

IPL Project Annual Report Form 2012

1. Project Title: Dynamics of subaerial and submarine megaslides

2. Main Project Fields

(1) Technology Development

Development of new high stress ring shear apparatus for 100-1000m deep megaslides.
Monitoring and Early Warning, Vulnerability and Risk Assessment,

(2) Targeted Landslides: Mechanisms and Impacts

Catastrophic Landslides, Coastal and Marine Landslides

(4) Mitigation, Preparedness and Recovery

Preparedness and Mitigation

3. Name of Project leader

Kyoji Sassa

Affiliation: Director, IPL World Centre, Kyoto, Japan

Contact: ICL Headquarters, The Association for Disaster Prevention Research, 138-1 Tanaka
Asukai-cho, Sakyo-ku, Kyoto 606-8226, Japan,

Tel: +81(75)7230640, +81(774) 384834, Fax:+81(75) 9500910,+81(774)384019

Email: sassa@iclhq.org

Core members of the Project

Kazuo Konagai, University of Tokyo, Institute of Industrial Science

Ikuo Towhata, University of Tokyo, Faculty of Engineering

Toyohiko Miyagi, Tohoku Gakuin University, Japan

Farrokh Nadim, ICG, Norway

Alexander Strom, Institute of Geospheres Dynamics of Russian Academy of Sciences

Roger Urgeles, Institute of Marine Sciences, Spanish National Research Council, Spain.

4. Objectives: (5 lines maximum)

Mega landslides of 100-1000 m in depth, greater than 10 million m³ in volume causes a great effect either on land, coastal or under water. Magaslides may trigger Tsunami, landslide dams which may fail and cause great debris flows or floods as well as causing direct damages. So far dynamics of such megaslides has not been studied. This project will develop a super high stress ring shear apparatus of 10 MPa for 100-1000 m deep landslides. The ring shear test results are combined to the Mutibeam Swath Bathymetry, InSAR, GPS on-land and sea floor investigation, combined to 50 Centrifuge model experiment for landslide triggered tsunami, and computer

simulation. It aims to establish Dynamics of Subaerial and Submarine megaslides which may provide reliable risk analysis of ongoing and also potential megaslides over the world.

Study Area: (2 lines maximum)

Japan, Pakistan, Uzbekistan, Norway, Italy, Central Asia, Mediterranean Sea, Viet Nam

5. Project Duration (1 line maximum)

5 years: January 2010 – March 2015

6. Report

1) Progress in the project: (30 lines maximum)

The undrained ring shear apparatus was improved to maintain the undrained state up to 1000 kPa in 2011. So far this value was 400-600 kPa in DPRI-3, 4, 5, 6, and 7 apparatus. We obtained drilled core samples in IODP (International Ocean Drilling Programme) drilling in Nankai Trough offshore of Japan. We implemented the undrained ring shear tests on submarine deposits. The volume of drilled core is very limited. So we have to develop new methodology to prepare sample. So far, putting dried samples into the shear box, then replacing pore air by CO₂ gas, then saturating soils by de-aired water. In this case, sample after shearing cannot be used. Marine deposits are fine, and drying process made the sample hard. Reuse is not possible.

New method was developed, 1) filling the shear box by CO₂ gas, then de-aired water, 2) sample fully saturated by de-aired water is slowly into the shear box, 3) consolidation and shearing, 4) removing a narrow shear zone from the sample, 5) the rest of sample are used for further test keeping it's saturated condition by de-aired water within a saturation apparatus under vacuum.

The test results were fine. But contributed paper to Science with more than 30 coauthors (because all onboard scientists must agree on the content and be coauthors). But it was rejected because the paper is not common for wide-area of scientist, it is suitable for more specialized journals. One year after drilling tour was Moratorium period of IODP. The research using sample cannot be published without agreement of all on-board scientists and co-authorship.

2) Planned future activities or Statement of completion of the Project (15 lines maximum)

Further tests were conducted on marine landslide soils. Papers will be contributed and published based on these submarine landslide soils, and also computer simulation using those test result.

Target of research is the Suruga bay possible submarine landslide in Japan

3) Beneficiaries of Project for Science, Education and/or Society (15 lines maximum)

Megaslides either on land and submarine bed are posing a great risk because of its scale.

Submarine landslides causes Tsunami. Global communities that are exposed to risk by subaerial and submarine megaslides, policy-makers, public administrators, researchers, scientists are beneficiaries of this project.

4) Results: (15 line maximum, e.g. publications)

Kyoji Sassa (2011). Dynamics of Subaerial and Submarine Megaslides. Special lecture, 5th International Symposium on Submarine Mass Movements and Their Consequences, 24-26 October 2011, Kyoto, Japan.

Note:

- 1) If you will change items 1)-6) from the proposal, please write the revised content **in Red**.
- 2) Please fill and submit this form by **30 March 2012** to the ICL Network <icl-network@iclhq.org>