



Laboratory of hydraulic Structures and GeoEnvironmental engineering EGGs

2022 autumn version

OUR MOTTO

Pursuit of Knowledge and Technology for Future Generations

Several *keywords* we have are

Dam management

Groundwater

Materials

AI

SDGs

REPRESENTATIVE RESEARCH TOPICS:

Quantification of solute transport phenomena in heterogeneous aquifers

Development of eco-friendly construction materials and high-performance concrete

Prediction of dam seepage using machine learning

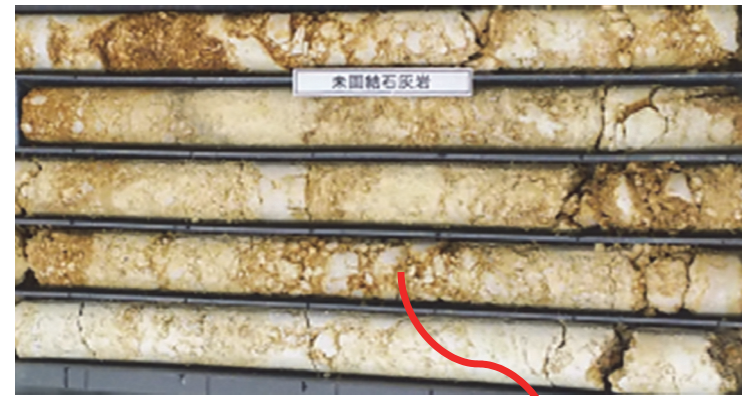
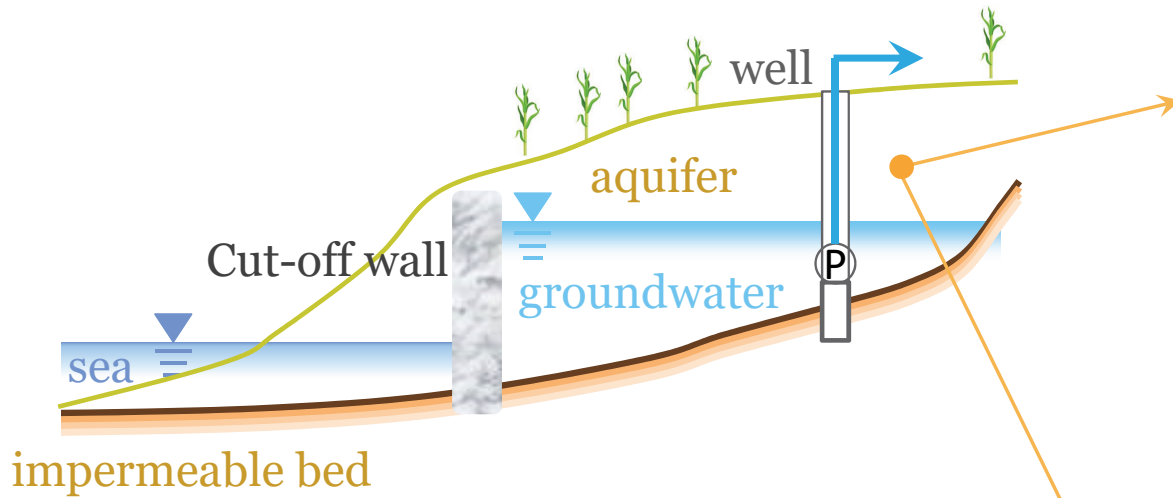
OUR RESEARCH TOPICS

SUBSURFACE DAM

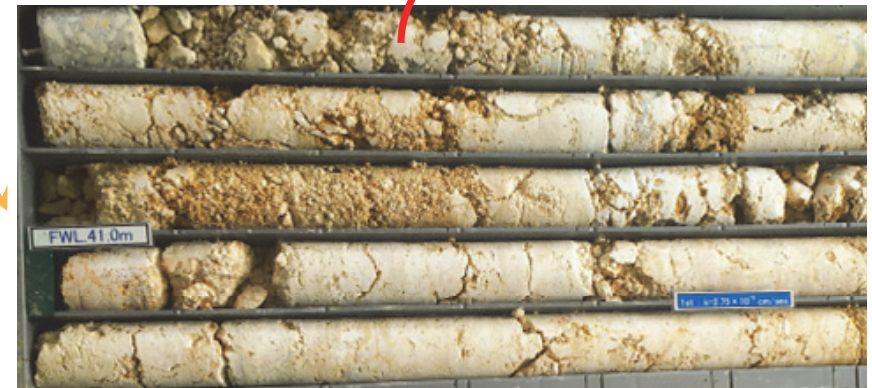
We have a research field in KIKAI island, Kagoshima prefecture in order to clarify the water and solute transport phenomena and to contribute **an effective management of subsurface dam** reservoir. Laboratory scale experiments related to salt water intrusion and solute transport in **highly heterogeneous porous formations** are also conducted.



Subsurface dams



Groundwater is stored within these pores.

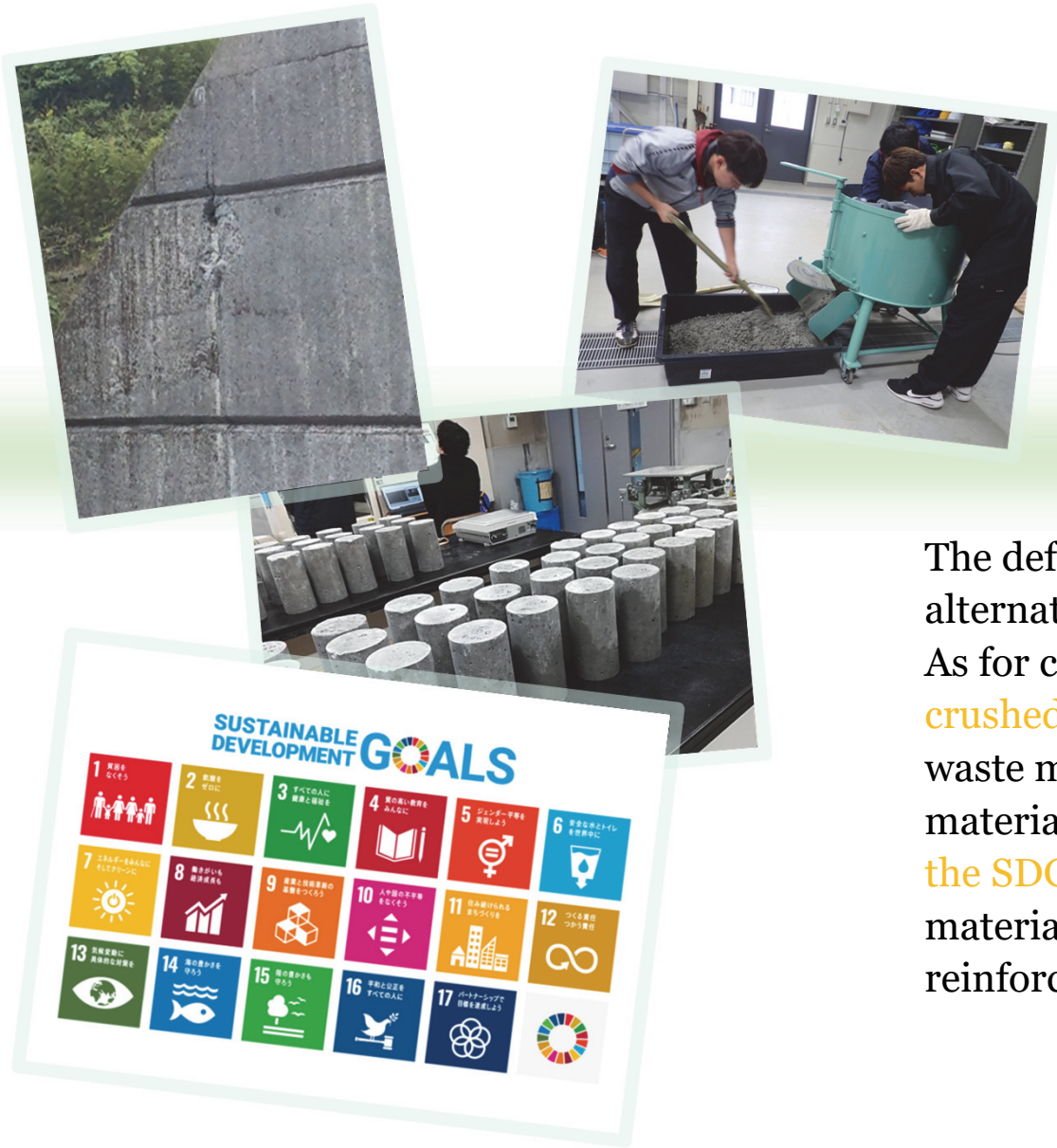


Subsurface dam is a wall structure designed to dam up the groundwater flow and store groundwater in a suitable geological formation and contribute to the increase of agricultural production and sustainable water use.

OUR RESEARCH TOPICS

UNIQUE CONCRETE

The deficit of natural sand arises the need of alternative materials for replacement of natural sand. As for concrete structure, we explore the utilization of **crushed stone** powder which is locally available stone waste material. This study is expected to reduce the material cost and construction cost and **to promote the SDGs**. We are also developing some concrete materials involving porous concrete and fiber-reinforced concrete.





OUR RESEARCH TOPICS

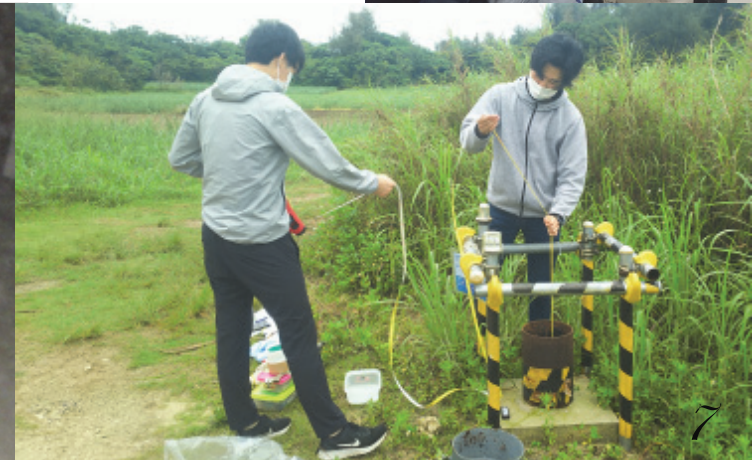


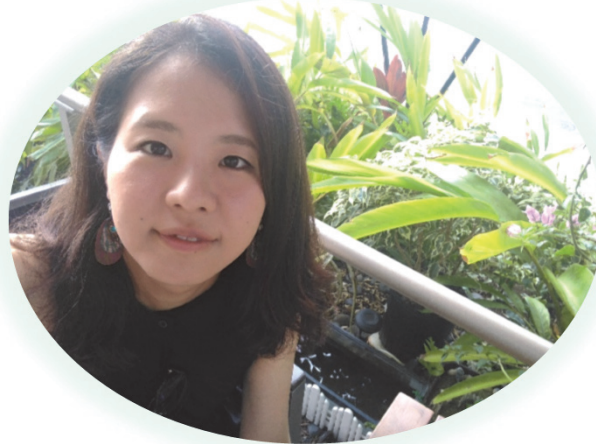
ARTIFICIAL INTELLIGENCE

Seepage rate through, below, or around dams is **an essential indicator of the health and condition of the dam**. Any abrupt change in the amount of leakage may be a serious sign of deterioration of dam body. We aim to create an artificial intelligence capable of predicting seepage rate and giving an alert for dam management.



Meet our professors and students





Dr. Mariko SUZUKI

Assistant Professor

- Eco-friendly construction materials
- High performance concrete
- Embankment

Professors



Dr. Kazuya INOUE

Professor

- Seepage & solute transport
- Inverse analysis & random walk theory
- Machine learning & artificial intelligence

Meet our students



Tomofumi OSHITA, M2
Predicting dam leakage
using **machine learning**

Kazutaka TOMITA, M2
Development of impervious
material of small earth dams
using **by-product** from quarry



Kento KOIDE, M2
Characteristics of **urea-mixed**
concrete with different
production processes



Yoshitarou TAKAHASHI, M2
Quantification of **density-driven flow**
in porous media



Itsuki MAENO, M2
Estimation of porosity of limestone
by thermal images, machine learning
and **deep learning**





Tomoka INAGUCHI, M1
Development of function
diagnosis of subsurface dams



Naoki KAYASHIMA, M1
Strength comparison of expansive
mortar and **deterioration**
mechanism of soil mixing wall



Naoki YAMASHITA, M1
Non-Fickian and anomalous
solute transport phenomena

Meet our students



Meet our students

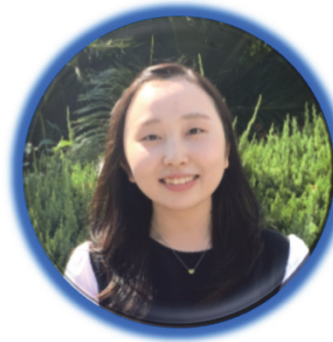
Yui TAKEUCHI, B4

Anomalous solute transport in highly heterogeneous porous media



Ai TAKANO, B4

Alerting management system in water quality using artificial intelligence



Kouki MATSUMOTO, B4

Mechanical properties of dehydrated cake discharged from crushed stone quarry



Momoko MAKINO, B4

Seawater intrusion phenomena in subsurface dams



Kentarou ISHIMOTO, B4

Mechanical properties of crashed stone dehydrated cake treated by cement

Nagi HONDA, B4

Unique concrete



Meet our students



Hokuto OKABE, B3
Chaos and fractal
hydraulic conductivity
modelling



Mio SUNAGUCHI, B3
Unique concrete



Yuta TERAMOTO, B3
Application of **persistent homology** to
artificial intelligence

Get in touch with us!



E-mail: mornel@kobe-u.ac.jp (Kazuya INOUE)

E-mail: msuzuki@peridot.kobe-u.ac.jp (Mariko SUZUKI)

URL: <https://www.research.kobe-u.ac.jp/ans-hysteng/index.html>

