Geological Museum of KIGAM: Research vs. Management

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지질박물관
GEOLOGICAL MUSEUM

Contents

1. General Information

Brief history, organization, and roles

1992.	Geological Sample Exhibition Hall open
1995.	Est. of Geological Museum Construction Committee
1999.	Construction completion, interior and exhibition installation
2001.	Geological Museum open (11th Nov.)
2008~	Revision of exhibition halls or individual exhibits, Construction of Geologic Time Street of Korea (2014)
2021.	20th Anniversary

- Collecting, managing, preserving, and displaying domestic and overseas **geological samples (rock, mineral, fossil)** which provide information about the formation of the Korean Peninsula and the earth, and the evolution of life
- **Popularizing geosciences** not only through basic research on geologic samples but also through various exhibitions as well as education and docent interpretation programs
- Identifying rocks and minerals on request

KIGAM president
└ Vice-president
└ Geoscience Platform Division
└ Geological Museum

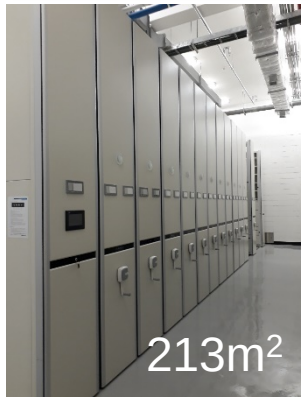
Facility

- 1st floor: Central Hall, Exhibition Hall 1, Discovery Room
- 2nd floor: Exhibition Hall 2, Science Room, Theater, Gift Shop

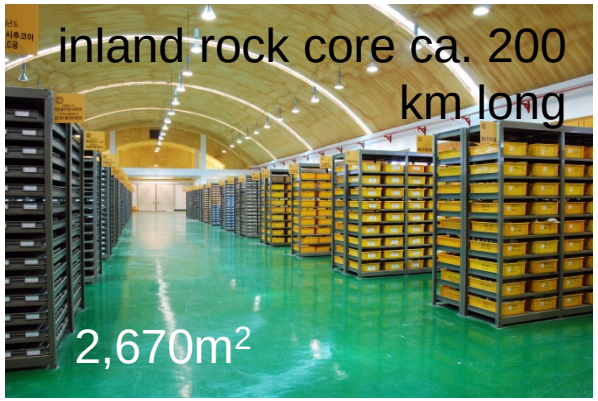
Total area for exhibition halls and hands-on activity rooms = 1,440 m^2

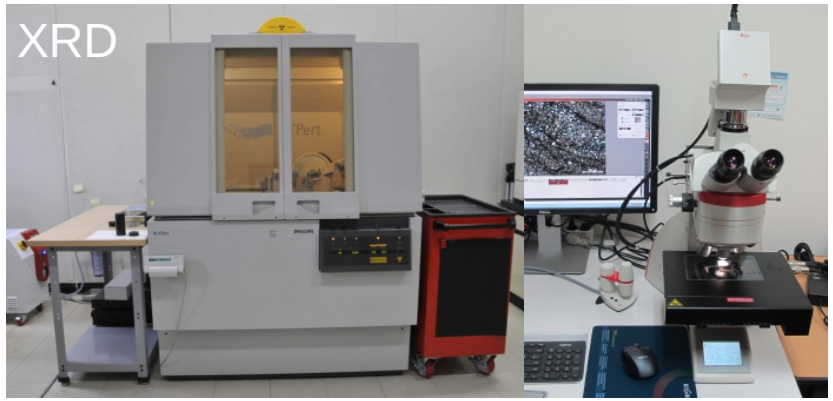
Facility

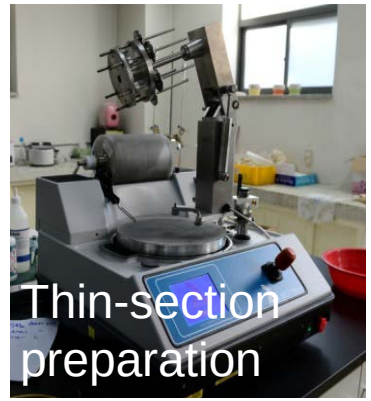
- Basement storage (currently housing over 6,000 rocks, minerals, and fossils)
- Outdoor exhibitions for large samples
- Rock core sample storage (separate building)
- XRD analysis & thin section labs



ca. 7,000 in storage and on show







Major Projects, People & tasks

- **Development and management done by research project** (No operational costs)
  - GMK is currently working on one of the KIGAM's "Basic Research Projects" funded by the Ministry of Science and ICT (ca. 0.95 million USD / yr including ca. 40% personnel cost for **2020~2024**)
  - *Blockbuster exhibitions, events, or research are difficult.*

Scientific Research (3~4)


Paleont.


Sediment.


Paleont.

?

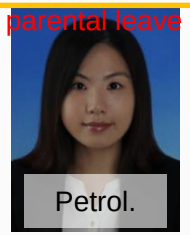
+ 1 or 2 specialist(s) from other department depending on scope of the project

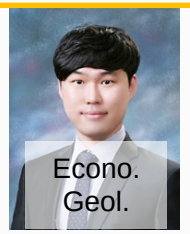
Total No. of regular staff = 7

Exhibition-education development/operation (7 + 1 intern)

Sample (specimen) Management (4)

parental leave


Petrol.


Econo. Geol.

Polarized microscopic analysis


XRD analyst


thin section technician

Administration & Museum shop (1)

Rock core Management (1)

Analytical service & Museum maintenance (3)

2. Research in GMK

Two fold Strategy

Exhibition, education developing research (short-term) *for*

- Permanent exhibition partial renovation/replacement
- Special (temporary) exhibition
- Pre-existing educational contents/programs upgrade or new development

1~3 people/team

results

actually displayed or operated

Scientific Research (short/long-term) *on*

- Individual's expertise (e.g. paleontology, sedimentology)
- GMK's certain sample

mostly individually

results

published then developed to an exhibit(ion) or an educational content, if available

- **Changing according to the scope of the project or man power**

Scientific research focus during 2020~2024

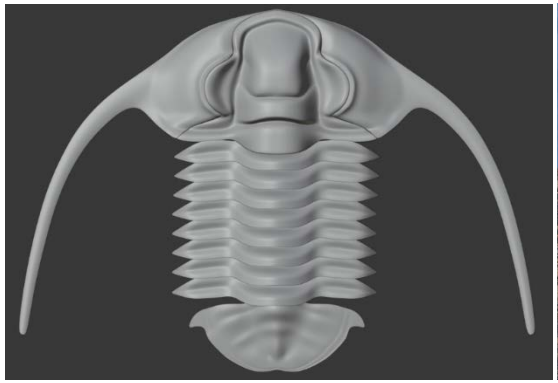
- **Depending on members' expertise** (currently paleontology, sedimentology, and geoheritage)

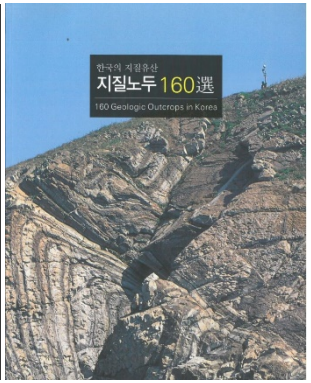
Short-term research (~3 yrs)

- *Fossils of Korea (oldest or endemic trilobites)*
- *Korean fossils as geoheritage*

→ Development of educational or entertainment contents

→ Special exhibition





e.g.,
plastic puzzle of Korean native fossil & Korean geoheritage book (in progress)

Long-term research (3+ yrs)

- *Dinosaurs of Korea and Mongolia*
- *New fossils from age-unknown strata*
- *Co-evolution of fauna and sedimentary environment during early Paleozoic*

→ Addition or replacement of individual exhibit

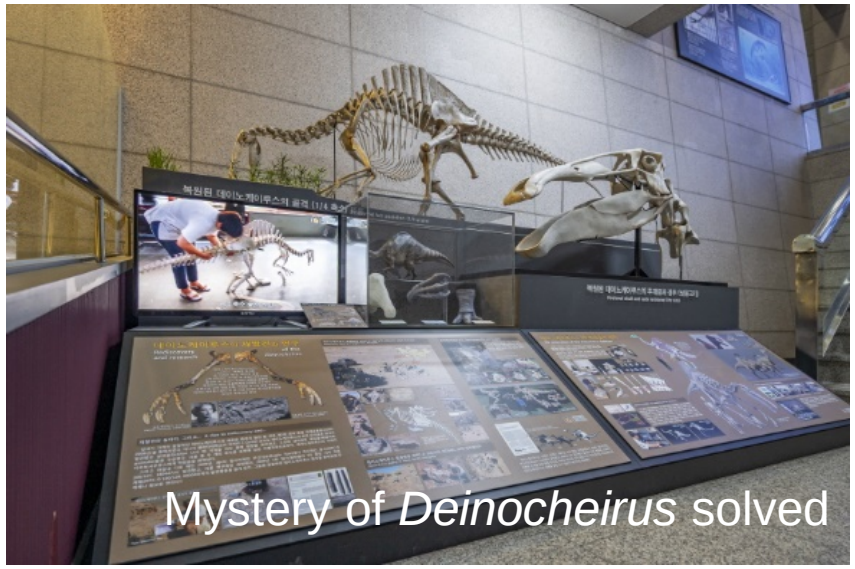
e.g., Dinosaur reconstruction exhibit (2019)

New (?) technique for developing exhibits – 3D printing

Self design & test

outsourced manufacture

Larger scale exhibits



Hands-on exhibit for understanding early mechanism of jaw

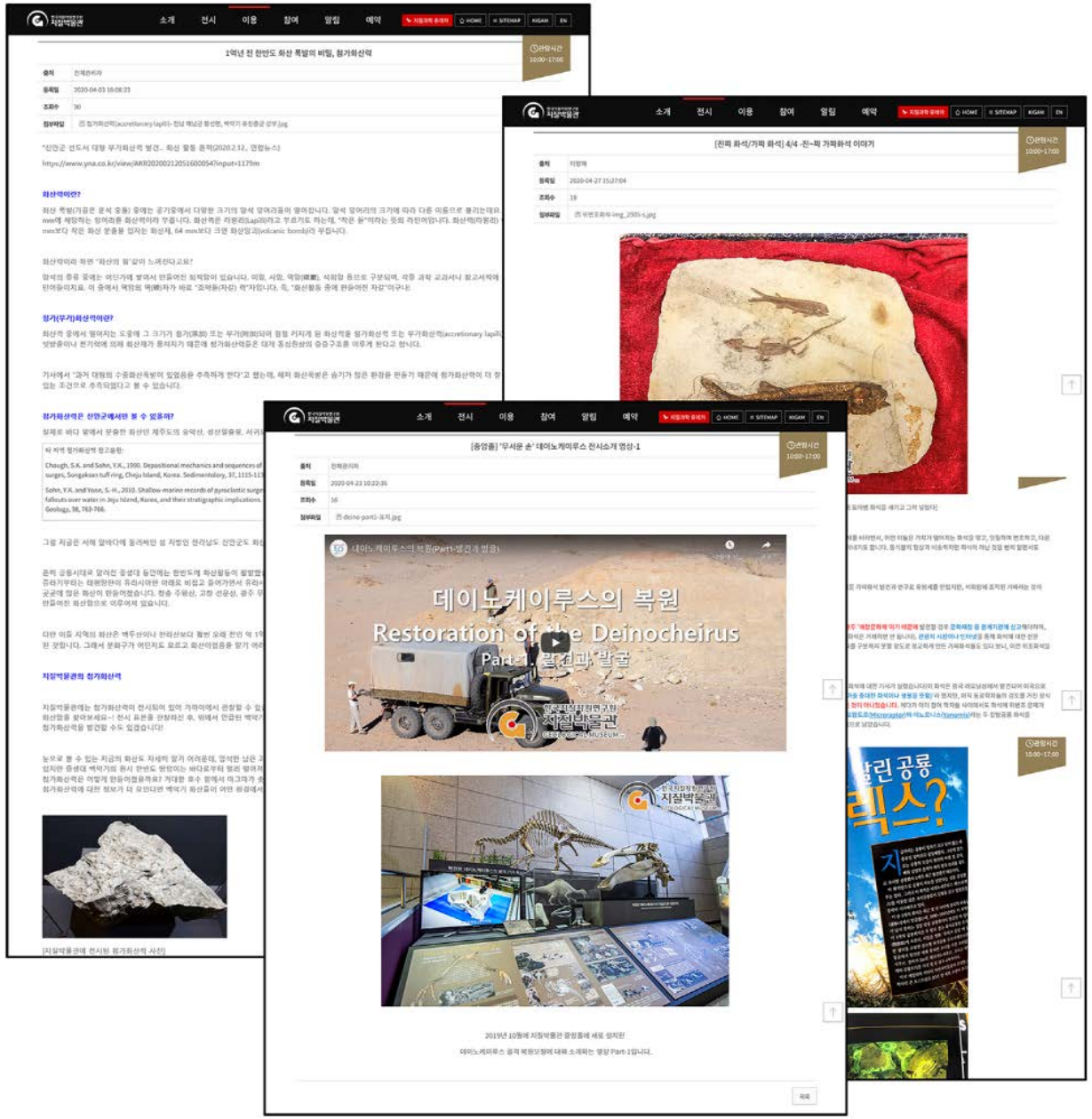
3. Activities to promote knowledge for visitors especially in 2020

“Geoscience Eureka” posting on GMK webpage

- Geology-related news interpretation
- Deep explanation on certain samples on show
- Misunderstanding and truth about fossils

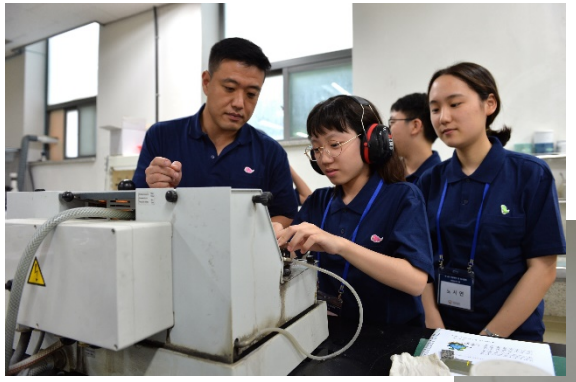
For on-line visitors

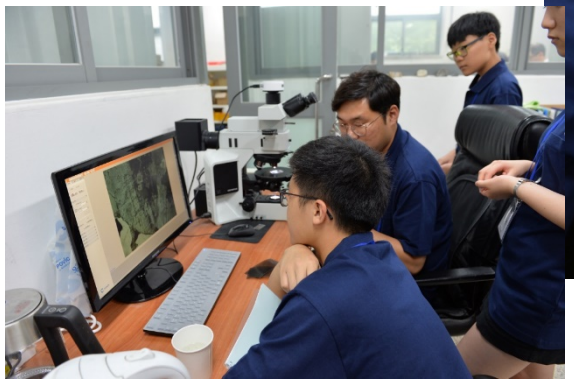
10 articles posted
in 2020



Educational events – rock thin section making

Before (~2019)





COVID-19

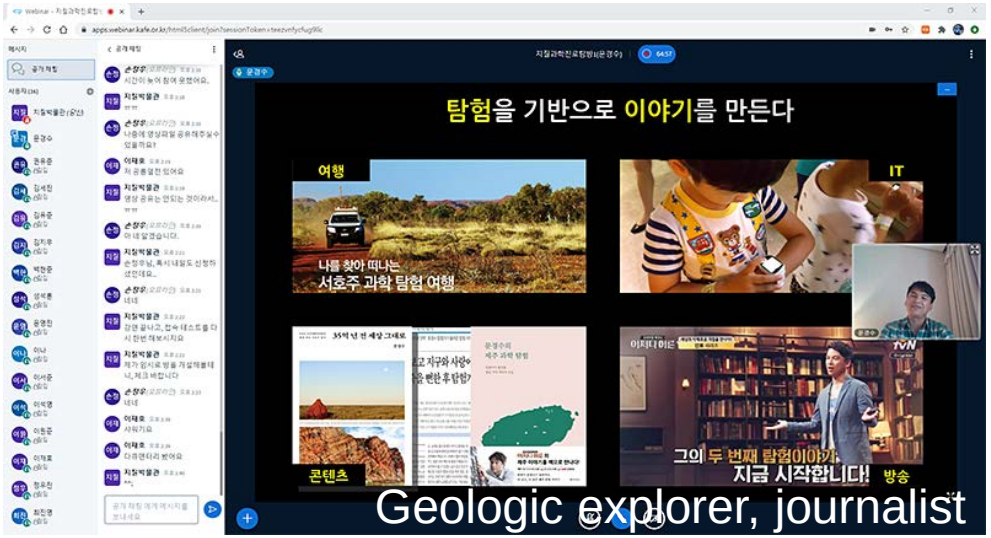
Delivery DIY kit (2020~)

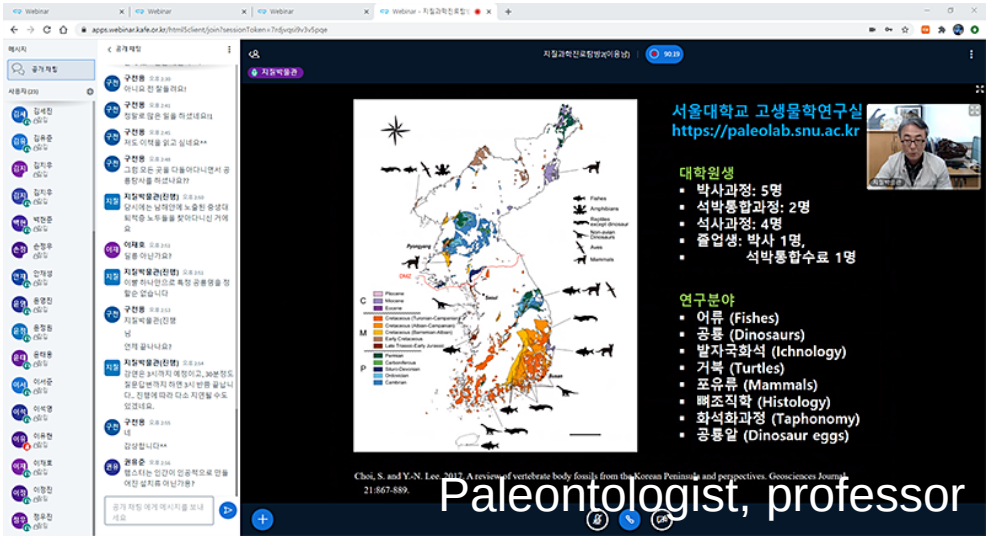
Educational events – lectures on career exploration in geoscience

Before (~2019)

COVID-19

On-line (2020~)



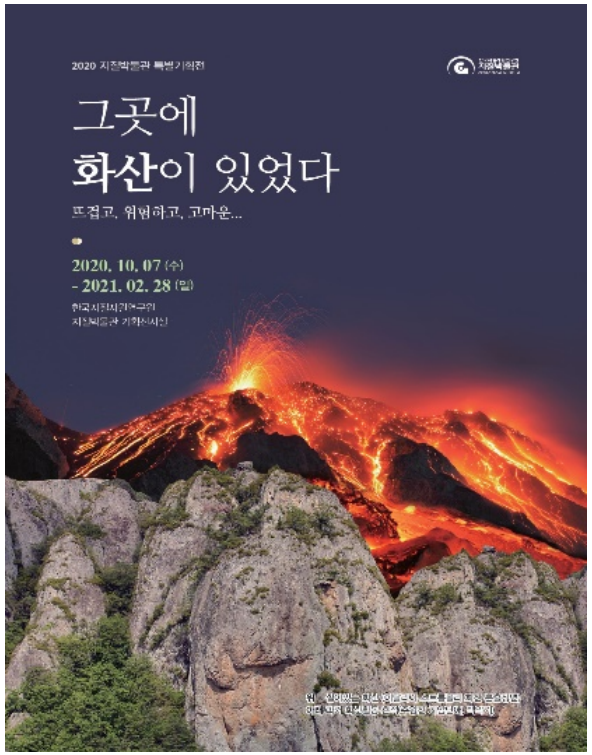


Special exhibition (every 2 yr, for 3~4 months)

Granite (2016)

Limestone (2018)

Volcano (2020)



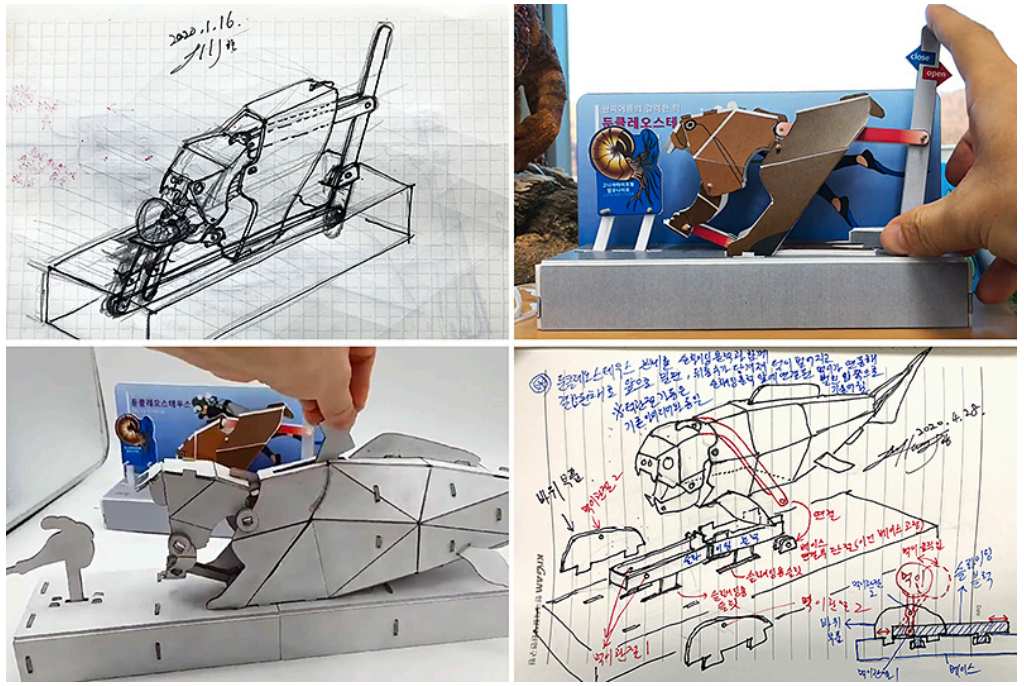
"There was a volcano:
the hot, the dangerous,
and the grateful…"

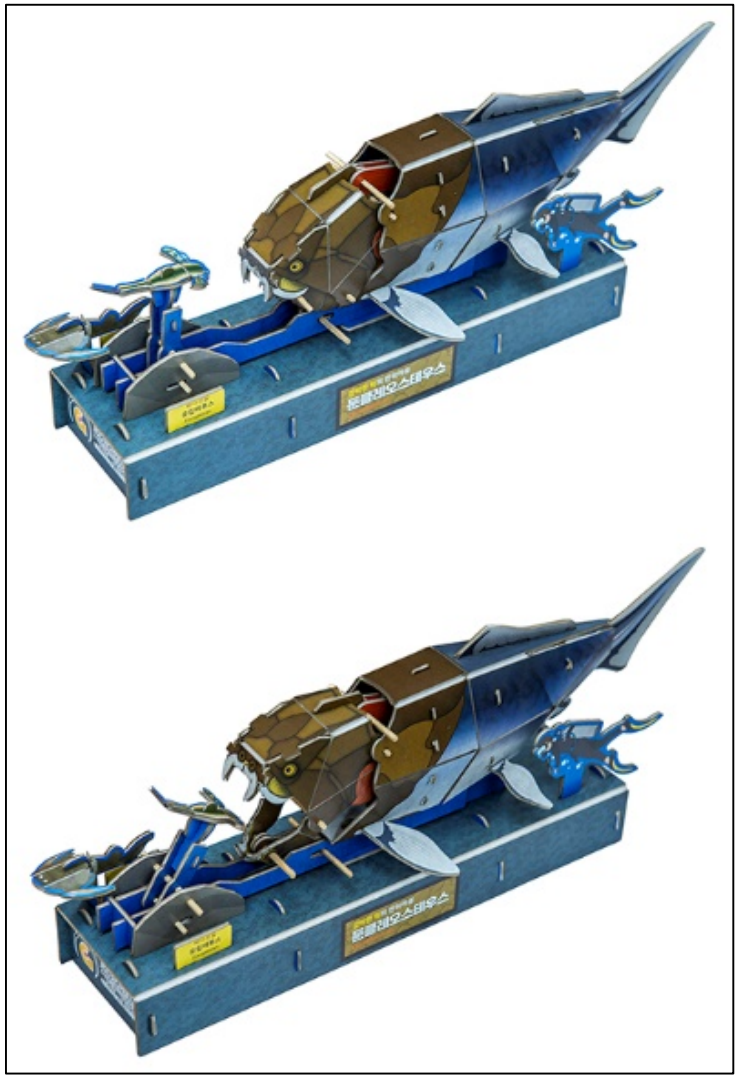
COVID-19

currently
transforming to
VR exhibition on website
for non-visit viewing

Secondary derivative from a new exhibit

Hands-on exhibit





KIGAM promotional education kit

4. Sample Management

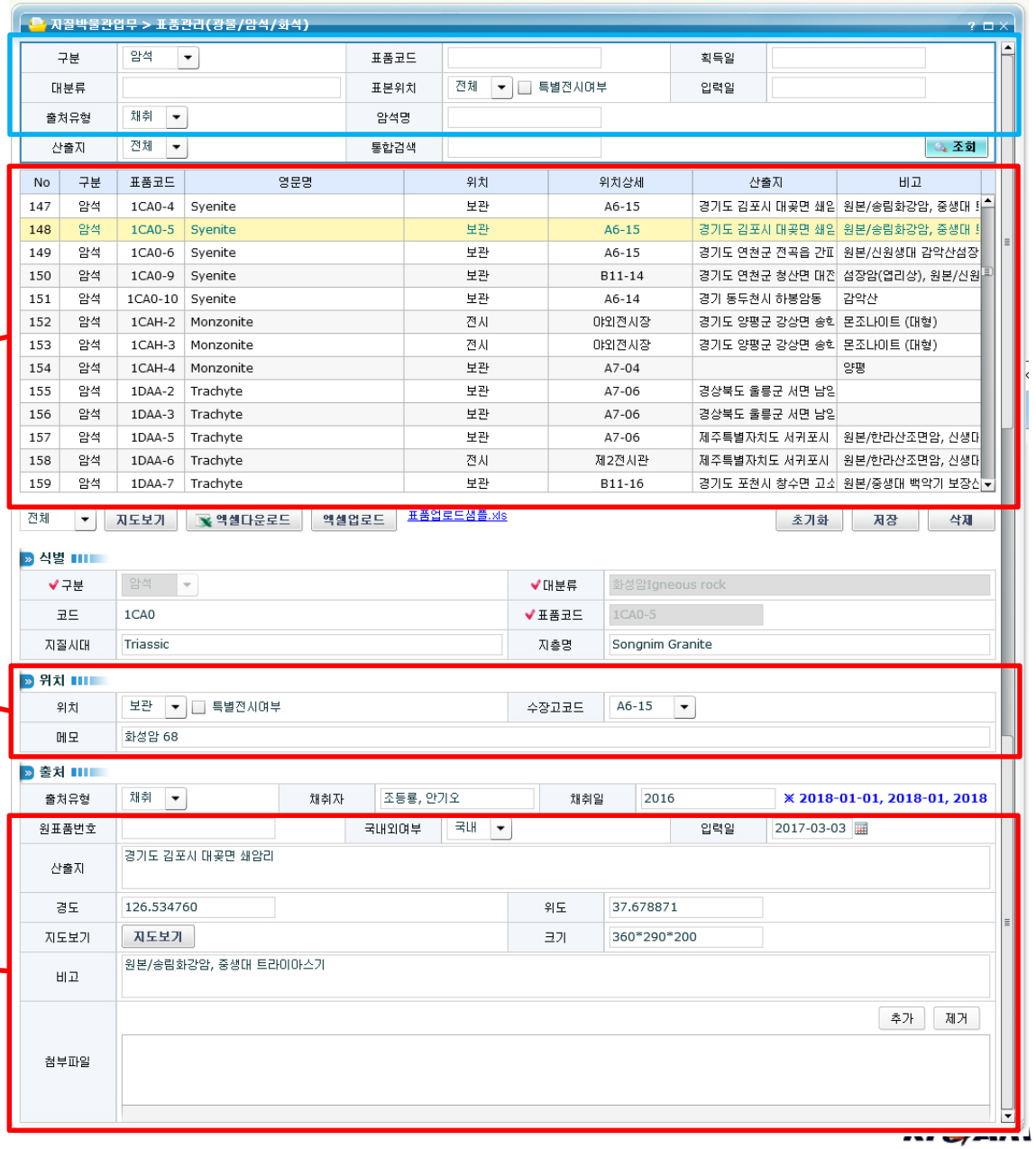
Sample management system (intranet, since 2018)

Designed
1. To know where the sample is
2. To easily add new samples in the list
3. To easily update geologic information of pre-existing sample
4. To enable sample search within KIGAM

Search result

Where it is now:
- a certain exhibition hall,
- storage room, or
- rent
- if stored, rack, shelf, & box numbers …

What it is:
- locality (coordinates)
- donated, sampled, or purchased
- size/dimension
- geology (formation, age …)
- remarks (related publications, preservation state …)
- photographs



Search by
- Category (rock, mineral, fossil)
- Subcategory (code)
- current position
- origin (domestic/overseas, donated/sampled…)
- keywords …

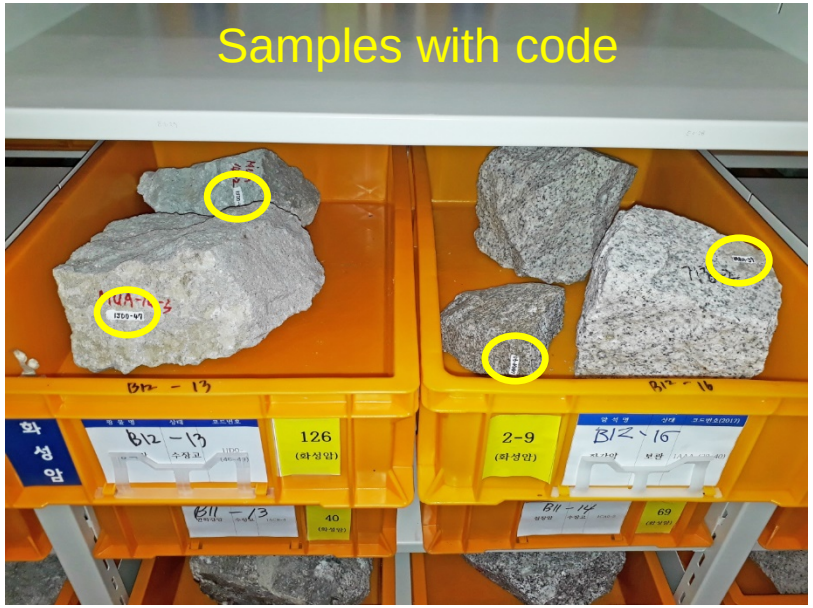
Hardware

- ✓ Basement of museum building
- ✓ Small and basic storage room
- ✓ Accessible by all museum staff

Rock section

Mobile racks (separate sections for rocks, minerals, and fossils)

Sample boxes on shelves



Samples with code

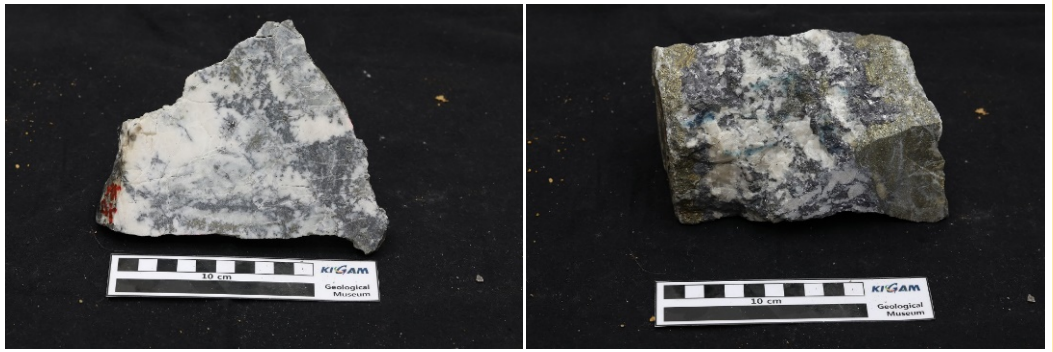
Collecting

- **Retired professors' or other organizations' donation**
- **Within-KIGAM donation**

  (e.g., Samples used in the geological survey report)

- **Thematic collection for revised stratigraphic units of Korea**
- **Valuable material from GMK's research, experiment, or analysis**

housed in separate section



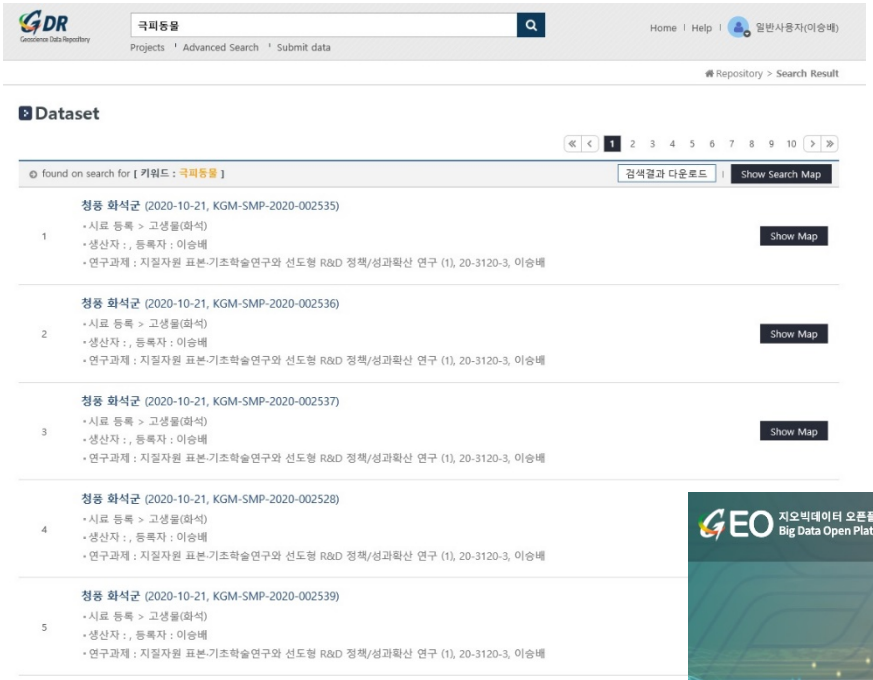
+400 important ore specimens donated by a retired professor in 2019

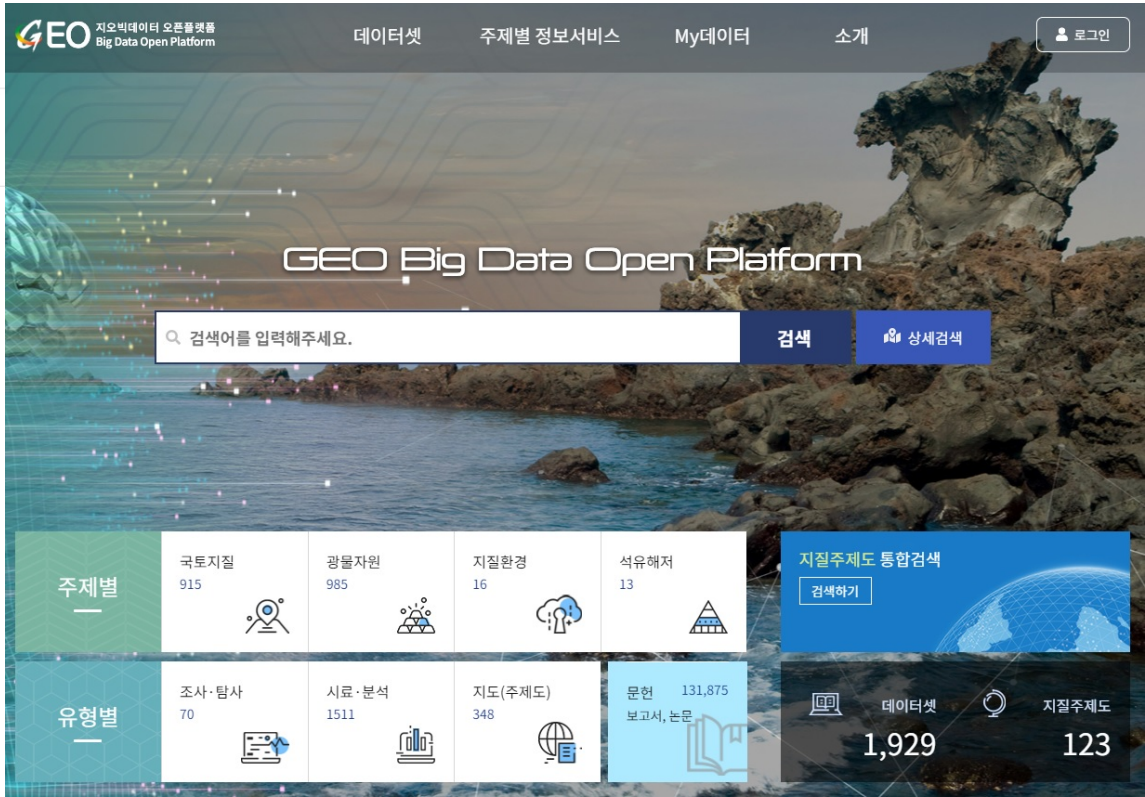
New fauna of echinoderms and brachiopods from age-unknown deformed stratum

New Cambrian trilobites

Into Geoscience Data Repository (GDR)

Geoscience Data Repository





Museum samples' metadata
also uploaded to GDR*
linked to
The Geo Big Data Open Platform
to be open to public

*Geoscience Data Center, KIGAM
is in charge of GDR and GBDOP

5. Major objectives 2021 ~ 2024

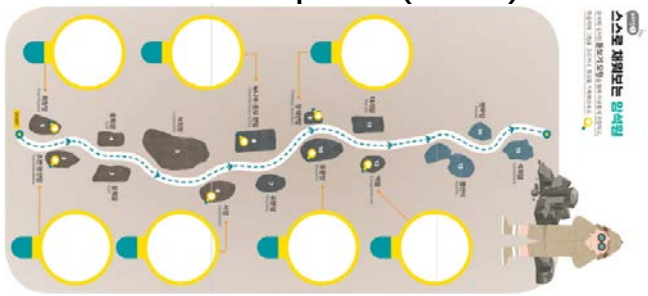
Rock (Geology) is everywhere, fun, and important!

We are the KIGAM! We are the ONE!

EDUcation +enterTAINMENT

- ✓ Hands-on activities
- ✓ Learning through amusement
- ✓ For diverse age-groups

"Playing lithophones (rock xylophones)" outdoor space (2021)



Upgrade of outdoor exhibition activity sheet (2021)

Quality education opportunity

- ✓ Providing a practical field for geological activity for high schoolers and collegers

"Geology Basics and Exercise" outdoor space (2023)

KIGAM's social engagement

- ✓ Exhibition of social issues in relation with KIGAM's research field

Special exhibition on
"Fossils as geoheritage (2022)"

Some indoor exhibit replacing to
"Fault and Earthquake (2022)"
"Climate Change (2024)"

Geoheritage popularization contents based on national-level samples designated by the Cultural Heritage Administration of Korea (e-book?, 2024)

6. Crude Ideas for collaboration with DMR museum(s)

1/2 Exchange of special exhibition with common interest

Explanatory panels and videos of general geology easily reproducible with translation
(Where limestone forms, composition and classification of limestone,
Definition and types of volcano, volcanic products, rocks, and hazards…)

Samples and activity items better to be modified by the other party

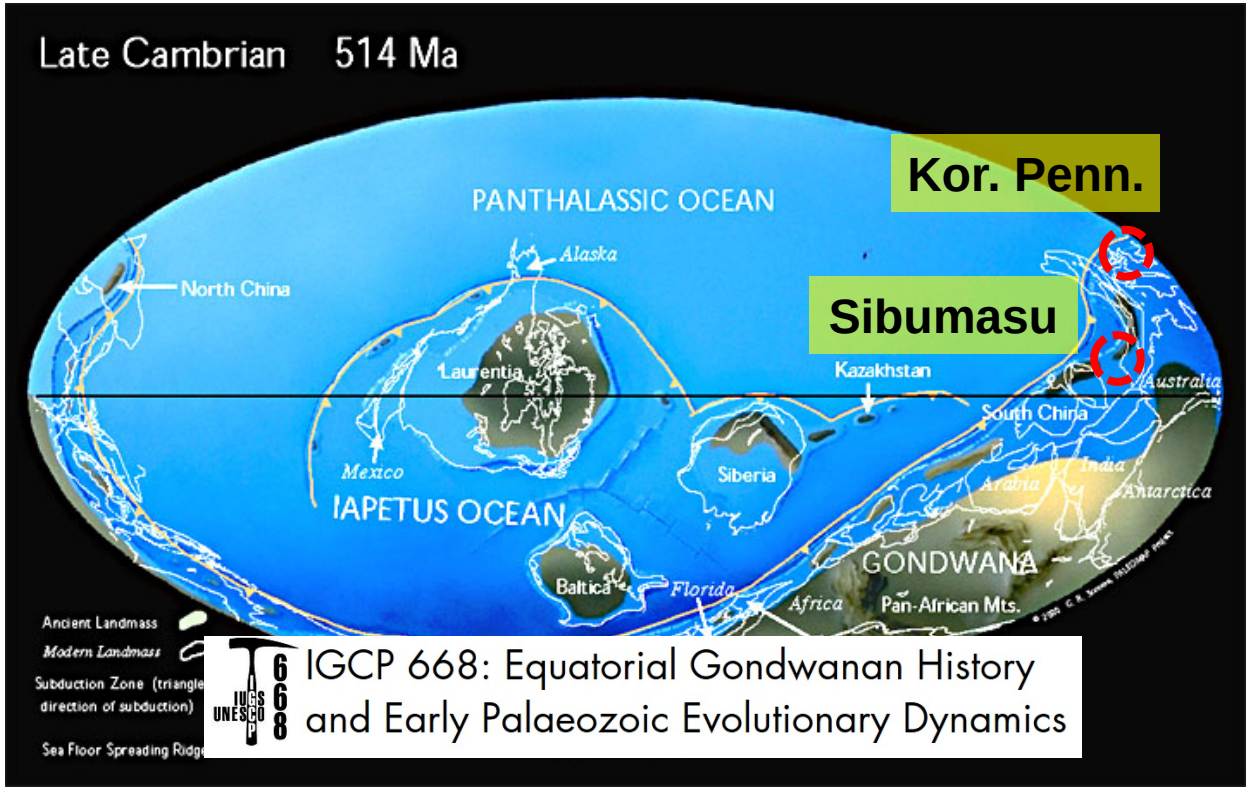
Once modified into Thai (Korean) style,
the exhibition can travel from museum to museum within Thailand (Korea).

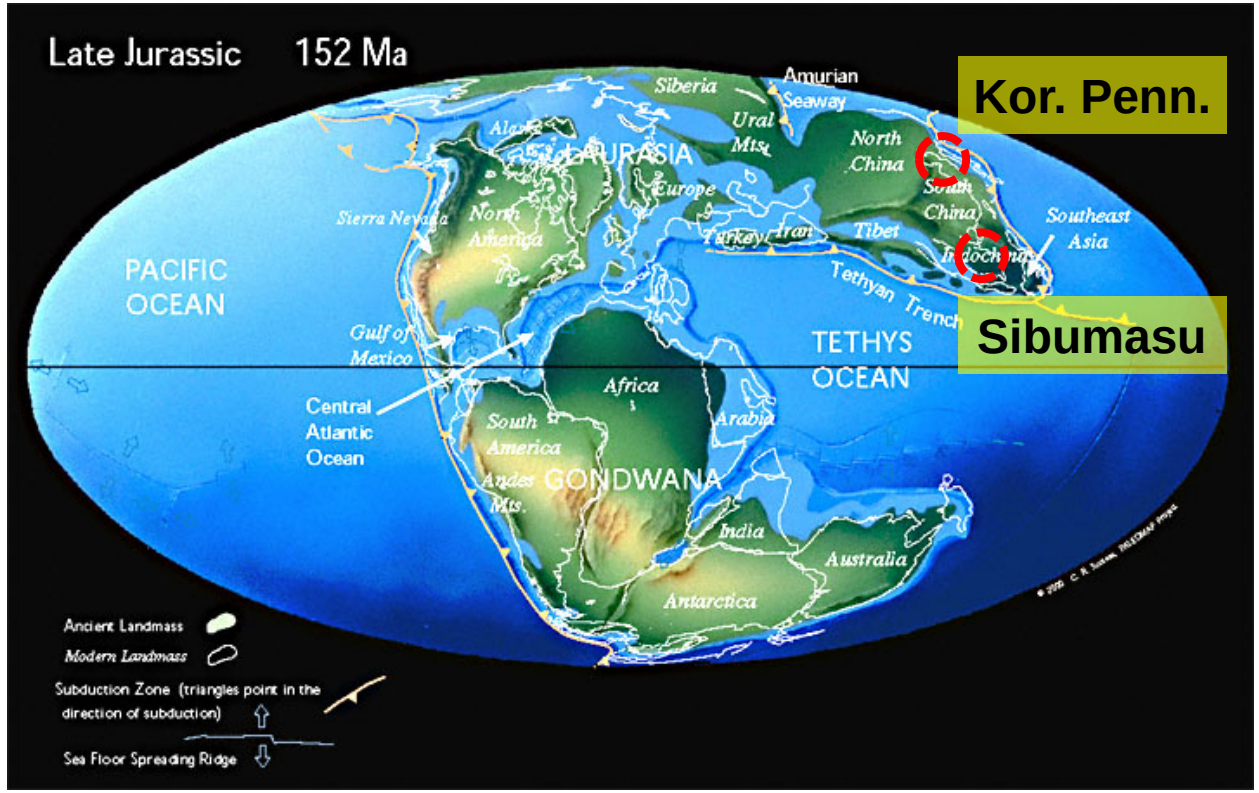
2/2 Joint Research

Close paleogeographic relationship between Korea and Thai
in **early Paleozoic** by sea and in **Mesozoic** via land

Invertebrate paleontology and sedimentology available

Vertebrate paleontology available





Contributable to collection of exotic geologic material (samples),
utilizable for future joint exhibitions of various scale or for some educational contents development/sharing to both sides

Thank you.


출발
버스
지하철
스토어뷰
음식점
주차장
Communicator
between
Geoscience and Public
KIGAM

Supplement 1.

Ordinary services

Guided tour

via KIGAM retirees

mobile service

Hands-on activity rooms

Virtual fossil excavation


Dinosaur bone puzzle


Hand specimens


Microscopes

Supplement 2.

Further information on Sample Classification Scheme

Geological Sample Metadata Scheme

Combined metadata format for **Rocks**, **Minerals**, **Fossils**, and Replicas

[Input data for each sample]

1. Category: rock, mineral, fossil, replica
2. Category code: 165 for Rocks, 24 for Minerals, 22 for Fossils (replicas)
3. Sample code: category code + serial number
4. Present location: **display** (hall and booth name), **storage** (rack and shelf number), or **rent**
5. Origin: sampled, donated, or purchased
6. Raw number (if existed)
7. Domestic or overseas
8. Name of sampler, donator, or vendor
9. Date of acquisition
10. Place of origin: address, geographic coordinates (if known)
11. Date of metadata input: automatically generated, manually modifiable
12. Size: length x width x height in mm
13. Remarks: related publication info, preservation issues, etc.
14. Common names: in Korean and in English
15. Detailed classification: e.g. rock: welded-tuff, fossil: phylum-class-order-family-genus-species
16. Geologic information: age, stratigraphic unit
17. Rental information

Major categories and codes

165 **rock codes** given to 74 Igneous, 48 Metamorphic, 43 Sedimentary rocks

Examples

1) Igneous rocks: Granite (1AAA), Biotite granite (1AAH), Tonalite (1ADD), Brecciated basalt (1ECN), Pumice (1JH0)
2) Metamorphic rocks: Slate (2H00), Mica-quartz schist (21MS), Garnet granitic gneiss (27E0), Marble (2R00)
3) Sedimentary rocks: Sandstone (3D00), Tuffaceous conglomerate (3870), Carbonaceous Shale (3TT0), Lignite (4P10), Chert (4950)

Specific code for rock sample = rock category code + serial number

Examples

13^{th} granite (1AAA-13), 3^{rd} pumice (1JH0-3), 21^{th} sandstone (3D00-21)

Rock sample classification and codes adopted from
“A petrological-mineralogical code for computer use”, published by Natural Environment Research Council (NERC): Institute of geological sciences (UK)

Major categories and codes

24 mineral codes given based on composition

Specific code for mineral sample = mineral category code + serial number
Example
7th feldspa =7Mxx

Mineral sample classification and codes adopted from
“A petrological-mineralogical code for computer use”, published by Natural Environment Research Council (NERC): Institute of geological sciences (UK)

Code	Classification
7A	Native elements
7B	Sulfides
7C	Sulfosalts; Selenides and Tellurides; Arsenides; Antimonides and Bismuthides
7D	Oxides; Hydroxides
7E	Titanates; Niobates; Tantalates
7F	Halides
7G	Nitrates; Iodates; Borates
7H	Carbonates
7I	Sulfates
7J	Phosphates
7K	Arsenates; Vanadates
7L	Arsenites; Antimonates and Antimonites; Selenates and Selenites; Tellurates and Tellurites; Chromates; Tungstates, and Molybdates
7M	Feldspars; Feldspathoids; Zeolites; and Associated silicates
7N	Pyroxenes; Pyroxenoids; Amphiboles
7P	Micaceous minerals and clay minerals
7Q	Olivine, Epidote, Garnet, Sillimanite Groups
7R	Silicates(except those in 7M to 7Q above) of Group Ⅰ, Ⅱ metals
7S	Silicates(except those in 7M to 7Q above)
7T	Silicates(except those in 7M to 7Q) of group Ⅳ metals, Group Ⅴmetals and Group Ⅵ metals
7U	Silicates(except those in 7M to 7Q) of Groups Ⅶ and Ⅷ metals
7V	Silicates(except those in 7M to 7Q) containing other anions
7Z	Hydrocarbons, Resins, Bitumens and other organic compounds
8A	Extra-terrestrial minerals: Meteorite
8B	Extra-terrestrial minerals: Tektite

Major categories and codes

Specific code for fossil sample = fossil category code + serial number

22 fossil codes according to taxa

Fossil sample classification and codes partly adopted from "National Species List", published by National Institute of Biological Resources, Ministry of Environment (Korea)

Kingdom	Phylum	Code
Animalia	Chordata	9A
	Porifera	9B
	Cnidaria	9C
	Brachiopoda	9D
	Acanthocephala	9E
	Ctenophora	
	Echiura	
	Enotoprocta	
	Nematomorpha	
	Nemertea	
	Siphuncula	
	Gastrotricha	
	Tardigrada	
	Rotifera	
	Nematoda	
	Chaetognatha	
	Platyhelminthes	
	Bryozoa	9F
	Mollusca	9G
	Arthropoda	9H
	Annelida	9I
	Echinodermata	9J
	Hemichordata	9K

Kingdom	Phylum	Code
Plantaea	Pteridophyta	9L
	Pinophyta (=Gymnospermophyta)	9M
	Magnoliophyta (=Angiospermophyta)	9N
	Bryophyta	9O
	Marchantiophyta	9P
	Anthocerophyta	9Q
	Charophyta	
	Chlorophyta	
	Rhodophyta	
	Bacillariophyta	
	Dinoiphyta	
	Ochrophyta	
	Unidentifiable plant	9R
Protista	Granulorecticulos	9S
	Actonopoda	
	Apicomplexa	
	Micropora	
	Ciliophora	
Dubacteria	Cyanobacteria	9T
	Actinobacteria	
Archaea	Euryarchaeota	9U
Unclassifiable fossils		9Z