

A PhD Research at Kyoto University

Failure Mechanism and Dynamic Process of Rainfall-induced Landslides through Physically Simulation Models: Case Studies in Asia

Methodology

Data Collection

- Field investigation
- Soil sampling
- Literature review

Laboratory Experiment using the Ring Shear Apparatus

- Un-drained shear stress control tests
- Pore-water pressure control tests, etc.

Landslide Simulation

- LS Rapid Model

Vietnam SATREPS Project

Case Studies

Master Thesis

Hai Van Landslides in the Weathered Granitic Rocks

On going

Deep-seated Catastrophic Landslides in Kii Peninsula

Tentative

Deep-seated Catastrophic Landslides in Nepal

Landslide risk assessment and the analysis

Failure Mechanism

Dynamic Process

Comparison between JP&VN

Proposals to LRA

Doctor Disertation

Research Framework on Landslides in PhD Program

Participating in research activities of the project



Site surveys on Hai Van Landslides



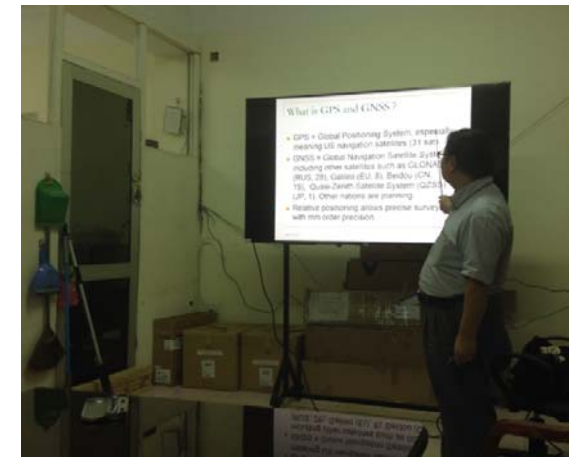
Aerial photo interpretation



UAV training



Landslide flume test



GNSS-usage training

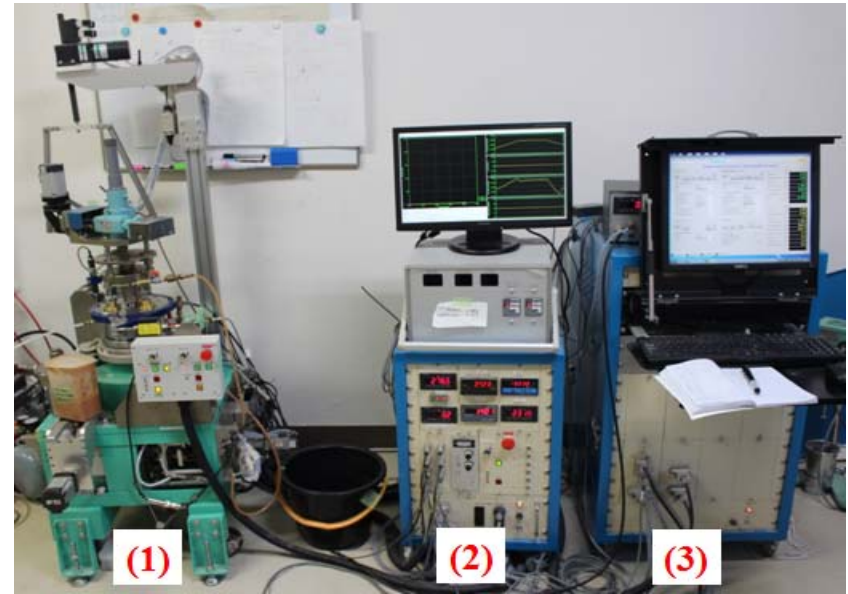
Study on rainfall-induced landslides in Hai Van Mountain



Weathered white granitic sand – Hai Van 2 (HV2)

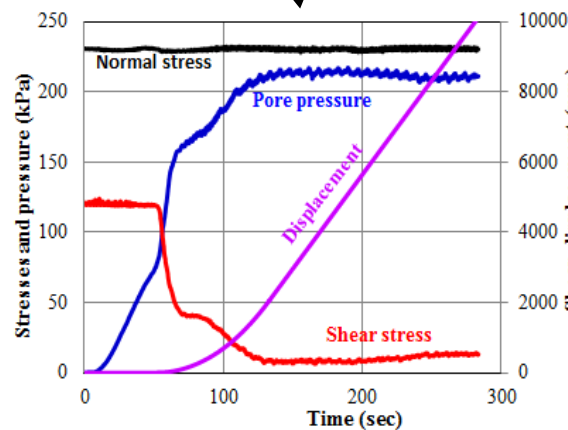
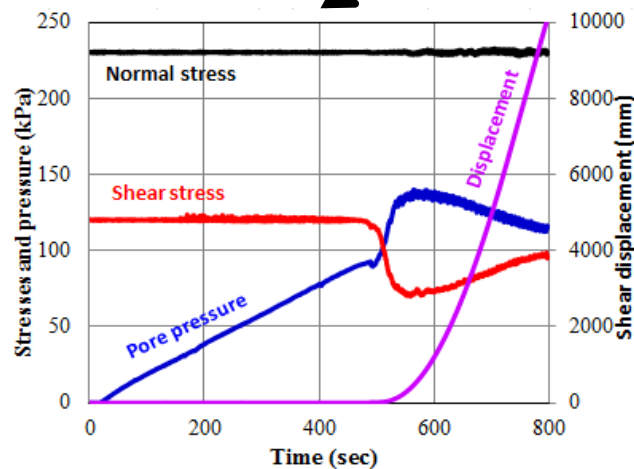


Weathered brown granitic soil sample – Hai Van 1 (HV1)

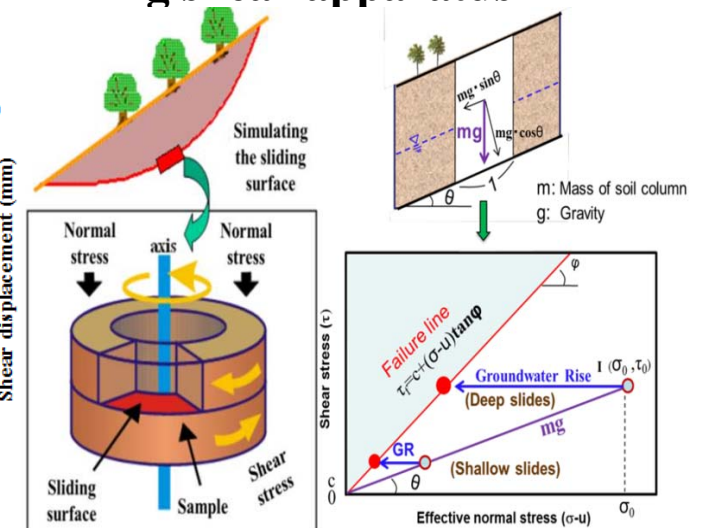


Soil sampling

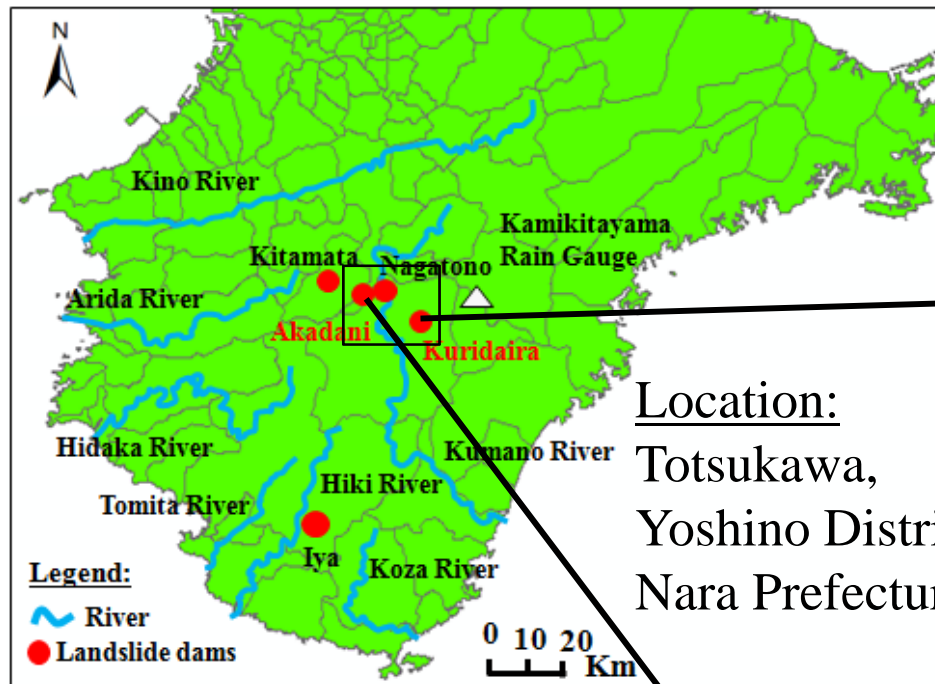
Landslide reproduction by ring shear apparatus



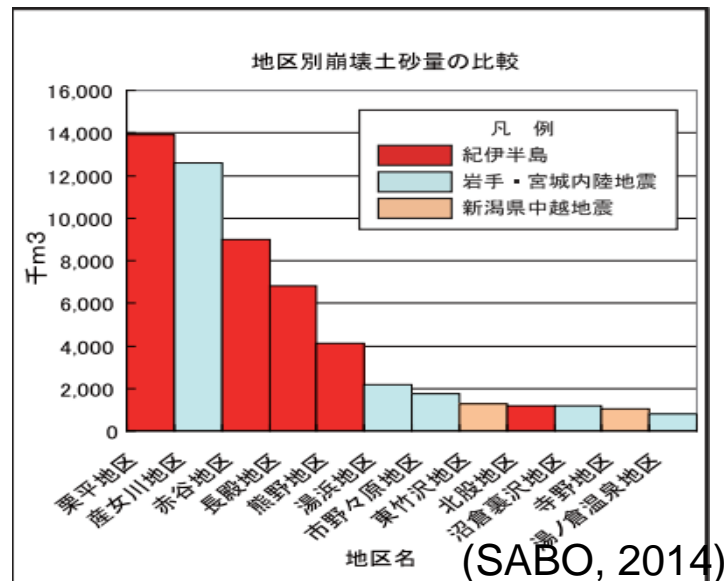
Test results



A study on Kii landslides



Location:
Totsukawa,
Yoshino District,
Nara Prefecture



(SABO, 2014)



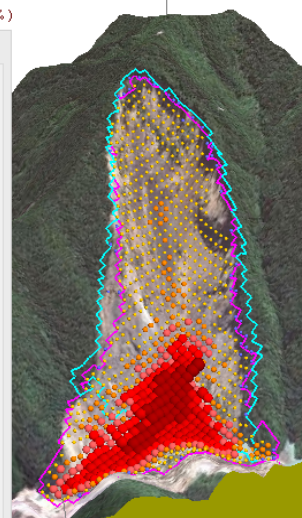
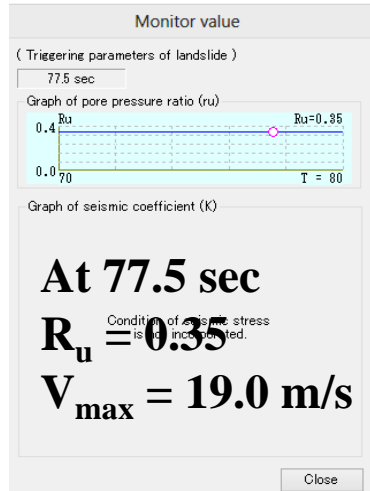
Photos courtesy of
Akatani and Kuridaira
landslide dams by Kii
Mountaion District Sabo
Office (SABO)

A study on Kii landslides

Computer Simulation Model of the Akatani landslide

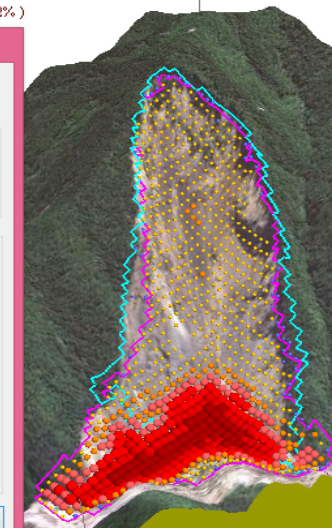
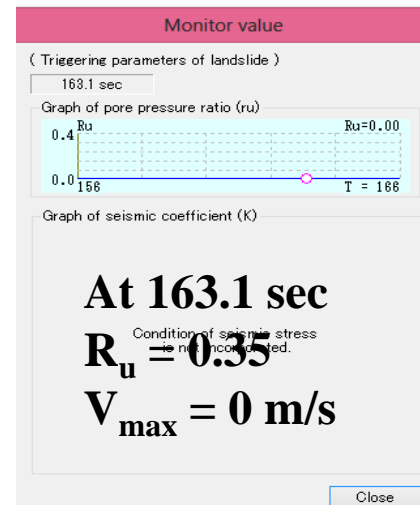
Landslide movement decelerated

Step : 16560 Time : 77.5 sec
 Umax : 15.8 m/sec Vmax : 19.0 m/sec
 Notes : First Soils (m3) : 9197000 , Current : 10118992 (10.0%)

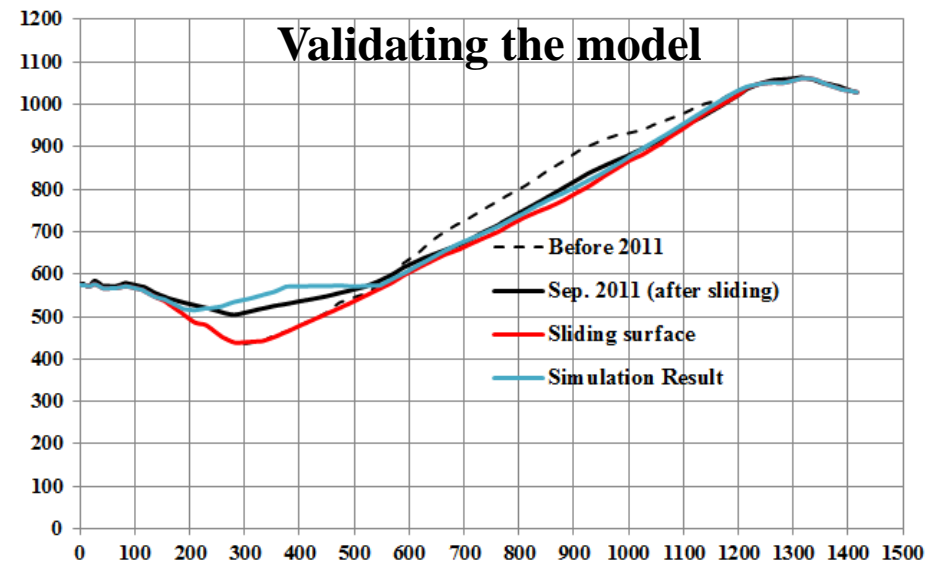


Mass movement stopped and formed a dam

Step : 33695 Time : 163.1 sec
 Umax : 0.0 m/sec Vmax : 0.0 m/sec
 Notes : First Soils (m3) : 9197000 , Current : 10224602 (11.2%)



Validating the model

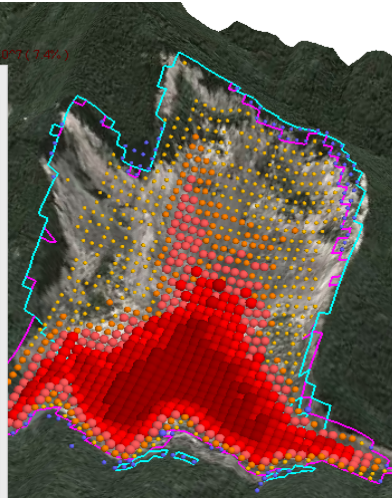
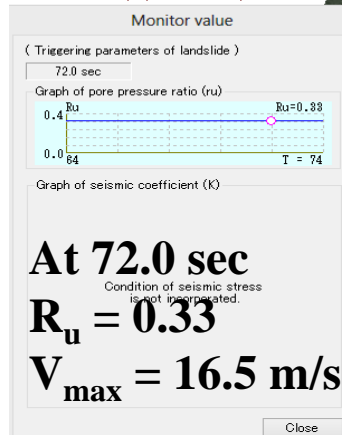


A study on Kii landslides

Computer Simulation Model of the Kuridaira landslide

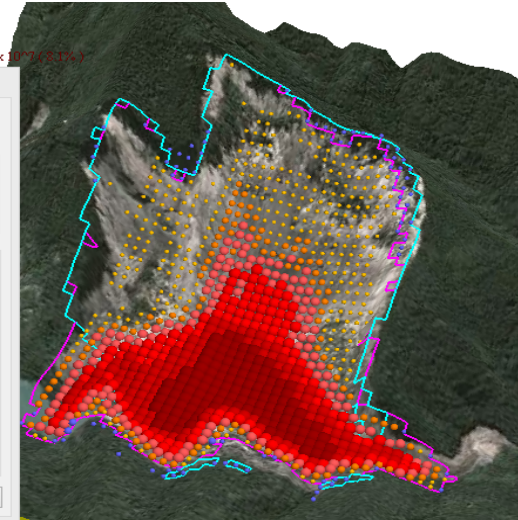
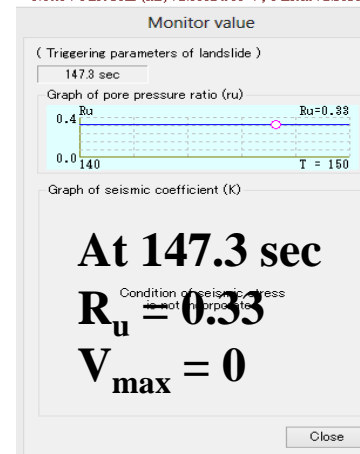
Landslide movement decelerated

Step : 15400 Time : 72.0 sec
 Umax : 10.7 m/sec Vmax : 16.5 m/sec
 Notes : First Soils (m3) : 2.1862 x 10⁷ , Current : 2.3436 x 10⁷ (1.07%)

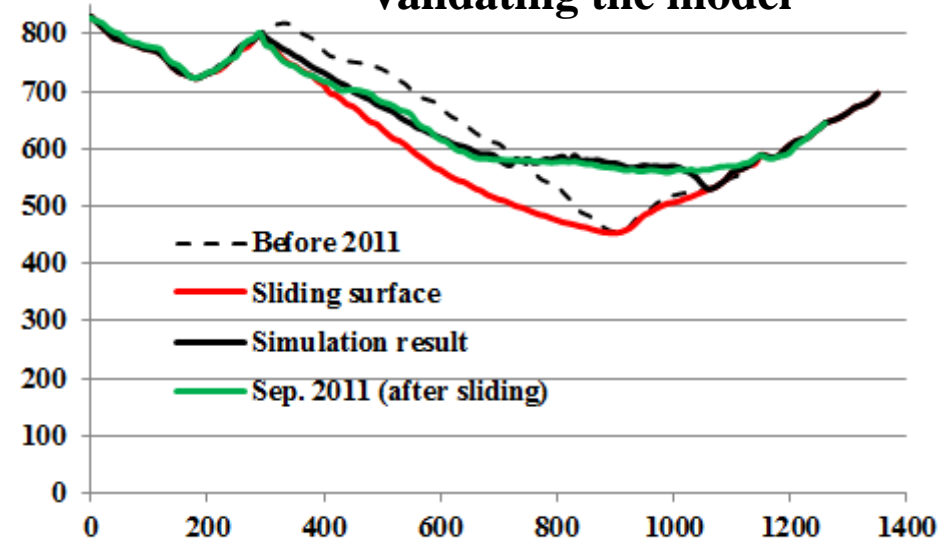


Mass movement stopped and formed a dam

Step : 30466 Time : 147.3 sec
 Umax : 0.0 m/sec Vmax : 0.0 m/sec
 Notes : First Soils (m3) : 2.1862 x 10⁷ , Current : 2.3636 x 10⁷ (8.17%)



Validating the model



International Cooperation Project in Nepal

Integrated Community-Based Disaster Risk Reduction Program in Nepal

Project counterparts:

1. Disaster Prevention Research Institute, Kyoto University
2. National Society for Earthquake Technology – Nepal NSET
3. Institute of Engineering, Tribhuvan University



Tribhuvan University

Lectures/interactive discussions with local people/students



पहिरो देखि होसियार।
BEWARE OF LANDSLIDE



Supported by:
Kyoto University
Japan

Landslide hazards at Kerabari village

The ongoing displacement process was identified



Pre-disaster measures for mitigating damages



Hole digging



Making a fence



Preparing steel wire

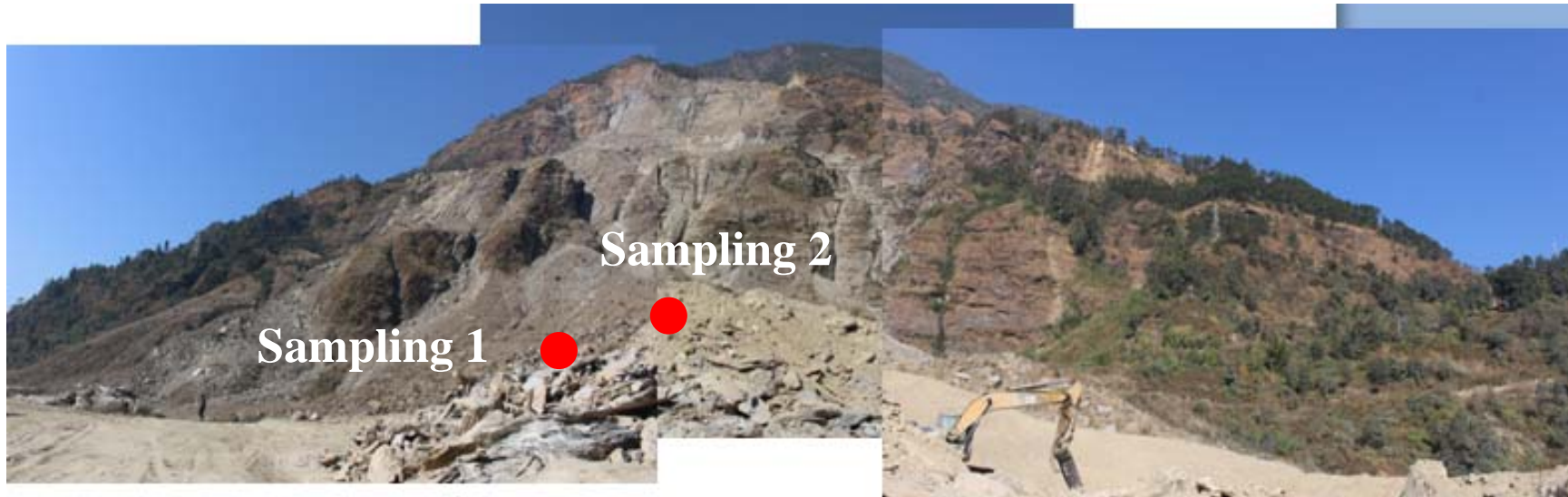


Building a crack monitoring system

A joint research on the Jure landslide dam in Nepal

The Jure landslide (7.4 million m³) occurred on August 2, 2014, killed 156, extensively destroyed tens of houses and damaged to the Sunkoshi hydropower dam (MOI, 2014).

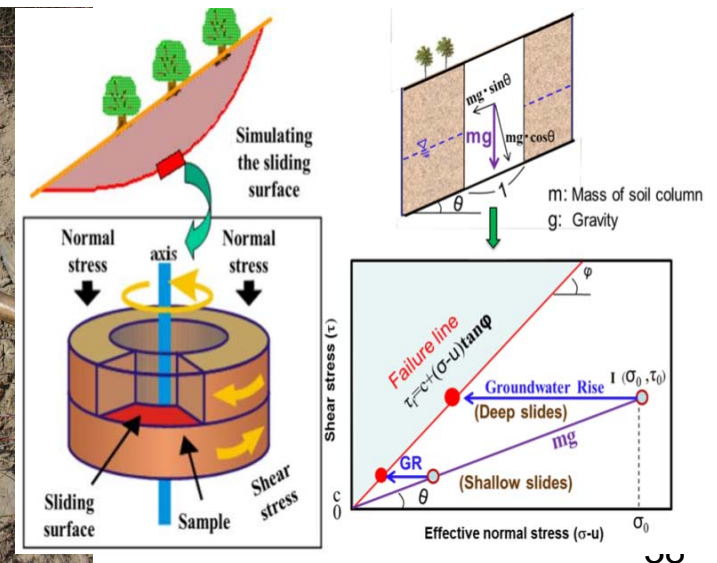
Overview of the Jure landslide (Dec. 2016)



Sample 1 (Phyllite rocks)



Sample 2 (Sandstone)



Conclusion

1. The Vietnam SATREPS project with its achievement presented a **remakable case of the joint cooperation project.**
2. The significance for the promotion of the international cooperation research
 - **Promoting and creating innovations/ excellent ways** in addressing and solving global/regional issues towards **sustainable development**
 - **Jointly developing the research capacity** (human resources and advance in science and technologies) in project counterpart countries
 - **Establishing international research networks** for DRR
 - **Widely promoting the development of science and research** worldwide

**Thank you very much
for your kind attention!**

