The International Consortium on Landslides (ICL)

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Outline]

The International Consortium on Landslides (ICL) was created to promote landslide research for the benefit of society and the environment, and capacity building, including education, notably in developing countries during the Kyoto University and UNESCO joint symposium on Landslides and Cultural Heritages in Kyoto in 2002. The outline of ICL as follows.

1. The domicile of ICL is Kyoto, Japan, where the Secretariat is located and ICL is legally registered as a non-profit organization of the Kyoto Prefectural Government according to the Japanese law in 2002.
3. ICL was approved as a scientific research organization (No. 94307) which can apply and receive the scientific grant of the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan in March 2007.
4. ICL was approved to be a NGO having operational relations with UNESCO in April 2007. It was reclassified as NGO with the consultative partnership with UNESCO in March 2012.
5. Major achievements and development of ICL activities are summarized as follows:
   - ICL established the UNITWIN (University Twining and Networking) Cooperation Programme on Landslide risk mitigation for society and the environment with UNESCO and Kyoto University in March 2003. The UNITWIN Headquarters Building was constructed by ICL and Kyoto University in Kyoto University Uji Campus in September 2004. Thereafter, the programme was developed to Landslide and water –related disaster risk management for society and the environment in November 2010.
   - ICL founded “Landslides”: Journal of the International Consortium on Landslides in 2004 as a core activity of ICL. It is a bimonthly full color journal (Impact factor 2013 is 2.814).
   - ICL has founded the **International Programme Landslides (IPL)** together with 7 global stakeholders (UNESCO, WMO, FAO, UNISDR, UNU, ICSU and WFEO) in 2006.
   - IPL activities including IPL projects, the World Landslide Forum (WLF) every three years, and the World Centres of Excellence on Landslide Risk Reduction (WCoEs) to be identified at WLF.
   - The First World Landslide Forum (WLF1) was organized at the United Nations University, Tokyo, in 2008, the Second World Landslide Forum (WLF2) at the Food and Agriculture Organization (FAO) of the United Nations, Rome, 2011, and the Third World Landslide Forum (WLF3) at National Convention Center of China, Beijing, in 2014.
   - 9 thematic Networks and regional Networks of ICL were established following ICL Strategic Plan 2012-2021.
   - ICL adopted the 2014 Beijing Declaration "Landslide Risk Mitigation: Toward a Safer Geo-environment" at the WLF3 in Beijing.
   - ICL is an organizer of the Working Session “Underlying Risk Factors” of WCDRR, on 16 March 2015 in Sendai, Japan and the ISDR-ICL Sendai Partnerships 2015 -2025. for global promotion of understanding and reducing landslide disaster risk will be adopted in WCDRR.

Research Achievements and Challenges

A summary of your organization's most important recent research achievements explaining how those research achievements connect back to actual disaster risk reduction goals.

The ICL group has published their research results in Journal "Landslides".
One example from Europe and one example from Asia for research achievements connecting to actual disaster risk reduction goals are shown in Fig.1 and Fig.2.

Research of InSAR technology to Landslide Inventory mapping and Landslide Monitoring has progressed. Now its technology has been applied in Italy, Austria, Slovakia and Taiwan for landslide disaster reduction. The upper figure is the application to Landslide Inventory Mapping, the lower figure is the application to Landslide monitoring. Landslide monitoring usesthe InSAR monitoring along the descending (b) and the ascending (C) orbit and the vertical component (d) using both data. (Fig.1)

Research of the measurement of parameters of landslide dynamics using the undrained dynamic loading ring shear test and the integrated computer simulation (LS-RAPID) has been progressed.
The above is the application to the 2014.8.20 Hiroshima landslide-debris flow disasters.
a : Photo of Hiroshima landslide disaster, b: Landslide debris deposition (red) and debris removal (pink). c: result of LS-RAPID where initial landslide mass was given as initial condition based on the real landslide (b). d: The whole slope are covered by 2 m unstable debris. When landslide mass will move less than pore pressure ratio less than 0.25 (usual previous rainfall), those landslide mass was removed regarding those unstable mass does not exist on 2014.8.20. Then, the real monitored rainfall was given, and it was converted to pore pressure ratio using SLIDE model. The result of landslide movement is rather similar to the real case and also LS-RAPID result imputing the initial real landslide mass (c). C is landslide reproduction after the disaster, d is hazard mapping before the event. This research achievement contributes to landslide risk assessment and actual disaster risk reduction goals. (Fig.2)

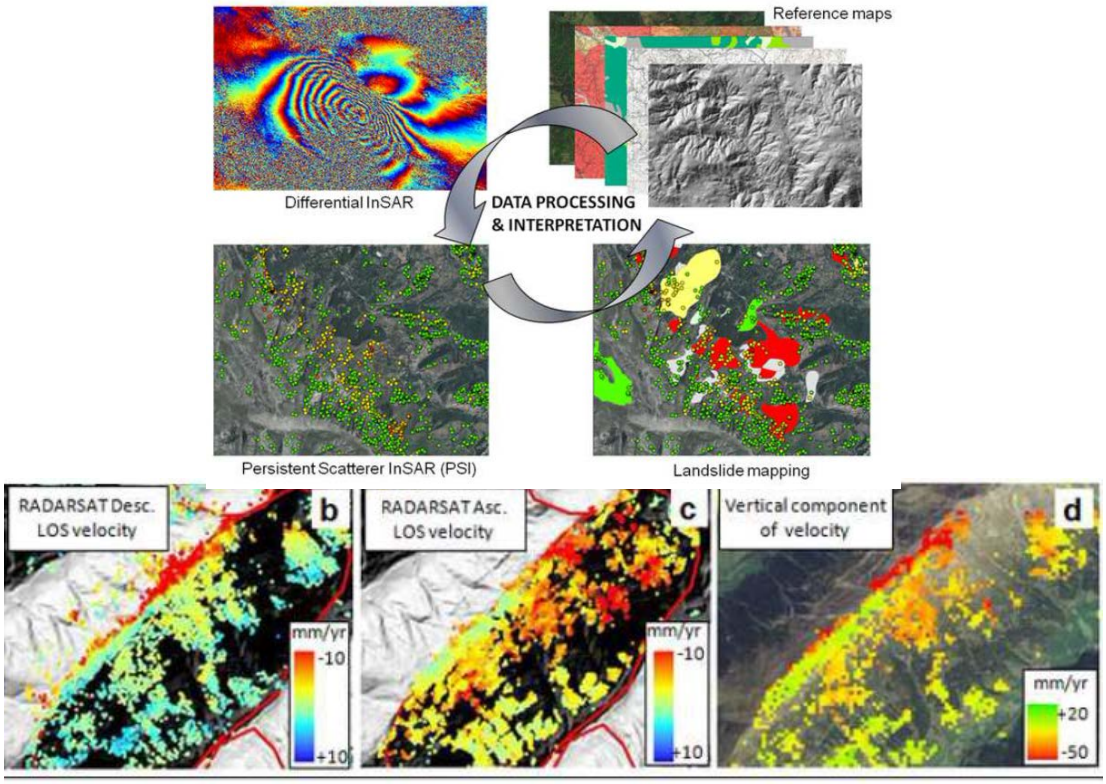

Fig.1 Application of InSAR technology to Landslide Mapping and Landslide Monitoring.

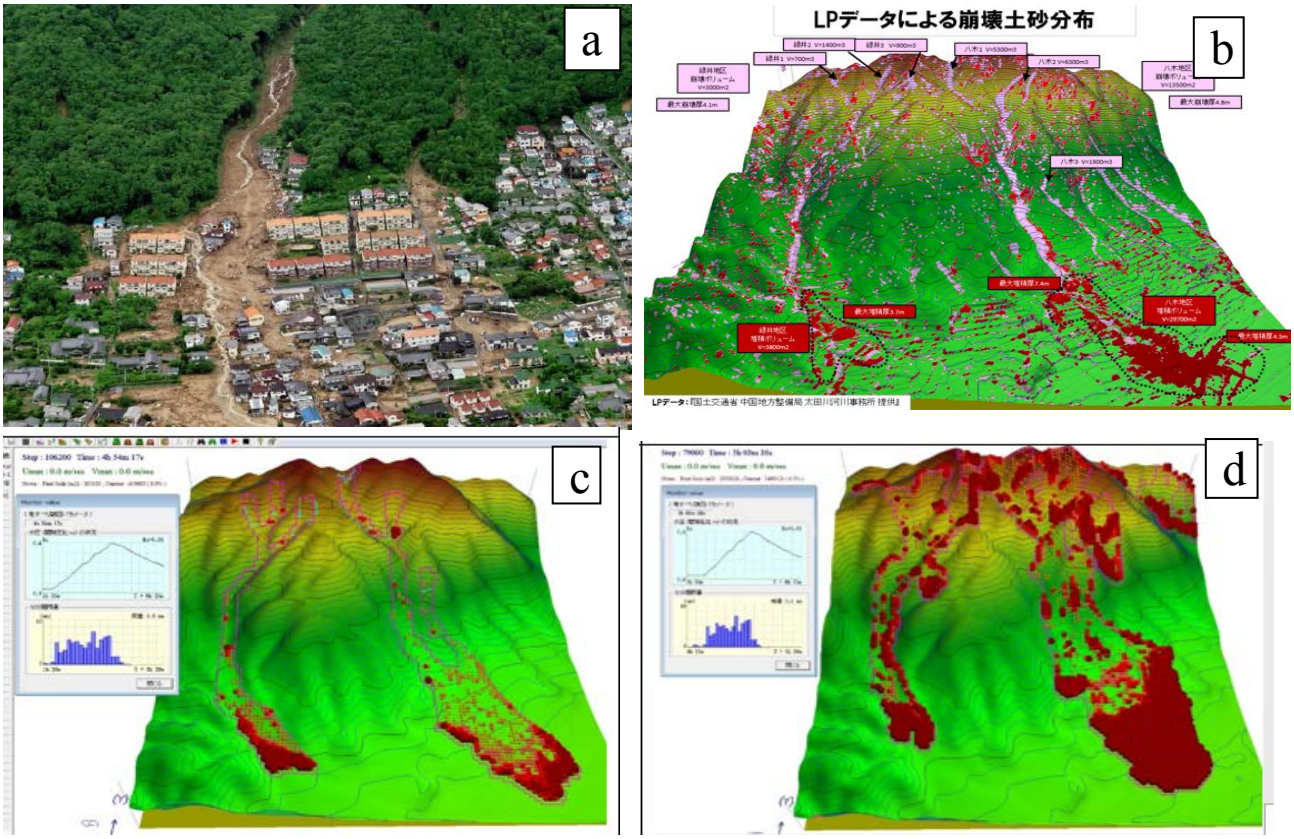

Fig.2 Development of hazard mapping and risk assessment technology based on the undrained ring shear test and the computer simulation.

A summary of what your organization sees as the major research challenges for the future.

In the IS DR-ICL Sendai Partnerships 2015 -2025, We agree on the following initial fields of cooperation in research and capacity building, coupled with social and financial investment:

- ✓ Development of people-centered early warning technology for landslides with increased precision and reliable prediction both in time and location, especially in a changing climate context.
- ✓ Development of hazard and vulnerability mapping, vulnerability and risk assessment with increased precision, and reliability as part of multi-hazard risk identification and management.
- ✓ Development of improved technologies for monitoring, testing, analyzing, simulating, and effective early warning for landslides.
- ✓ Development of international teaching tools that are always updated and may be used free of charge by national and local leaders and practitioners, in developed and developing countries through the Sendai Partnerships 2015-2025.
- ✓ Open communication with society through integrated research, capacity building, knowledge transfer, awareness-raising, training, and educational activities to enable societies to develop effective policies and strategies for reducing landslide disaster risk, to strengthen their capacities for preventing hazards to develop into major disasters, and to enhance the effectiveness and efficiency of relief programs.
- ✓ Development of new initiatives to study research frontiers in understanding landslide disaster risk, such as the effect of climate change on large-scale landslides and debris flows, the effective prediction of localized rainfall to provide earlier warning and evacuation especially in developing countries, the mechanism and dynamics of submarine landslides during earthquakes that may cause or enhance tsunamis, and geotechnical studies of catastrophic megaslides for prediction and hazard assessment.

ICL is proposing the ISDR-ICL Sendai Partnerships 2015-2025 to promote the understanding and reducing landslide disaster risk to be adopted in WCDRR 2015 in Sendai. It will be announced to launch at the Working Session "Underlying Risk Factors" on 16 March 2015. It will be signed by UNESCO, UNU, ICSU, WFEO, IUGS, IUGG, National Civil Protection Department of the Italian Presidency of the Council of Ministers, Italy, the National Protection and Rescue Directorate, Republic of Croatia, Cabinet Office, Japan, MEXT, Japan, and the Science Council of Japan, Kyoto University as well as UNISDR and ICL.

ISDR-ICL SENDAI PARTNERSHIPS 2015-2025 FOR GLOBAL PROMOTION OF UNDERSTANDING AND REDUCING LANDSLIDE DISASTER RISK

Tools for Implementing and Monitoring *the Post-2015 Framework for Disaster Risk Reduction and the Sustainable Development Goals*

The above partnerships was proposed based on the following acknowledgement:

- ✓ Landslide disasters are caused by exposure to hazardous motions of soil and rock that threaten vulnerable human settlements in mountains, cities, coasts, and islands.
- ✓ Climate change will intensify the risk of landslides in some landslide prone areas through an increase in the frequency and/or magnitude of heavy rainfall, and shifts in the location and periodicity of heavy rainfall.
- ✓ Developments in mountains and coastal areas, including construction of roads and railways and expansion of urban areas due to population shifts, increase exposure to hazards of landslides.
- ✓ Although they are not frequent, strong earthquakes have potential to trigger rapid and long runout landslides and liquefaction. Earthquake-induced coastal or submarine large-scale landslides or megaslides (with depths on the order of hundreds of meters to one thousand meters) in the ocean floor can trigger large tsunami waves. These hazardous motions of soil and water impacting on exposed and vulnerable population can result into very damaging effects.
- ✓ The combined effects of triggering factors, including rainfall, earthquakes, and volcanic eruptions, can lead to greater impacts through disastrous landslides such as lahars, debris flows, rock falls, and megaslides.
- ✓ Understanding landslide disaster risk requires a multi-hazard approach and a focus on social and institutional vulnerability. The study of social and institutional as well as physical vulnerability is needed to assess the extent and magnitude of landslide disasters and to guide formulation of effective policy responses.
- ✓ Human intervention can make a greater impact on exposure and vulnerability through, among other factors, land use and urban planning, building codes, risk assessments, early warning systems, legal and policy development, integrated research, insurance, and, above all, substantive educational and awareness-raising efforts by relevant stakeholders.
- ✓ The understanding of landslide disaster risk, including risk identification, vulnerability assessment, time prediction, and disaster assessment, using the most up-to-date and advanced knowledge, is a challenging task. The effectiveness of landslide disaster risk

reduction measures depends on scientific and technological developments for understanding disaster risk (natural hazards or events and social vulnerability), political "buy-in", and on increased public awareness and education.

- ✓ At a higher level, social and financial investment is vital for understanding and reducing landslide disaster risk, in particular social and institutional vulnerability through coordination of policies, planning, research, capacity development, and the production of publications and tools that are accessible, available free of charge and are easy to use for everyone in both developing and developed countries.

We are planning to develop the **Landslide Teaching Tools** to promote capacity development as well as to develop landslide science toward a safer future. This is voluntary commitment to the WCDRR and its Sendai Partnerships. The content and how to implement will be discussed in Sendai and also in 2015 by surveying various condition. The current draft summary is below.

ISDR-ICL Landslide Teaching Tools

A voluntary commitment to the ***ISDR-ICL SENDAI PARTNERSHIPS 2015-2025***
to promote understanding and reducing landslide disaster risk

Thus far many activities have been undertaken to understand and reduce the risk from landslide disasters in many countries. New knowledge and experience gained through these significant activities are not always shared within worldwide communities, and distributed to leaders and practitioners in developing, and even developed countries.

The ISDR-ICL teaching tools include the updated knowledge, technology, policy, guidelines and standards, as well as practices in different countries for reducing landslide disaster risk. A wide variety of updated information will be collected, edited and uploaded on a WEB site. Leaders and practitioners in both developing and developed countries will have access to and may download any of the teaching tools free of charge.

Each teaching tool will be developed by a contributing organization of the Sendai Partnerships and will have a unique identifier1. The contributing organization retains the copyright and the responsibility for its content and updating.

Example of Identifier: TEXT-tool 3.081-1.1

3: Stands for Part Number within Disaster (Part No.3 : Testing and Simulation)
081: Stands for Country code of contributing organization (Japan)
1: Consecutive number located to each contributing organization within a country (International Consortium on Landslides)
1: The number of tools of the contributing organization (Landslide Initiation Mechanism)

1 The identifier will consists of:

- The "TEXT tools" (original text developed for this tools), "PDF tools" (already published information) or PPT tools (Powerpoint® files for lecture).
- The Part number within the disaster
- The Country code
- Code of the organization
- Consecutive number of the tool developed by a single organization