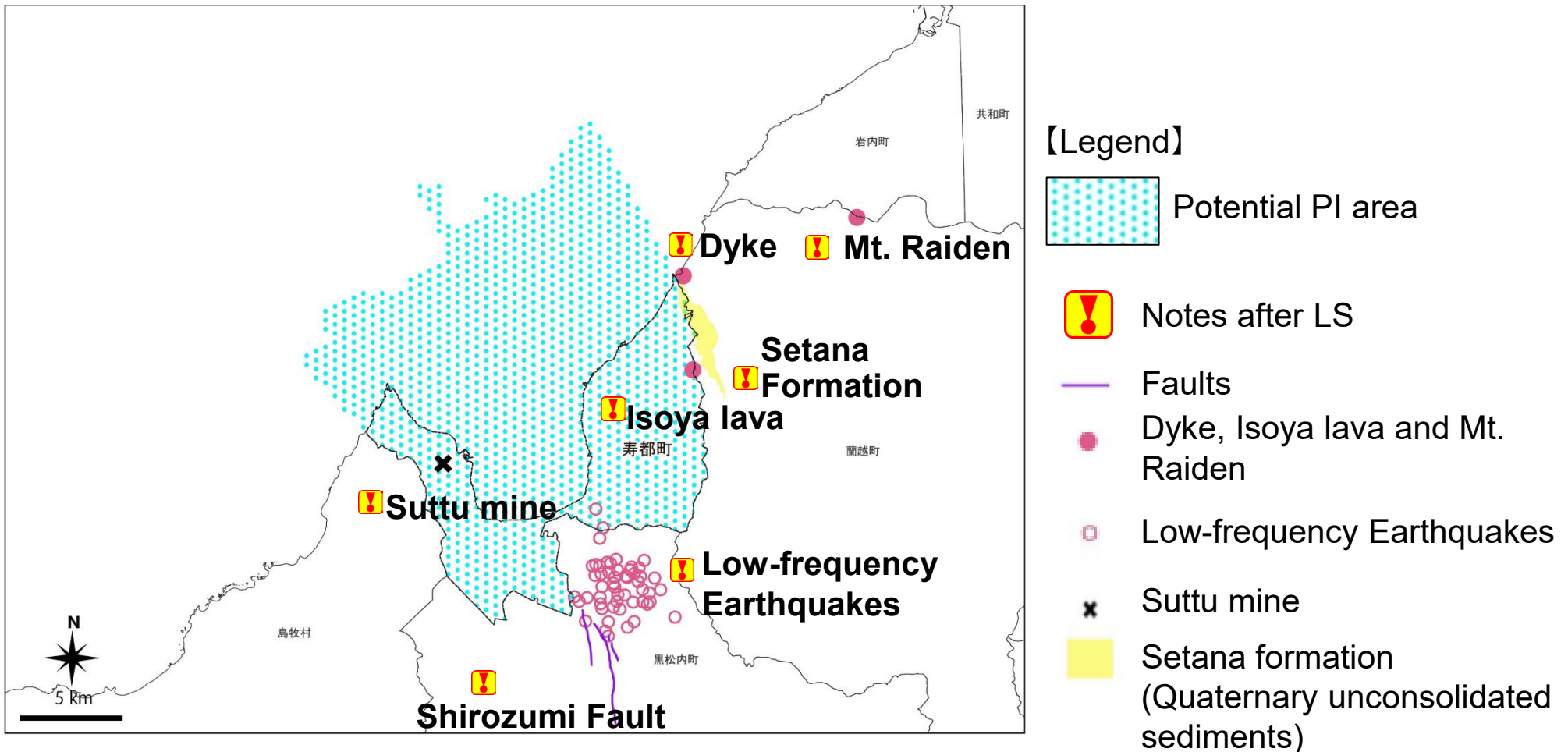
8. Socio-economic



✖Matters to be specifically noted in PI

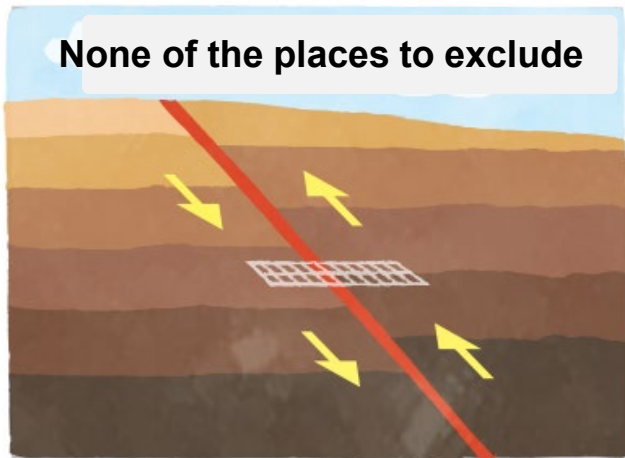
Result of the Literature Survey for Suttu (2/2)

- There were no “places to exclude,” so the entire Literature Survey (LS) area is the potential Preliminary Investigation (PI) area.

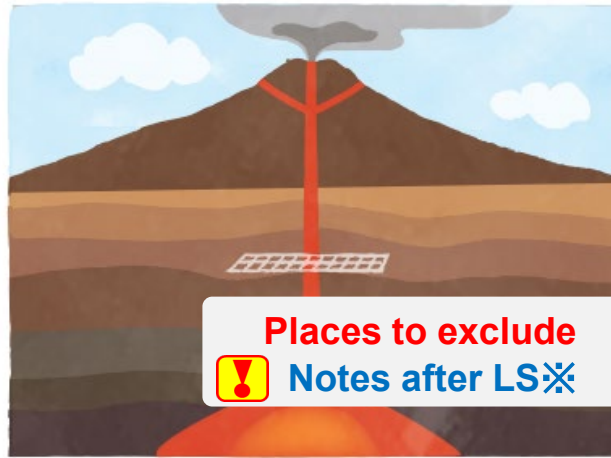


Result of the Literature Survey for Kamoenai (1/2)

1. Fault etc.



2. Magma intrusions and eruptions



3. Erosion



4. Unconsolidated geological formations



5. Mineral resources

6. Geothermal resources



7. Geological characteristics

⚠ Notes after LS✘

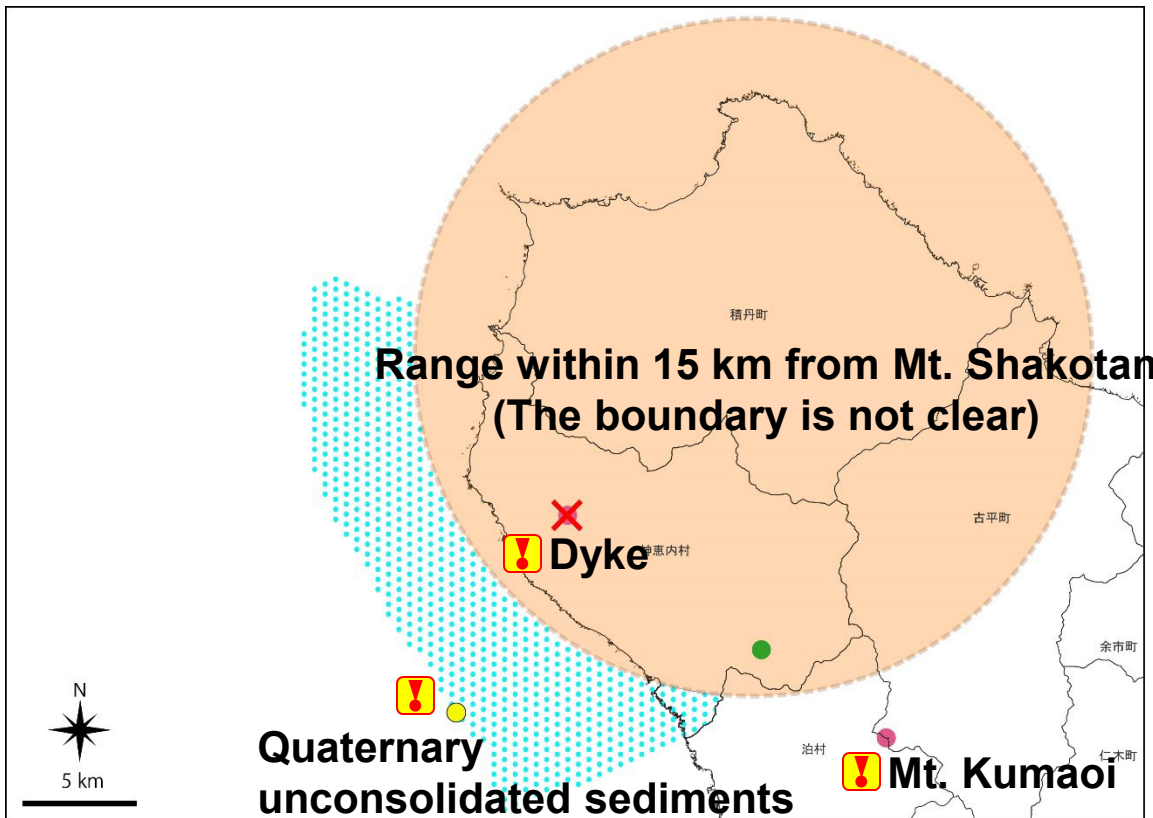
8. Socio-economic

The places where use is prohibited under laws or regulations
(protected forest for rare species populations)

✘Matters to be specifically noted in PI

Result of the Literature Survey for Kamoenai (2/2)

- Excluding the area within 15 km from Mt. Shakotan (the boundary is not clear) is the potential PI area among the LS area.



【Legend】



Potential PI area



Notes after LS



Dyke, Mt. Kumaoui



Quaternary unconsolidated sediments

<Places to exclude>



Dyke

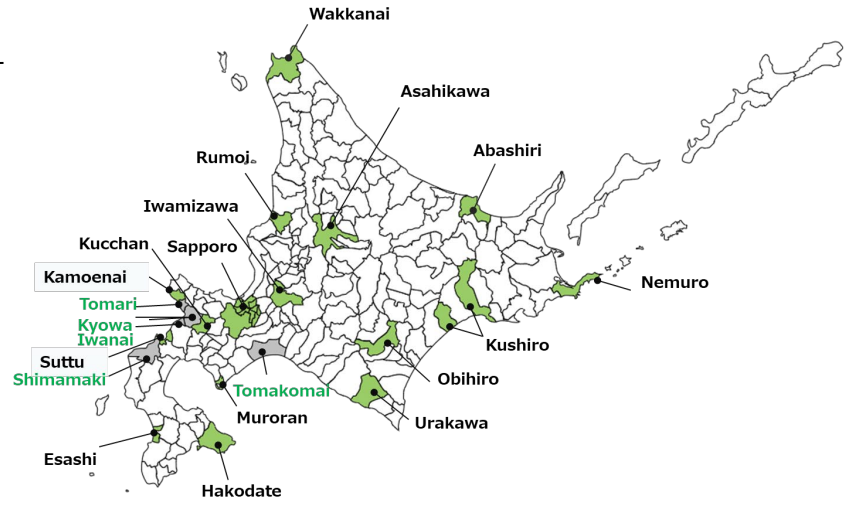
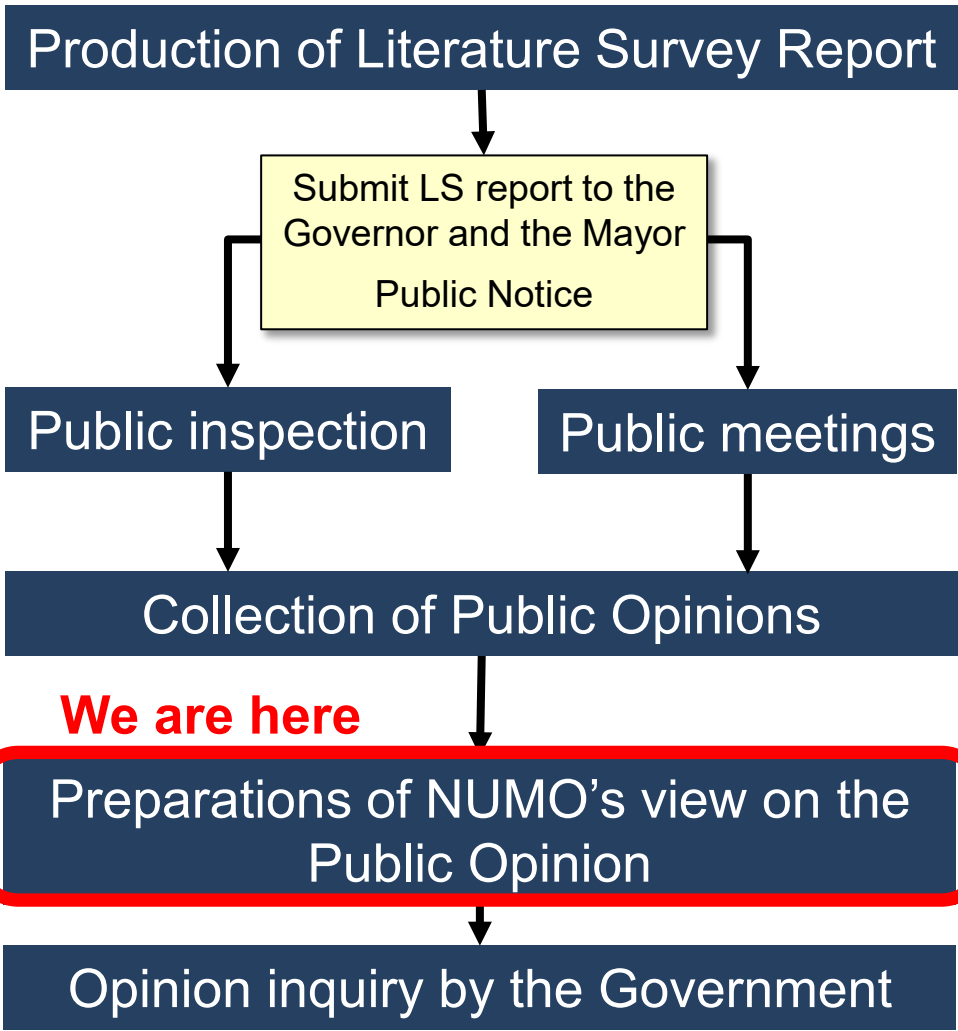


Mt. Shakotan
(Active center is not clear)

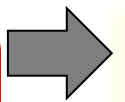


The places where use is prohibited under laws or regulations

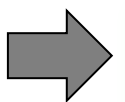
Legal process after completion of Literature Survey Report for Suttu and Kamoenai



25 public meetings
1,517 participants
2,114 written questions



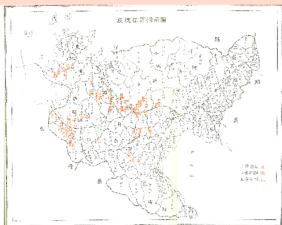
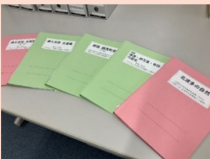
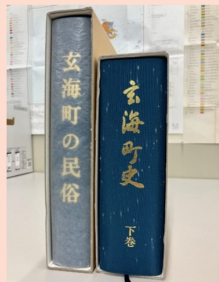
Send the **NUMO's** view to **Governor and Mayors**



The Government asks opinions from **Governor and Mayors** if they wish to proceed to the Preliminary Investigation Stage

Status of the Literature Survey for Genkai Town

- Collecting the necessary documents and data such as geological map and technical papers specific to Genkai Town has been completed.

Copy at Saga Prefectural Library	Copy at Genkai Town Library	Purchased from Genkai Town
<ul style="list-style-type: none">Geology and Underground Resources of Saga Prefecture  <p>Saga Prefectural Development Division (1954)</p>	<ul style="list-style-type: none">Local History Journal: Matsura Province, Second EditionThe Nature of KitahataPhoto Album: The Shōwa Era in Karatsu, Imari, and AritaNew Edition of the History of Chinzei Town, Volume IIIllustrated History of Karatsu, Imari, and Arita 	<ul style="list-style-type: none">Folklore of Genkai TownHistory of Genkai Town, Volume II 

- NUMO established the local office for communication.
- NUMO and the municipality have jointly established the Place for Dialogue.





Contents

- Background information
- Site selection process
 - Activities before the Literature Survey (LS)
 - Status of the Literature Survey
- Lessons learned
- Further actions



Lessons learned (1/2)

- The Nationwide Map has been found to be invaluable in facilitating dialogue activities promoted to deepen public understanding of the geological disposal project. In this way, establishing requirements and criteria for distinguishing favorable and unfavorable areas and visualizing them on a map has also been found to be an effective way of raising awareness that geological disposal is possible even in Japan, which is located in a tectonic belt, and where many stakeholders thought that geological disposal would not be possible.
- NUMO has conducted the Literature Surveys and compiled reports covering two municipalities in Hokkaido based on the Evaluation Guidelines at the Literature Survey Stage. Furthermore, the reports were confirmed by the national council. This process has been extremely effective in ensuring the appropriateness of the Literature Survey report, such as whether it was possible to proceed to the preliminary investigation, gaining understanding through dialogue among experts, and enhancing public confidence in its objectivity and transparency.



Lessons learned (2/2)

- Regarding the dissemination of technical information, we have undertaken a wide range of activities, not only in the local area but also nationwide. These include the publication of numerous reports, the organization of symposiums and international seminars, the provision of easy-to-understand safety information, and the creation of opportunities to provide information to the media.
 - From the perspective of balancing scientific accuracy and clarity, we have introduced several improvements:
 - Emphasizing on dialogue rather than one-way communication;
 - Centering on the accuracy of the main message, with consistency across supporting details; and
 - Utilizing accessible communication tools such as images, videos, site visits, and natural analogues.
- We have also been exploring strategies to expand opportunities for providing information to the mass media:
 - Using language that aligns with the needs of the media;
 - Demonstrating honesty in admitting when we don't know the answer to a question; and
 - Training generalists capable of broad technical communication.
- We believe that these efforts are effective in fostering long-term understanding.



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Further actions

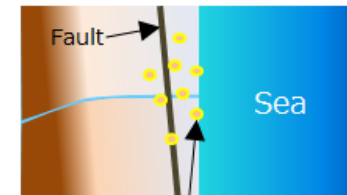
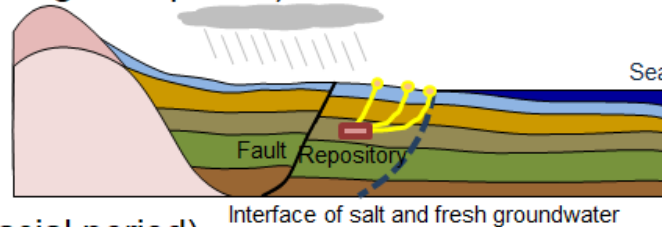
- NUMO continues
 - communication activities throughout Japan in order to have more municipalities accept the Literature Survey, and
 - stepwise characterization of the geological environment, design of the repository and safety assessment.

Concepts of SDM development and data management, which are key techniques for the characterization, will be shown as topics

4D-SDM development

- 4D-SDMs (Site Descriptive Models which consider long-term evolution of the geological environment) are to be developed at a regional scale to take into account **temporal and spatial changes in the geological environment characteristics** due to long-term topographical, climatic and sea-level changes.

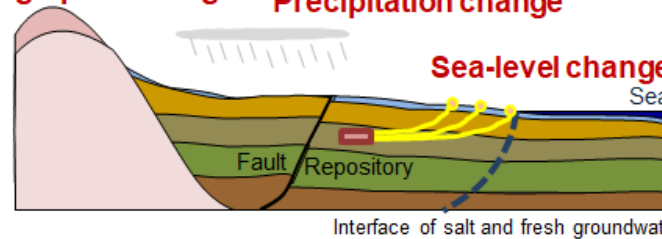
Present (Interglacial period)



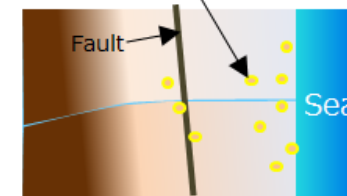
Future (Glacial period)

Topographic Change **Precipitation change**

Sea-level change



Discharge area of groundwater (GBI)



Output of simulation results

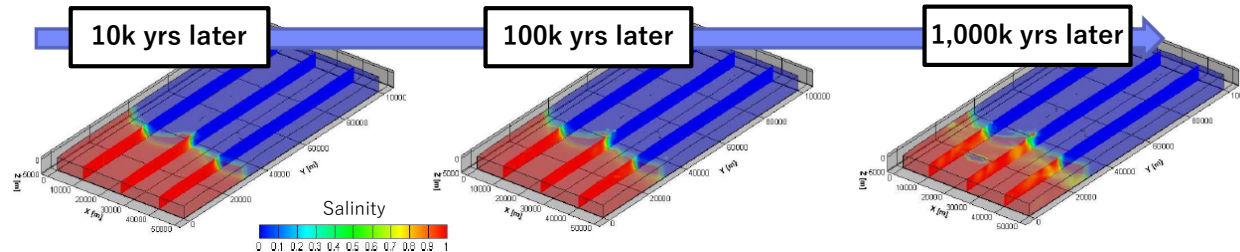
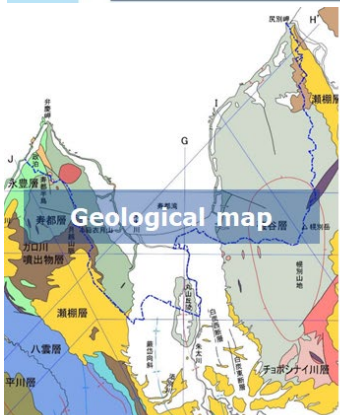


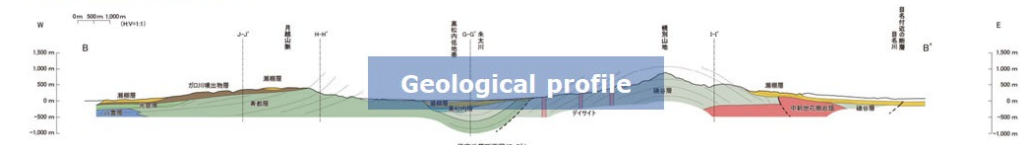
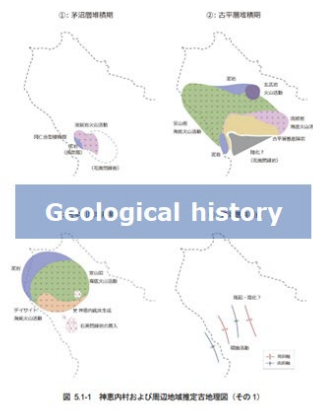
Image of estimation results of groundwater salinity distribution change

4D-SDM development



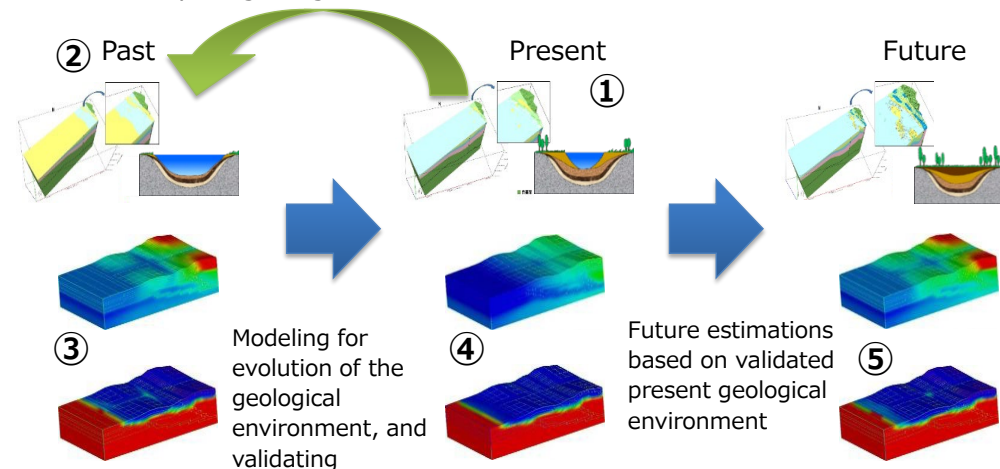
Stratigraphic correlation table

地層番号 (層位)	地層名 (層位)	地層厚 (m)	地層年代 (Ma)	地層年代 (Ma)
02017.00	新第三紀層 (新第三紀層)	約1.000	I	約1.000
02018.00	新第三紀層 (新第三紀層)	約1.000	II	約1.000
02019.00	新第三紀層 (新第三紀層)	約1.000	III	約1.000
02020.00	新第三紀層 (新第三紀層)	約1.000	IV	約1.000
02021.00	新第三紀層 (新第三紀層)	約1.000	V	約1.000
02022.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02023.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02024.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02025.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02026.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02027.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02028.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02029.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02030.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02031.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02032.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02033.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02034.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02035.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02036.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02037.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02038.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02039.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000
02040.00	新第三紀層 (新第三紀層)	約1.000	VI	約1.000



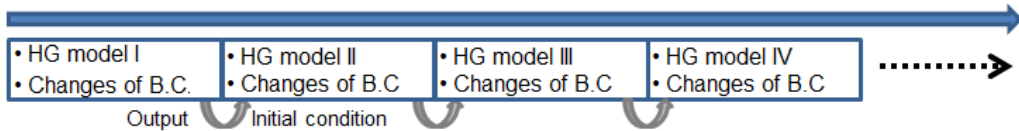
Data from the Literature Survey (mainly geological characteristics) and the Preliminary Investigations

Collecting information on the evolution in the past geological environmental



Geological environment characteristics and their changes to consider

- changes in topography, geological structure, and the surface environment
- changes in hydraulic and hydrochemical fields

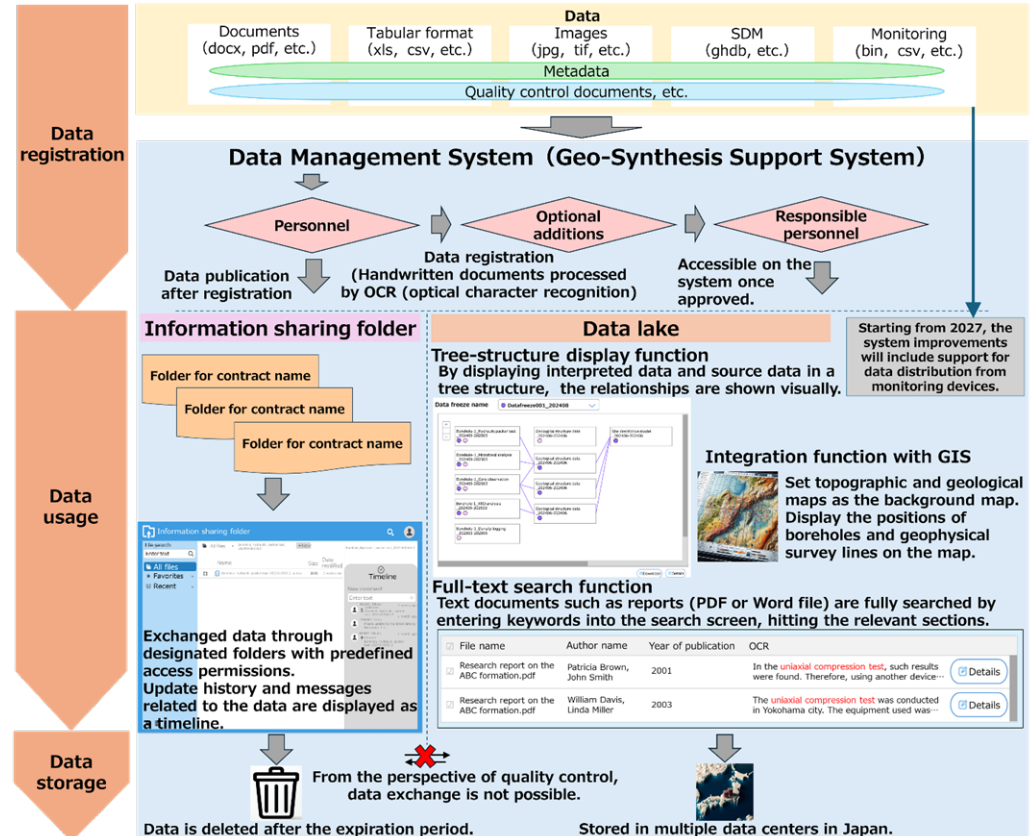


Data management systems for site investigations

- NUMO is developing the Geo-Synthesis Support System to manage extensive and diverse data generated during stepwise site investigations.

➤ The system covers measurements, data evaluation, and relevant information for judgement of data quality and validity.

➤ It is designed to align with development of SDMs for site-specific safety case, ensuring user-friendliness, transparency and traceability in line with quality assurance requirements and flexibility.



Overview of the Data Management System



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- ONOE, H., SAEGUSA, H., ABUMI, H. and OZUTSUMI, T., Study for technical development of 4D-SDM modeling for long-term post-closure safety assessment of the repository in Japan (2) Approach of model uncertainty evaluation of 4D-SDM, Proc. IHLRWM 2025, No.11151 (2025).



**THANK YOU FOR YOUR
ATTENTION**