PROGRAMME Book for Participants

The Fifth World Landslide Forum

Implementing and monitoring the Sendai Landslide Partnerships 2015-2025

-Voluntary contribution to the Sendai Framework 2015-2030 and the Agenda 2030-Sustainable Development Goals-

Date: 2-6 November 2021,
Venue: Kyoto International Conference Center (KICC), Kyoto, Japan

Organizers, Cosponsors, Supporting Organizations, and Sponsors of WLF5

Organizers

International Consortium on Landslides (ICL)

Global Promotion Committee of International Programme on Landslides (IPL-GPC), including:

United Nations Educational, Scientific and Cultural Organization (UNESCO), World Meteorological Organization (WMO), Food and Agriculture Organization (FAO), United Nations Office for Disaster Risk Reduction (UNDRR), United Nations University (UNU), International Science Council (ISC), World Federation of Engineering Organizations (WFEO), International Union of Geological Sciences (IUGS), International Union of Geodesy and Geophysics (IUGG)

Kyoto University (KU), Japan Landslide Society (JLS), Japanese Geotechnical Society (JGS), Japan Society for Natural Disaster Science (JSNDS) and Japan Association for Slope Disaster Management (JASDiM)

Cosponsors

Cabinet Office (Disaster Management Bureau) of Japan, Ministry of Foreign Affairs of Japan (MOFA), Ministry of Education, Culture, Sports, Science and Technology-Japan (MEXT), Ministry of Land Infrastructure, Transport and Tourism (MLIT), Ministry of Agriculture, Forestry and Fisheries (MAFF), Science Council of Japan (SCJ), Japan International Cooperation Agency (JICA), Japan Society of Civil Engineers (JSCE), and Japanese Society of Irrigation, Drainage and Rural Engineering (JSIDRE), Japan Society of Erosion Control Engineering, Japan Society of Engineering Geology.

Supporting Organizations with Finance

Kyoto University Foundation, Tokyo Geographical Society, International Union of Geological Sciences (IUGS), Association for Disaster Prevention Research, Kyoto, Japan.

Sponsors

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Asia Air Survey Co., Ltd., Kanagawa, Japan
Kiso-Jiban Consultants Co., Ltd., Tokyo, Japan
Kawasaki Geological Engineering Co. Ltd., Tokyo, Japan
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Nissaku Co., Ltd., Saitama, Japan

#Programme is supported by a subsidy from Kyoto City and the Kyoto Convenetion & Visiters Bureau.

Logos of WLF5 Organizers and Kyoto MICE.

General Schedule of the Fifth World Landslide Forum

Date	Time	Activities
2 Nov. 2021 (Tue)	9:00-18:00	Forum Registration in Reception desk in KICC
	14:00-16:00	21st BOR/ICL, 17th GPC/IPL and KLC2020 General Conference in Room (Room 104)
3 Nov. 2021 (Wed)	9:00 – 10:00	Opening addresses: ICL, ICL supporting organizations and host organization (Room A)
	10:10-11:50	High-level Panel Discussion "KLC2020 review and way forward" (Room A). Panelists: Representatives of KLC2020 signatories. Adoption of "Launchng Declaration of the ICL Open Access Book Series for KLC2020" Certificates to the founding KLC2020 official promoters
	12:00-12:20	Group photo of all participants on the stage (Room A)
	12:00-13:30	Lunch (SWAN)
	13:30-15:30	**Forum lectures/** (Room A) Fausto Guzzetti (Italy): On the prediction of landslides and their consequence Charles NG (Hong Kong, China): Interaction mechanisms between debris flow and multiple barriers **Forum speech:** Dwikorita Karnawati (Indonesia) KLC2020 Multi-hazard round table discussion
	15:45-17:00	**Recognition and Awards Ceremony** (Room A) World Centres of Excellence on Landslide Risk Reduction (WCoEs) 2020-2023 Bestow the Varnes Medals, IPL Award for Success 2017-2021
	8:00-17:00	Preparation and Exhibition in Booths and Panels (Room B1)
	18:30-20:30	Welcome Reception (Room SAKURA)
4 Nov. 2021 (Thur)	9:00-17:00	Parallel Sessions (8 rooms)
	9:30-12:00	KLC2020 Muti-hazard Round Table Discussion (Room 510)
	12:00-13:30	Lunch (SWAN)
	9:00-17:00	Exhibition in Booths and Panels (Room B1)

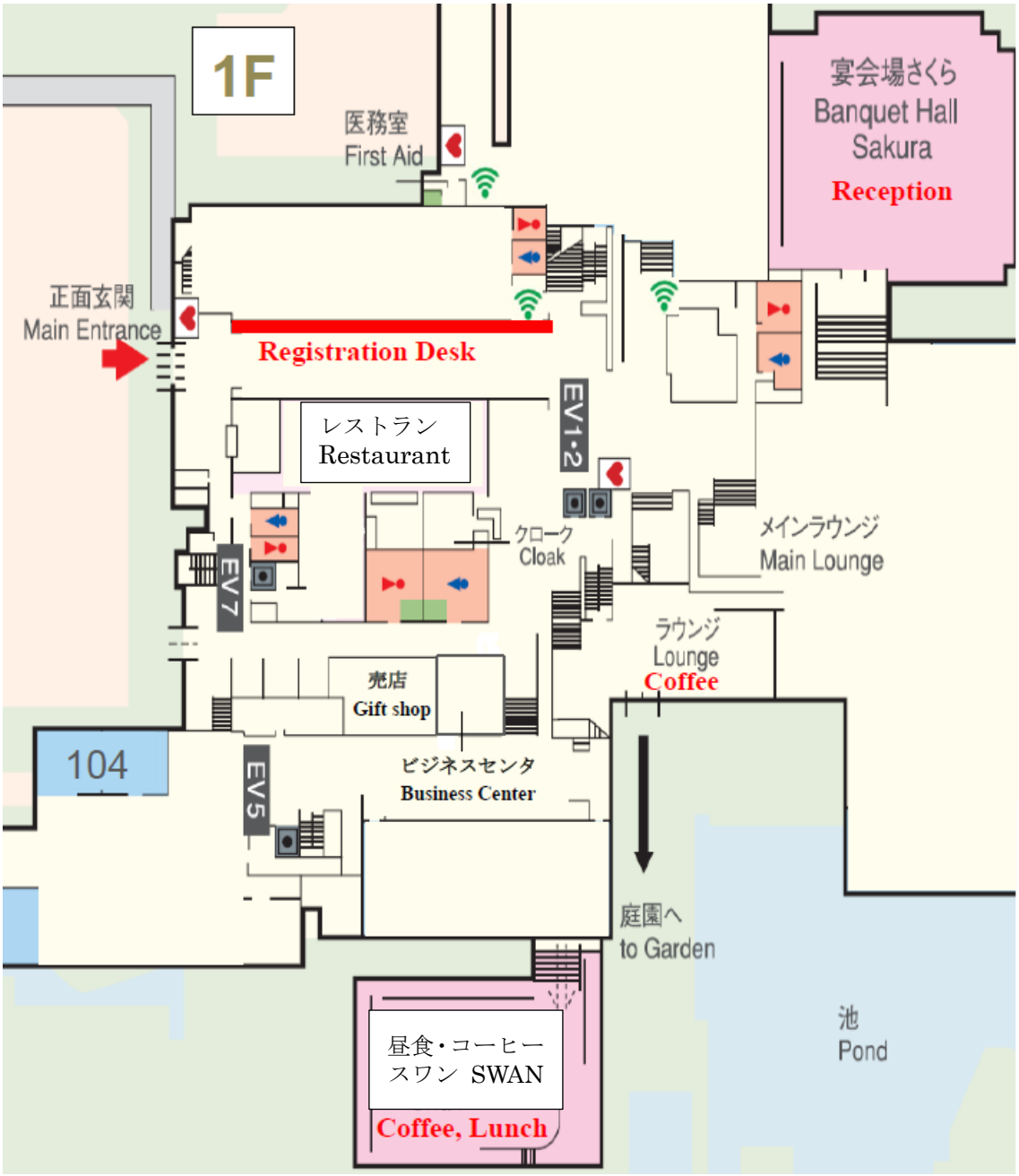
5 Nov. 2021 (Fri)	9:00-17:00	Parallel Sessions (8 rooms)
	9:00-17:00	Special Event of World Tsunami Awareness Day in Room 510 Special Lectures and Panel Discussion on Landslide-induced Tsunamis
	12:00-13:30	Lunch (SWAN)
	9:00-17:00	Exhibition in Booths and Panels (Room B1)
6 Nov. 2021 (Sat)	9:00-12:00	Parallel Sessions
	12:00-13:30	Lunch (SWAN)
6 Nov. 2021 (Sat)	13:30-15:30	**Forum Lectures and Award Lectures** in Room 510 (5F) Michel Jaboyedoff (Switzerland): Improving the rockfall failure hazard assessment. Brian Collins (U.S.A): Progress and lessons learned from responses to catastrophic landslides Claudio Margottini (Italy) Fukuoka IPL Award lecture Beena Ajmera (USA) Oldrich Hungr Award lecture
	15:30-17:00	**Closing Ceremony** in Room 510 (5F) ➢ Speech by ICL President Nicola Casagli (2021.1.1 - 2023.12.31) ➢ Introduction of new ICL officers by ICL President ➢ Certificates to new ICL members (2017-2021) by ICL President ➢ Acknowledgement to WLF5 supporting organizations with financial support and sponsors by ICL President Welcome to 6th WLF (WLF6 Forum Chair, Nicola Casagli)

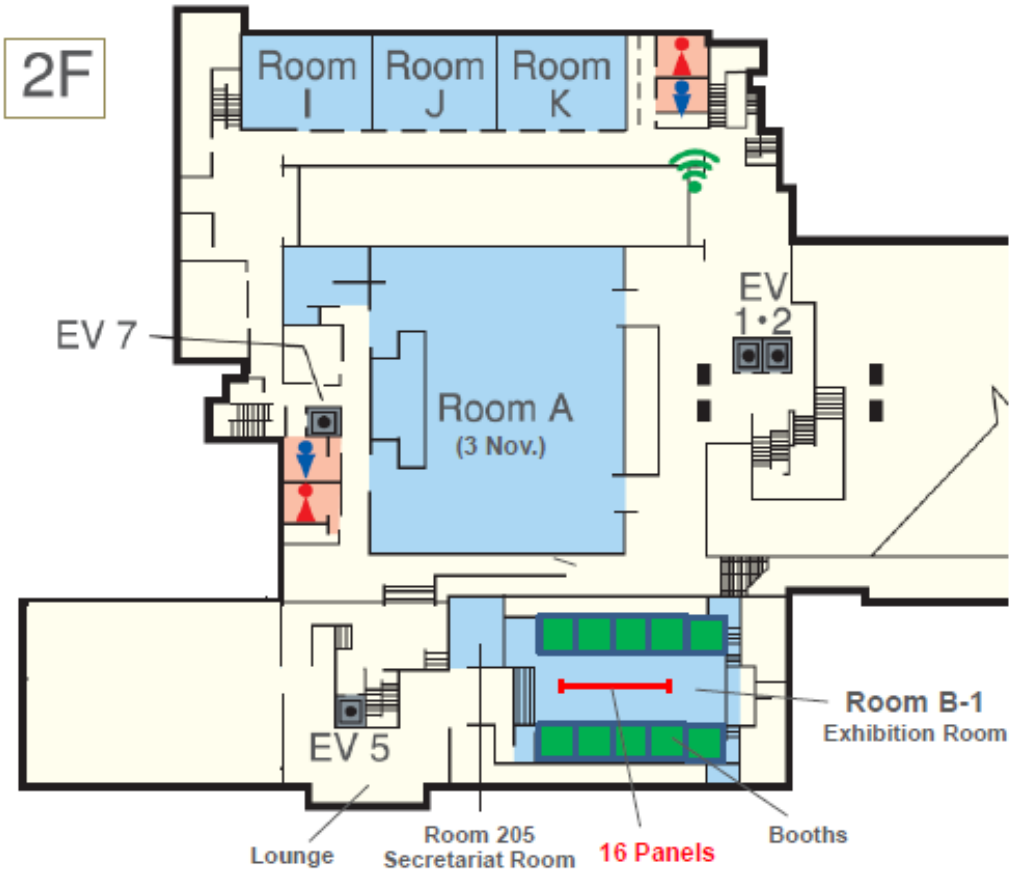
WLF5 Rooms and Time Allocation for Plenary and Parallel Sessions

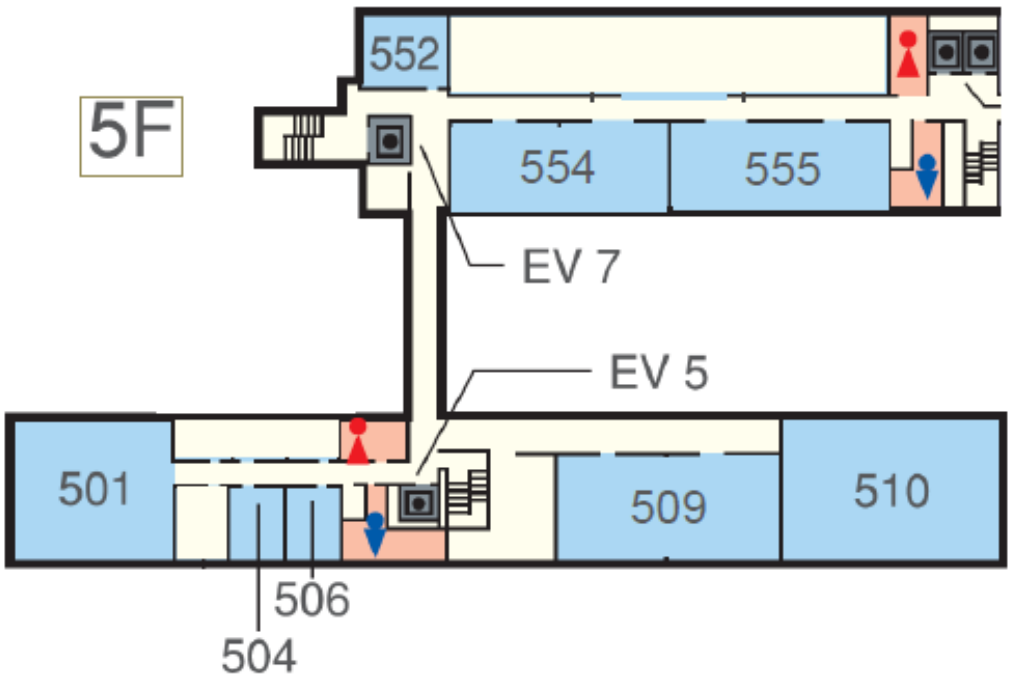
Session Rooms	3 Nov. (9:00-12:30)	3 Nov. (13:30-17:00)	4 Nov. (9:00-12:30)	4 Nov. (13:30-17:00)	5 Nov. (9:00-12:30)	5 Nov. (13:30-17:00)	6 Nov. (9:00-12:00)	6 Nov. (13:30-17:00)
R-A (2F)	Opening / high-level panel	Forum Lectures and Awards						
R-510 (5F)			KLC2020 Multi-hazard RTD	SATREPS Project Meeting	World Tsunami Awareness Day Event		Thematic issue papers / E-posters	Forum Lectures/ Closing Ceremony
Theme 1 R-I (2F)			S1.1	S1.2	S1.3	S1.4	S1.5	
Theme 2 R-J (2F)			S2.1	S2.1 S2.2	S2.2	S2.3 S2.4	S2.5	
Theme 3 R-K (2F)			S3.1	S3.1 S3.2	S3.4	S3.3	S3.3	
Theme 4 R-501 (5F)			S4.1	S4.2	S4.3 S4.4	S4.5		
Theme 5 R-509 (5F)			S5.1 S5.2	S5.3	S5.4	S5.5		
Theme 6 R-554 (5F)			S6.1 S6.2	S6.3 S6.4	S6.4 S6.5	S6.6 Korean Session		
Japan Landslide Society R-555 (5F)			S6. E1	S6. E1 S6. E3	S6. E2	S6. E5	S6. E4	
Room B1 (2 F)	Exhibition Booths and Poster Panels							
SWAN (1F)	9:00-15:00 Coffee							
	12:00-15:00 Lunch (Bento)							
SAKURA (1F)	18:30-20:30 Reception							

Room Location for Sessions and Exhibition

(1st, 2nd and 5th Floor)




2F
Room I
Room J
Room K
EV 7
Room A
(3 Nov.)
EV 1•2
EV 5
Room B-1
Exhibition Room
Lounge
Room 205
Secretariat Room
16 Panels
Booths


5F
552
554
555
EV 7
EV 5
501
509
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504

Plenary Session Programme

3 NOVEMBER 2021 (WEDNESDAY) AT ROOM A

1. Opening Greetings from ICL, ICL supporting organizations and host organizations

(17:00-18:00 PDT 2 November, 1:00-2:00 CET 3 November, 9:00-10:00 JST 3 November)

Chairs: Kyoji Sassa (WLF5 Forum Chair) and
Qunli Han (Co-Chair of Global Promotion Committee of IPL/Executive Director of Integrated Research on Disaster Risk)

Opening address from the primary organizer

- Nicola Casagli (President of the International Consortium on Landslides)

Greetings from United Nations organizations

- David Malone (Under-Secretary-General of the United Nations/Rector of the United Nations University)
- Mami Mizutori (United Nations Special Representative of the Secretary-General for Disaster Risk Reduction)
- Petteri Taalas, Secretary-General of the World Meteorological Organization (WMO)
- Maria Helena Semedo, Deputy Director-General of the Food and Agriculture Organizations (FAO)
- Shamila Nair-Bedouelle (Assistant Director-General for Natural Sciences, the United Nations Educational, Scientific and Cultural Organization (UNESCO))

Greetings from scientific organizations

- José M.P. Vieira (President of the World Federation of Engineering Organizations: WFEO)
- Kathryn Whaler (President of the International Union of Geodesy and Geophysics: IUGG)
- John Ludden (President International Union of Geological Sciences: IUGS)

Welcome messages from host organizations

- Hiroaki Tsunakawa, Director for Sabo Planning Coordination, Ministry of Land Infrastructure, Transport and Tourism, Japan
- Akira Murakami, Executive Vice-President of Kyoto University

2. High-level Panel Discussion "Review of KLC2020 and the way forward"

(18:00-19:50 PDT 2 November, 2:00-3:50 CET 3 November, 10:00-11:50 JST 3 November)

Opening Greetings from Forum Chairs

- Peter Bobrowsky (Geological Survey of Canada, Canada) and Kaoru Takara (Kyoto University, Japan)

Chairs: Matjaž Mikoš (Co-Chair, Global Promotion Committee of IPL / Chair of WLF4, Ljubljana, 2017)
Kazuo Konagai (Chair of Science Committee of the KLC2020 Secretariat, Kyoto, Japan)

- Opening Speeches from chairs

Keynote speech

- Kyoji Sassa (Secretary General of KLC2020 Secretariat): Review of KLC2020 and a new Open Access Book Series for KLC2020

Speech from 9 panelists from KLC2020 signatory organizations

ICL supporting organizations:

- Paola Albrito (Chief of Branch, Intergovernmental processes, Interagency cooperation and Partnerships, UNDRR)
- Soichiro Yasukawa (Programme Specialist on Disaster Risk Reduction, UNESCO)
- José M.P. Vieira (President of the World Federation of Engineering Organizations: WFEO)
- Hiroshi Kitazato (Treasure of IUGS, Tokyo University of Marine Science and Technology, Japan)
- John LaBrecque (Chair of IUGG GeoRisk Commission, Center for Space Research, University of Texas Austin, USA.)

ICL full members:

- Binod Tiwari (Vice President for America, California State University – Fullerton, USA)
- Paola Reichenbach (Director of Research, IRPI, Italian National Research Council, Italy)
- Maneesha Ramesh (Dean, School for Sustainable Development and International Programs, Amrita University, India)

ICL supporter:

- Hiroaki Tauchi (General manager, International Geohazard Management Department, Nippon Koei, Co., Ltd., Tokyo, Japan)

Discussion (panelists and floor)

Concluding remarks

- Sálvano Briceño (First Chairperson of the Global Promotion Committee of IPL (2007-2014), Former Director of UNISDR (2001-2011)

Adoption of the Launching Declaration of the ICL Open Access Book Series for KLC2020 by all participants

11:50-12:00 JST Break
12:00-12:20 JST Joint photo of all participants on the stage (Room A)
12:00-12:30 JST Lunch (Room Sakura)

3. Forum lectures/Forum speech
(21:30-23:30 PDT 2 November, 5:30-7:30 CET 3 November, 13:30-15:30 JST 3 November)

Chairs: Željko Arbanas (Vice President for Europe, University of Rijeka, Croatia) and Veronica Tofani (Vice President for WLF6, University of Florence, Italy)

Forum lectures

- Fausto Guzzetti (General Director of Office III, Department of Civil Protection, Italian Presidency of the Council of Ministers, Italy): On the prediction of landslides and their consequence

- Charles NG (Chair Professor and Dean of Graduate School, Hong Kong University of Science and Technology, China): Interaction mechanisms between debris flow and multiple barriers

Forum Speech

Dwikorita Karnawati (Head of Agency for Meteorology, Climatology, and Geophysics of the Republic of Indonesia): Promotion of intergovernmental network of ICL-KLC2020

4. Recognition and Awards Ceremony
(23:45 PDT 2 Nov. -1:00 PDT 3 Nov. . 7:45-9:45 CET 3 November, 15:45-17:00 JST 3 November)

World Centres of Excellence on Landslide Risk Reduction (WCoEs) 2020-2023

Bestow the Varnes Medals (2017-2021), IPL Awards for Success (2017-2020)

5. Welcome Reception 18:30-21:00 JST (Room Sakura)

6 NOVEMBER 2021 (SATURDAY) AT ROOM 510

6. Forum Lectures and Award Lectures

(21:30 –23:30 PDT 5 November, 5:30-7:30 CET 6 November, 13:30-15:30 JST 6 November)

Chairs: Vít Vilímek (Vice President for Mission (KLC2020), Charles University, Prague, Czech Republic) and Fawu Wang (Professor, Tongji University, China)

Forum Lectures

- Michel Jaboyedoff (Professor, University of Lausanne, Switzerland): Improving the rockfall failure hazard assessment.
- Brian Collins (Research civil engineer, U.S. Geological Survey, USA): Progress and lessons learned from responses to catastrophic landslides

Award Lectures

- Claudio Margottini (ISPRA - Dpt. Geological Survey of Italy) Fukuoka IPL Award lecture
- Beena Ajmera (Assistant Professor, North Dakota State University, USA) Oldrich Hungr Award lecture

7. Closing Ceremony

(23:30 PDT 5 November –1:00 PDT 6 November, 7:30-9:00 CET 6 November, 15:30-17:00 JST 6 November)

Masters of Ceremonies: Alexander Strom (Chief expert, Geodynamic Research Center LLC., Russia) and Ryosuke Uzuoka (Vice Director, DPRI, Kyoto University, Japan)

- Speech by ICL President Nicola Casagli (2021.1.1 - 2023.12.31)
- Introduction of new ICL officers by ICL President
- Certificates to new ICL members (2017-2021) by ICL President
- Acknowledgement to WLF5 financial support organizations and sponsors by Forum chair
- Welcome to 6th WLF (WLF6 Forum Chair, Nicola Casagli)

Parallel Session Programme

Theme 1 Sendai Landslide Partnerships and Kyoto Landslide Commitment
Contact: ICL secretariat <secretariat@iclhq.org>

Session 1.1 Sendai Landslide Partnerships, Kyoto Landslide Commitment, and International Programme on Landslides
Convener: Peter Bobrowsky (peter.bobrowsky@canada.ca) & Alexander Strom (strom.alexandr@yandex.ru)
4th Nov. 9:00-12:30 JST

1	Kyoji Sassa	Japan	Kyoto 2020 Commitment for Global Promotion of Understanding and Reducing Landslide Disaster Risk
2	Peter T. Bobrowsky	Canada	International Consortium on Landslides (ICL): Proposing and Host Organization of SLP20152025 and KLC2020
3	Matjaž Mikoš	Slovenia	The ICL journal Landslides - 16 years of capacity development for landslide risk reduction
4	Kaoru Takara	Japan	UNITWIN-UNESCO/KU/ICL Programme
5	Qunli Han	China	International Programme on Landslides (IPL): A programme of the ICL for Landslide Disaster Risk Reduction
6	Alexander Strom	Russia	Central Asia – rockslides' and rock avalanches' treasury and workbook
7	Biljana Abolmasov	Serbia	Results of recent monitoring activities on landslide Umka, Belgrade, Serbia - IPL 181
8	Matjaž Mikoš	Slovenia	Landslides in Weathered Flysch: From Activation to Deposition (WCoE 2017-2020)
9	Snježana Mihalić Arbanas	Croatia	Report of the Croatian WCoE 2017-2020: From landslide mapping to risk assessment
10	Nicola Casagli	Italy	Advanced technologies for Landslides (WCoE 2017-2020)
11	Vít Vilímek	Czech Republic	Complex geomorphological and engineering geological research of landslides with adverse societal impacts
12	Željko Arbanas	Croatia	Report of the IPL-219, IPL-220 and Croatian WCoE 2017-2020: From landslide investigation to landslide prediction and stabilization
13	Satoru Nishikawa	Japan	Ichi-Nichi-Mae (The Day before the Disaster) Project for Landslide Awareness and Risk Communication
Session 1.1 Sendai Landslide Partnerships, Kyoto Landslide Commitment, and International Programme on Landslides (continue) **Convener: Peter Bobrowsky (peter.bobrowsky@canada.ca) & Alexander Strom (strom.alexandr@yandex.ru)** **13:30-14:45 JST**			
14	Eleftheria Poyiadji	Greece	Landslides in Greece and related legislation: difficulties and potential improvements
15	Surya Parkash	India	Emerging Issues and Innovative Strategies for Landslides Risk Management
16	Bayes Ahmed	UK	The root causes of landslide vulnerability in Bangladesh
17	Shuai ZHANG	China	Hydrated halloysite: the pesky stuff responsible for a cascade of landslides triggered by the 2018 Iburi earthquake, Japan
18	Bastian van den Bout	Netherlands	Impact of multi-hazard interactions on risk assessment

Session 1.2 Landslide-induced Tsunamis
Convener: Shinji Sassa (sassa_pari@hotmail.co.jp)
4th Nov. 15:00-16:30 JST

1	Taro Kakinuma	Japan	Numerical simulation for tsunami generation due to a landslide
2	Federico Di Traglia	Italy	Dealing with mass flow-induced tsunamis at Stromboli volcano: monitoring strategies
3	Kazuki Murata	Japan	Tsunami Disaster caused by the 1923 Great Kanto Earthquake and the Importance of Submarine Landslides
4	Wahyu Widiyanto	Chinese Taipei	Post-event field surveys of 2018 tsunami in Palu Bay and Sunda Strait
5	Tso-Ren Wu	Chinese Taipei	Three-Dimensional Simulation on the Rockslide and Mudslide Generated Tsunamis
6	Junji Miyamoto	Japan	Submarine landslide study in a drum centrifuge

Session 1.3 Landslides at UNESCO designates sites and contribution from WMO, FAO, IRDR
Convener: Qunli Han (qunli.han@irdrinternational.org) & Vít Vilímek (vit.vilimek@natur.cuni.cz)
5th Nov. 9:00-12:30 JST

1	Yuki Matsuoka	Japan	Sendai voluntary commitments: landslide stakeholders and the all-of-society approach enhanced by UNDRR
2	Vít Vilímek	Czech Republic	Contribution of the collaborative effort of the Czech WCoE to landslide risk reduction at the Machupicchu, Peru
3	Irina Pavlova	France	Landslides at UNESCO-designated sites
4	Daniele Spizzichino	Italy	Traditional knowledge and local expertise in landslide risk mitigation of world heritages
5	William Frodella	Italy	Assessing landslide hazards in cultural heritage sites of the UNESCO Tentative List: examples from developing countries
6	Rodrigo Alcaíno-Olivares	Canada	Thermo-mechanical cliff stability at tomb KV42 in the Valley of the Kings, Egypt
7	Xu Tang	China	Collaboration in MHEWS through an Integrated Way: The Great Efforts Contributed by Multi-stakeholder Partnership at National, Regional and International Levels
8	Yuka Makino	Italy	Resilient Watershed Management: Landscape Approach to Climate Change and Disaster Risk Reduction
9	Fang Lian	China	Integrating DRR into the conservation and management mechanisms of the internationally designated sites – view of IRDR
10	Giuseppe Esposito	Italy	Landslide hazard and risk assessment for civil protection early response
11	Irasema Alcántara-Ayala	Mexico	Size matters: the impact of small, medium and large landslide disasters

Session 1.4 Education and Capacity Development for Risk Management and Risk Governance
Convener: Matjaž Mikoš (matjaz.mikos@gmail.com) & Hendy Setiawan (hendy.setiawan@ugm.ac.id)
5th Nov.13:30-16:15 JST

1	Emanuele Intrieri	Italy	Early warning systems in Italy: state-of-the-art and future trends
2	Jan Klimeš	Czech Republic	Community-based landslide risk management in contrasting social environments, cases from the Czech Republic

3	Lee-Ping Shi	Chinese Taipei	Refinement Progresses on Freeway Slope Maintenance after a Huge Landslide Disaster
4	Ricardo J. Garnica-Peña	Mexico	Landslide exposure community-based mapping: a first encounter in a small rural locality of Mexico
5	Elizabeth A. Holcombe	UK	Co-producing data and decision support tools to reduce landslide risk in the humid tropics
6	Mohamad Fazli Sardi	Malaysia	ICT-based landslide disaster simulation drill: Road to achieve 2030 global commitment
7	Sao-Jeng Chao	Chinese Taipei	A Preliminary Work of Safety Potential Analysis Model for Anchors Used on Freeway Slopes
8	Tamara Breuninger	Germany	Initial Experiences of Community Involvement in an Early Warning System in Informal Settlements in Medellín, Colombia
9	Hendy Setiawan	Indonesia	Capacity Building and Community Preparedness towards Landslide Disaster in Pagerharjo Village, Kulon Progo Regency of Yogyakarta, Indonesia
10	Alexandra Urgilez	Netherlands	Characterization and hydrological analysis of the Guarumales deep-seatedlandslide in the tropical Ecuadorian Andes
11	Mateja Jemec Auflic	Slovenia	On the importance of geological data for landslide risk reduction in Slovenia

Session 1.5 SATREPS-Rain-induced Rapid and Long Travelling Landslides
Convener: Kazuo Konagai (kaz3776k@gmail.com) & Ryosuke Uzuoka (uzuoka.ryosuke.6z@kyoto-u.ac.jp)
6th Nov. 9:00-10:45 JST

1	Kazuo Konagai	Japan	SATREPS project for Sri Lanka with regard to “Development of early warning technology of Rain-induced Rapid and Long-travelling Landslides”
2	Ryo Onishi	Japan	Technology development of reliable rainfall prediction in mountain regions of Sri Lanka
3	Shiho Asano	Japan	Strategy for monitoring creeping movements of unstable soil masses triggered by heavy rain at pilot sites in tropical forested mountain
4	Ryosuke Uzuoka	Japan	Porewater pressure build-up of slopes subjected to different rainfall conditions by centrifuge modelling
5	Imaya Ariyarathna	Japan	Early warning system against rainfall-induced landslide in Sri Lanka
6	Toru Koike	Japan	Strengthening non-structural measures for Landslide Risk Reduction in Sri Lanka – Achievement in Project SABO -
7	Major General Sudantha Ranasinghe	Sri Lanka	Role of Disaster Management Center on Landslide Risk Management

Theme 2 From Mapping to Hazard and Risk Zonation
Contact:Paola Reichenbach <paola.reichenbach@irpi.cnr.it> and Snježana Mihalić Arbanas <snjezana.mihalic@rgn.unizg.hr>
Session 2.1 Landslide recognition and mapping
Convener: Dalia Kirschbaum (dalia.kirschbaum@nasa.gov) & Shoji Doshida (sdoshida@fri.go.jp)
4th Nov. 9:00-12:00 JST

1	Benjamin B. Mirus	USA	Landslides across the USA: occurrence, susceptibility, and data limitations
2	Toyohiko Miyagi	Japan	Landslide Recognition and Mapping for Slope Disaster Risk Reduction and Management
3	Rafał Sikora	Poland	New Landslide Inventory Map of the Sudetes Mountains (South-Western

			Poland)
4	Kamila Pawluszek-Filipiak	Poland	Opportunities and challenges of the object-oriented automatic landslide detection from the high resolution Digital Elevation Model
5	Mio Kasai	Japan	Can Repeat LiDAR Surveys Locate Future Massive Landslides?
6	Nguyen Kim Thanh	Vietnam	Developing recognition and simple mapping by UAV/SfM for local resident in mountainous area in Vietnam – A case study in Po Xi Ngai Community, Laocai province
7	Vladimir Greif	Slovakia	Landslide activity classification based on Sentinel-1 satellite radar interferometry data
8	Carlo Tacconi Stefanelli	Italy	Damming predisposition of river networks: a mapping methodology
9	Timotej Verbovšek	Slovenia	Maximum Likelihood Classification method for detection of litho-geomorphological units in the Vipava Valley, SW Slovenia
10	Pham Van Tien	Vietnam	Landslides along Halong-Vandon Expressway in Quang Ninh province, Vietnam
11	Tomislav Popit	Slovenia	Roughness analysis of fossil landslide surfaces in the Vipava Valley, SW Slovenia
12	John Dehls	Norway	Mapping landslides at a nationwide scale using InSAR: the Norwegian Ground Motion Service
Session 2.1 Landslide recognition and mapping (continue) **Convener: Paola Reichenbach (paola.reichenbach@irpi.cnr.it) & Snjezana Mihalic Arbanas (snjezana.mihalic@rgn.unizg.hr)** **4th Nov. 13:30-13:50 JST**			
13	Txomin Bornaetxea	Spain	The Effective Surveyed Area. Uncertainty reduction in field work based landslide inventories.
14	William Schulz	USA	Use of InSAR at multiple spatial and temporal scales to reveal landsliding mechanisms

Session 2.2 Landslide hazard assessment and zonation – susceptibility modelling
Convener: Paola Reichenbach (paola.reichenbach@irpi.cnr.it) & Snjezana Mihalic Arbanas (snjezana.mihalic@rgn.unizg.hr)
4th Nov. 13:50-17:00 JST

1	Samuele Segoni	Italy	Landslide susceptibility assessment in complex geological settings: sensitivity to geological information and insights on its parameterization
2	Hiroshi Yagi	Japan	Landslide susceptibility mapping by interpretation of aerial photographs, AHP and precise DEM
3	Christian Arnhardt	UK	An expert-based Landslide susceptibility assessment on city scale level with limited data - an example from Kuala Lumpur City
4	Gabriel Legorreta Paulin	Mexico	Landslide susceptibility in two secondary rivers of La Ciénega watershed, Nevado de Toluca volcano, Mexico
5	Sharad Kumar Gupta	India	An Ordinal Scale Weighting Approach for Susceptibility Mapping Around Tehri Dam, Uttarakhand, India
6	Meei-Ling Lin	Chinese Taipei	Potential Analysis of Deep-seated Landslides Caused by Typhoon Morakot Using Slope Unit
7	Lea Tien Tay	Malaysia	Landslide Hazard Mapping of Penang Island Malaysia based on Multilayer Perceptron Approach
8	Zheng Han	China	Landslide Susceptibility Mapping Based on the Deep Belief Network: A Case Study in Sichuan Province, China

9	Jie Dou	Japan	A Comparative study of deep learning and conventional neural network for evaluating landslide susceptibility using landslide initiation zones
10	Domenico Calcaterra	Italy	Landslide susceptibility assessment by ensemble-based Machine Learning models
11	Anika Braun	Germany	Overcoming data scarcity related issues for landslide susceptibility modeling with machine learning
12	Jewgenij Torizin	Germany	Practical accounting for uncertainties in data-driven landslide susceptibility models. Examples from the Lanzhou case study
Session 2.2 Landslide hazard assessment and zonation – susceptibility modelling (continue) Convener: Benjamin Mirus (bbmirus@usgs.gov) & Toyohiko Miyagi (c1934009@mail.tohoku-gakuin.ac.jp) 5th Nov. 9:00-12:25 JST			
13	Victor Carvalho Cabral	Brazil	Assessment of shallow landslides susceptibility using SHALSTAB and SINMAP at Serra do Mar, Brazil
14	Biljana Abolmasov	Serbia	Regional slope stability analysis in landslide hazard assessment context, North Macedonia example
15	Shoji Doshida	Japan	Evaluation of secondary landslide susceptibility for the rescue activity using LiDAR UAV data
16	Johnny Alexander Vega	Colombia	Methodology for landslides assessment causing river channel obstructions and the consequent water shortage in rural communities
17	Edier Aristizabal	Colombia	Rainfall-induced shallow landslide susceptibility assessment in mountainous and tropical scarse-data region of the Colombian Andes
18	Shahram Nasiri	Australia	Concerns over reliable earthquake-induced landslide hazard assessment: Developing sophisticated geotechnical databases and 3D landslide inventories
19	Farrokh Nadim	Norway	Theoretical framework for estimating the annual probability of occurrence of landslides
20	Dalia Kirschbaum	USA	Multi-scale landslide hazard assessment using remote sensing data
21	Laurie Kurilla	Italy	Global debris flow susceptibility, current and future impact, based on climate and urbanization trends
22	Paola Reichenbach	Italy	Evaluating the Terrain Susceptibility to Mass Movements
23	Massimiliano Bordoni	Italy	Data-driven Modelling of the Spatio-Temporal Probability of Occurrence of Shallow Landslides with the Integration of Satellite Data
24	Corrado Camera	Italy	Introducing the climate component into landslide susceptibility mapping
25	Greta Bajni	Italy	The role of climatic predictors for non-stationary rockfall susceptibility modelling
26	Mauro Rossi	Italy	Probabilistic modeling of rockfall source areas
27	Marco Loche	Czech Republic	Introducing Land Surface Temperature in Susceptibility Modeling
28	Song Eu	Korea	Dynamic Landslide Hazard Assessment by Matrix Combination of Soil Water Index and Landslide Susceptibility Map
29	Claudia Meisina	Italy	Impact of agricultural management in vineyards to landslides susceptibility in Italian
30	Dymphna Nolasco-Javier	Philippines	Landslide susceptibility assessment using binary logistic regression in northern Philippines

Session 2.3 Landslide hazard assessment and zonation – temporal and size modelling

Convener: Mauro Rossi (mauro.rossi@irpi.cnr.it)& Erica Akemi Goto (ericagoto@gmail.com)
5th Nov. 13:30-16:00 JST

1	Stefan Steger	Italy	A statistical exploratory analysis of inventoried slide-type movements for South Tyrol (Italy)
2	Gabriel Legorreta Paulin	Mexico	Assessing landslide volume for landform hazard zoning purposes
3	Chris Massey	New Zealand	Empirical relationships to estimate the probability of runout exceedance for various landslide types
4	Rex L Baum	USA	Rapid sensitivity analysis for reducing uncertainty in landslide hazard assessment
5	Kana Nakatani	Japan	Applying debris flow simulation for detailed hazard and risk mapping and for considering effective countermeasures
6	Kaiheng Hu	China	Debris-Flow Peak Discharge Calculation Model Based on Erosion Zoning
7	Takashi Koi	Japan	Rainfall-induced lahar occurrences shortly after eruptions and its initiation processes in Japan
8	Jiaying Li	China	Spatiotemporal Assessment of Geological Hazard Safety along Railway Engineering using a Novel Method: A Case Study of the Sichuan-Tibet Railway, China
9	Mohamed Rouai	Morocco	Slope Stability and Landslide Hazard in Volubilis Archaeological Site (Morocco)
10	Olivier Dewitte	Belgium	Landslide Timing in a Changing Tropical Environment: the North Tanganyika-Kivu Rift region, Africa

Session 2.4 Landslide data and information for disaster mitigation
Convener: Txomin Bornaetxea (txomin.bornaetxea@ehu.eus) & Mio Kasai (kasaim@for.agr.hokudai.ac.jp)
5th Nov. 16:00-17:00 JST

1	Mohd Farid Abdul Kadir	Malaysia	Risk-informed Land Use Planning for Landslide Disaster Risk Reduction: A Case Study of Cameron Highlands, Pahang, Malaysia
2	Paolo Tarolli	Italy	Landslides in steep-slope agricultural landscapes
3	Matteo Del Soldato	Italy	From satellite images to field survey: a complete scheme of lanslide InSAR monitoring
4	Toyohiko MIYAGI	Japan	Slope disaster risk reduction map as a communication tool for community based DRR in Japan & Vietnam

Session 2.5 Landslide vulnerability of people, communities and the built environment
Convener: Dario Peduto (dpeduto@unisa.it) & Mike Winter (mwinter@trl.co.uk)
6th Nov. 9:00-11:00 JST

1	Paola Salvati	Italy	People vulnerability to landslide: risky behaviours and dangerous conditions by gender and age
2	Erica Akemi Goto	USA	Using mixed-methods to understand community vulnerability to debris flows in Montecito, CA
3	Dario Peduto	Italy	Innovation in analysis and forecasting of vulnerability to slow-moving landslides
4	Ricardo Garnica-Peña	Mexico	On the use of UAVs for landslide exposure of households: La Gloria neighbourhood, Teziutlán, Puebla
5	Aditi Singh	India	Site-specific risk assessment of buildings exposed to rock fall in India- A case study

6	Michio Ishigaki	Japan	The Advanced Method for Detecting Geotechnical Risks of Landslide Failures by Surveying Historical Surface Deformation and Underground Water
7	Settimio Ferlisi	Italy	Quantitative analysis of the consequences induced by slow-moving landslides to a road network in southern Italy
8	Kuntala Bhusan	India	Landslide Scenario in North Eastern Region of India and Associated Challenges

Theme 3: Monitoring and Early Warning

Contact: Veronica Tofani <veronica.tofani@unifi.it>

Session 3.1 Landslide monitoring and geophysical surveys
Convener: David Huntley (david.huntley@canada.ca) & Jan Klimes (klimes@irsm.cas.cz)
4th Nov. 9:00-12:30 JST

1	Paola Revellino	Italy	Defining kinematic and evolutive features of earth flows using integrated monitoring and low-cost sensors
2	Jan Blahůt	Czech Republic	Monitoring of thermoelastic wave within a rock mass coupling information from IR camera and crack meters: a 24-hour experiment on “Branická skála” Rock in Prague, Czechia
3	David Huntley	Canada	Field testing innovative differential geospatial and photogrammetric monitoring of a slow-moving landslide, south-central British Columbia, Canada
4	Paolo Allasia	Italy	The role of measure of deep-seated displacements in the monitoring networks on large-scale landslide
5	Filip Hartvich	Czech Republic	Multiinstrumental monitoring network Slopenet - new advances
6	Lal Dinpuia	India	Slope Instabilities Analysis and Monitoring of Aizawl Landslide, Mizoram, Northeast India
7	Jongmans Denis	France	Geophysical monitoring of landslides: state-of-the art and recent advances
8	Sebastian Uhlemann	USA	Geophysical monitoring of landslides – A step closer towards predictive understanding?
9	Jim Whiteley	UK	Recent advances in high spatial resolution geophysical monitoring of moisture-induced landslides
10	Hao Luo	China	Characteristic analysis of the Nayong rock avalanche based on the seismic signal
11	Liang Feng	Italy	Rockfall detection and early warning using micro-seismic monitoring
12	Yu Zhuang	China	Electrical resistivity tomography (ERT) based investigation of two landslides in Guizhou, China
13	Kiminori Araiba	Japan	Vibration of Piled Rocks - Which rock can be removed ?
14	Hong-Hu Zhu	China	Multi-parameter monitoring of landslides using a distributed fiber optic sensing system

Session 3.2 Remote sensing for landslide risk management
Convener: Veronica Tofani (veronica.tofani@unifi.it) & Martin Krkac (mkrkac@rgn.hr)
4th Nov. 13:30-15:45 JST

1	Mihai Niculita	Romania	LiDAR and UAV SfM for landslide monitoring
2	Paolo Mazzanti	Italy	Recent developments in photomonitoring
3	Ko-Fei Liu	Chinese Taipei	Debris flow detection with video camera

4	Giulia Tessari	Switzerland	Comparison between PS and SBAS InSAR techniques in monitoring shallow landslides
5	Ying Liu	China	Remote sensing monitoring of landslides along highways
6	Anna Barra	Spain	Sentinel-1 landslides detection: the Granada coast
7	Chaoying Zhao	China	Landslide Dynamic Deformation Monitoring with Sequential Least Squares Based SAR/InSAR techniques
8	David Bonneau	Canada	Towards managing debris channel risks to infrastructure: Understanding debris processes using remotely sensed data.

Session 3.3 Landslide early warning systems
Convener: Michele Calvello (mcalvello@unisa.it) & Faisal Fathani (tfathani@ugm.ac.id)
5th Nov. 13:30-16:30 JST

1	Gaetano Pecoraro	Italy	Definition and first application of a probabilistic warning model for rainfall-induced landslides
2	Katerina Kavoura	Greece	Establishment of an integrated landslide early warning and monitoring system in populated areas
3	Nguyen Duc Ha	Vietnam	An Integrated WebGIS System for Shallow Landslide Hazard Early Warning
4	Adrian Wicki	Switzerland	The value of soil wetness measurements for regional landslide Early Warning Systems
5	John Singer	Germany	Technical concepts for an early warning system for rainfall induced landslides in informal settlements
6	Agus Setyo Muntohar	Indonesia	Development of Landslide Early Warning System based on the Satellite-Derived Rainfall Threshold in Indonesia
7	Qiang Xu	China	Presenting Some Successful Cases of Regional Landslides Early Warning Systems in China
8	Klaus-Peter Keilig	Germany	Towards an early warning system for instable slopes in Gorgia The large Tskneti Akhaldaba landslide
9	Lin Wang	Japan	An EWS of landslide and slope failure by MEMS tilting sensor array
10	Piciullo Luca	Norway	Standards for the performance assessment of territorial landslide early warning systems
11	Zongji Yang	China	Application and verification of a multivariate real-time early warning method for rainfall-induced landslides: implication for evolution of landslide-generated debris flows Landslides
Session 3.3 Landslide early warning systems (continue) **Convener: Michele Calvello (mcalvello@unisa.it) & Faisal Fathani (tfathani@ugm.ac.id)** **6th Nov. 9:00-10:45**			
12	Michele Calvello	Italy	LandAware: a new international network on Landslide Early Warning Systems
13	Chih-Chung Chung	Chinese Taipei	The Development of TDR-integrated landslide Early Warning System
14	Thom Bogaard	Netherlands	What hydrological information should we include in landslide hazard assessment and Early Warning Systems?
15	Teuku Faisal Fathani	Indonesia	Global standard for multi-hazards early warning system
16	Masashi Sekiguchi	Japan	Need for Information Disclosure of Landslide Early Warning Systems
17	Imaya Ariyarathna	Japan	The time prediction Method of an onset of rainfall induced landslides for early warning

Session 3.4 Forecasting models and time predictions of landslides
Convener: Katsuo Sasahara (sasahara@kochi-u.ac.jp) & Emanuele Intrieri (emanuele.intrieri@unifi.it)
5th Nov. 9:00-12:30 JST

1	Maria Teresa Brunetti	Italy	Regional approaches in forecasting rainfall-induced landslides
2	Graziella Devoli	Norway	Seven years of landslide forecasting in Norway – strengths and limitations
3	Hyuck-Jin Park	Republic of Korea	Probabilistic modelling of uncertainties in physically based landslide susceptibility assessment
4	Veronica Tofani	Italy	Characterization of hillslope deposits for physically-based landslide forecasting models
5	Judith Uwihirwe	Netherlands	Landslide precipitation thresholds in Rwanda
6	Nikhil Nedumpallile Vasu	UK	Methodology for developing a preliminary hydrological threshold for rainfall-induced landslides in Kuala Lumpur city, Malaysia
7	Brenda Rosser	New Zealand	Development of a Rainfall-induced Landslide Forecast Tool for New Zealand
8	Naoki Iwata	Japan	Influence of intervals measuring surface displacement on time prediction of slope failure using Fukuzono Method
9	Katsuo Sasahara	Japan	Velocity and acceleration of surface displacement in sandy model slope with various slope conditions
10	Praveen Kumar	India	Comparison of Moving-average, Lazy, and Information Gain Methods for Predicting Weekly Slope-movements: A Case-study in Chamoli, India
11	Antoinette Tordesillas	Australia	New insights into the spatiotemporal precursory failure dynamics of the 2017 Xinmo landslide and its surrounds
12	Martin Krkač	Croatia	A comparative study of random forests and multiple linear regression in the prediction of landslide velocity
13	Adriaan van Natijne	Netherlands	Machine Learning: Potential for Deep-Seated Landslide Nowcasting

Theme 4: Testing, Modeling and Risk Assessment
Contact: Binod Tiwari <btiwari@fullerton.edu>

Session 4.1 Recent Development in Physical Modeling of Landslides
Convener: Katsuo Sasahara (sasahara@kochi-u.ac.jp) & Binod Tiwari (btiwari@fullerton.edu)
4th Nov. 9:00-11:00 JST

1	Rolando P Orense	New Zealand	Application of magnetic tracking system in laboratory-scale rock avalanche model tests
2	Yanto	Indonesia	A simple physically-based distributed translational landslide model
3	Nobutaka Hiraoka	Japan	Centrifuge Modelling of Slope Failure due to Groundwater during Excavation
4	Binod Tiwari	USA	Experimental Studies on the Effect of Vegetation Density to Change Underground Seepage Rate and Stability of Slopes
5	Jonathan M Carey	USA	Experimental Studies on the Effect of Vegetation Density to Change Underground Seepage Rate and Stability of Slopes
6	Dongri Song	China	Basal Stresses of Debris Flow in Instrumented Flume
7	Clarence Choi	China	Landslide Growth: Collisions and Contractile Skins

8	Anthony Leung	Hong Kong SAR, China	Innovative Use of Thermo-Active Pile Row in Unsaturated Soil Slopes

Session 4.2 Recent Development in Numerical Modeling of Landslides
Convener: Deepak Raj Bhat (deepakbhat@okuyama.co.jp) & Beena Ajmera (beena.ajmera@ndsu.edu)
4th Nov. 11:15-12:30 JST

1	Daniel Pradel	USA	Numerical Modelling for Slope Stabilizations in Modern Geotechnical Practice
2	Qiuhua Liang	UK	A coupled discrete element and depth-averaged model for flow-like landslide simulations
3	Martin Mergili	Austria	Advanced methods for simulating complex landslides
4	Laura Longoni	Italy	First test results from the SMART-SED simulation tool basin scale sediment yield model
Session 4.2 Recent Development in Numerical Modeling of Landslides (continue) **Convener: Khang Dang (khangdq@gmail.com) & Beena Ajmera (beena.ajmera@ndsu.edu)** **4th Nov. 13:30-16:30 JST**			
5	Khang Dang	Japan	Hazard assessment of a rainfall-induced deep-seated landslide in Hakha city, Myanmar
6	Doan Huy Loi	Japan	Landslide hazard zoning based on the integrated simulation model (LS-Rapid)
7	Akihiko Wakai	Japan	Numerical simulation of a creeping landslide case in Japan
8	Takashi Kitazume	Japan	Numerical simulation of debris flows after ash fall at Mt. Fuji
9	Thirapong Pipatpongsa	Japan	On the progression of slope failures using inverse velocity of surface movements in an undercut slope model
10	Mario Martinelli	Netherlands	Rainfall boundary condition in a multiphase Material Point Method
11	Hitoshi Nakase	Japan	Reproduction of Sedimentation State during Rock Slope Failure Using the Simplified DEM Model
12	Matjaž Mikoš	Slovenia	An extreme May 2018 debris flood case study in northern Slovenia: analysis, modelling, and mitigation
13	Chaojun Ouyang	China	Numerical modeling of dynamic process and risk prediction of recent catastrophe landslides
14	Shuji Moriguchi	Japan	Sensitivity Analysis of DEM Parameters in Granular Flow Simulations

Session 4.3 Recent Development in Soil and Rock Testing Techniques, Application and Analysis Methods
Convener: Sabatino Cuomo (scuomo@unisa.it) & Netra Prakash Bhandary (netra@ehime-u.ac.jp)
5th Nov. 9:00-10:45 JST

1	Binod Tiwari	USA	Recent Developments in the Evaluation and Application of Residual and Fully Softened Shear Strengths for the Stability Analyses of Landslides
2	Deepak Raj Bhat	Japan	Shearing rate effect on residual strength of typical clay soils in ring shear test
3	Sabatino Cuomo	Italy	Simple shear tests for unsaturated soils
4	Beena Ajmera	USA	Simplest Methods of Determining Dynamic Soil Properties for Use in Co-seismic Hazard Analysis
5	Shenghua Cui	China	Liquefaction within Bedding Fault: New Understanding of the Initiation and Movement of Daguangbao Landslide Triggered by the 2008 Wenchuan Earthquake (Ms=8.0)
6	Netra Prakash Bhandary	Japan	Residual-state ring shear creep tests on clayey materials and development of creep failure model

7	Jakub Roháč	Czech Republic	Challenges in Evaluating Shear-Rate Effects in Soils
8	Satoshi Goto	Japan	Monotonic and Cyclic Behaviour of Tephra Layer Landslide at Takanodai from the 2016 Kumamoto Earthquake

Session 4.4 Recent Advancements in the Methods of Slope Stability and Deformation Analyses
Convener: Jiawei Xu (xu.jiawei.38z@st.kyoto-u.ac.jp) & Binod Tiwari (btiwari@fullerton.edu)
5th Nov. 11:10-12:40 JST

1	Timur Ersöz	Turkey	Slope Stability Assessment of Weak and Weathered Rocks with BQ System
2	Elizabeth A Holcombe	UK	Soil databases to assist slope stability assessments in the Eastern Caribbean
3	Ran LI	China	Failure mechanism of a flow-like landslide triggered by the 2018 Western Shimane Earthquake
4	Saaduddin	UK	The Mt Gamalama instability level in generating landslide-induced tsunami in Ternate Island, Indonesia
5	Jiawei Xu	Japan	Seepage and deformation of unsaturated slope during post-earthquake rainfall
6	Jan Jerman	Czech Republic	3D analysis of settlement and stability of the open-cast coal mine landfill: Bílina mine case

Session 4.5 Recent Development in Disaster Risk Assessment
Convener: Ryosuke Uzuoka (uzuoka.ryosuke.6z@kyoto-u.ac.jp) & Giuseppe Mandrone (giuseppe.mandrone@unito.it)
5th Nov. 13:30-17:00 JST

1	Limin Zhang	China	Engineering Risk Mitigation for Landslide Hazard Chains: the Baige Landslides on the Jinsha River in 2018
2	Shantanu Sarkar	India	Engineering Geological Investigation and Slope Stability Analysis for Landslide Hazard Assessment in Indian Himalayas
3	Giuseppe Mandrone	Italy	First considerations about post 2017 wildfire erosion response and debris flows in Susa valley (NW Italy)
4	Wahyu Wilopo	Indonesia	Identification of Sliding Surface and Crack Pattern in the Soil Creep, Case Study: Unika Soegijapranata Campus, Semarang, Central Java, Indonesia
5	Tina Peternel	Slovenia	Preliminary result of real-time landslide monitoring in the case of the hinterland of Koroška Bela, NW Slovenia
6	Saskia de Vilder	New Zealand	Quantitative risk analysis of earthquake-induced landslides
7	Clarence E. Choi	Hong Kong SAR, China	Role of Remote Sensing Technology in Landslide Risk Management of Hong Kong
8	Luqi Wang	China	Risk assessment of submerged rock mass in reservoir area
9	Panyabot Kaothon	Republic of Korea	Prediction the Global Factor of Safety in Soil-Nailed Slope by A Simplified Method
10	Keh-Jian Shou	Chinese Taipei	On the Scale Effect of the Catchment Landslide Susceptibility with Consideration of Climate Change
11	Jordi Corominas	Spain	Fragmental rockfalls and the analysis of risk
12	Ratih Indri Hapsari	Indonesia	Satellite Soil Moisture for Estimating Landslide Hazard
13	Holger Pankrath	Germany	Shaking table tests of small scaled slope models

Theme 5: Catastrophic Landslides and Frontiers of Landslide Science
Contact: Vít Vilímek <vit.vilimek@natur.cuni.cz>, Alexander Strom < strom.alexandr@yandex.ru>, Fawu Wang <wangfw@tongji.edu.cn>

Session 5.1 Landslides and earthquakes
Convener: Alexander Strom (strom.alexandr@yandex.ru) & Hiroshi Yagi (yagi@e.yamagata-u.ac.jp)
4th Nov. 9:00-10:30 JST

1	Paulus Rahardjo	Indonesia	Study on the Phenomena of Liquefaction Induced Massive Landslides in 28 September 2018 Palu-Donggala Earthquake
2	Daria Shubina	Russia	The Krasnogorsk landslide (Northern Caucasus): its evolution and modern activity
3	Hiroshi Yagi	Japan	Slope deformation of Jure landslide 2014 along Sun Koshi in Lesser Nepal Himalaya and effect of Gorkha earthquake 2015
4	Toshiya Aoki	Japan	Pressure head dynamics on a natural slope in Eastern Iburi struck by the 2018 Hokkaido earthquake
5	Sergio Sepulveda	Chile	New insights on recent and active large rock slides in the Andean paraglacial environments of central Chile
6	Salvatore Martino	Italy	Earthquake-triggered landslides and slope-seismic waves interaction inferring induced displacements

Session 5.2 Landslide dams and outburst floods
Convener: Vít Vilímek (vit.vilimek@natur.cuni.cz) & Toshiya Aoki (aokitoshiya6@eis.hokudai.ac.jp)
4th Nov. 10:45-12:15 JST

1	Tomas Kroczek	Czech Republic	Rockfall/rockslide hazard, lake expansion and dead-ice melting assessment: Lake Imja, Nepal
2	Oleg V. Zerkal	Russia	Formation of the 2018 Bureya landslide, Far East of Russia
3	Regine Morgenstern	New Zealand	Landslide dam hazards: assessing their formation, failure modes, longevity and downstream impacts
4	Chukwuueloka A.U. Okeke	Nigeria	The Sedimentology and Internal Structure of Landslide Dams – Implications for Internal Erosion and Piping Failure: A Review
5	Christian Zangerl	Austria	Investigation, characterisation and monitoring of deep-seated landslides in the surroundings of large dam reservoirs
6	Arash Barjasteh	IRAN	March 2019 flood impact on the stability of Ambal salt ridge in the Gotvand dam reservoir, Southern Iran

Session 5.3 Catastrophic large-scale landslides in mountainous regions
Convener: Hans-Balder Havenith (hb.havenith@uliege.be) & Toshimi Mizuno (mizuno-oshimi@oyonet.oyo.co.jp)
4th Nov. 13:30-17:15 JST

1	Alexander Strom	Russia	Rock avalanches: basic characteristics and classification criteria
2	Jan Burda	Czech Republic	An interdisciplinary assessment of a coal-mining-induced catastrophic landslide (Czech Republic)
3	Gioachino Roberti	Canada	Could glacial retreat-related landslides trigger volcanic eruptions? Insights from Mount Meager, British Columbia
4	Hans-Balder Havenith	Belgium	Structural and dynamic numerical models of rockslides in the Carpathians and the Alps

5	Michele Delchiaro	Italy	Quantitative investigation of a Mass Rock Creep deforming slope through A-Din SAR and geomorphometry
6	Ching-Ying Tsou	Japan	Deformational Features of Deep-Seated Gravitational Slope Deformation of Slate Slopes in the Central Range, Taiwan
7	Kiichiro Kawamura	Japan	Bathymetric Analyses of Submarine Landslides on the Jan Mayen Ridge, Norwegian–Greenland Sea
8	Dirk Kuhn	Germany	Forkastningsfjellet rock slide, Spitsbergen: State of activity in a changing climate
9	Vinod K Sharma	India	Catastrophic landslides in Indian sector of Himalaya
10	Andrée Blais-Stevens	Canada	Landslides that caused fatalities in Canada from 1771-2019
11	Mark E. Reid	USA	Basal Liquefaction from Rapid Landsliding: The 2014 Deadly Oso Landslide (USA)
12	Toshimi Mizuno	Japan	The evaluation of Deep-seated catastrophic landslides (DCLs) on Kii Peninsula 2011 by means of the historical deformation
13	Violchen Sepulveda	Chile	Catastrophic landslide and subsequent tsunamis in North-Patagonian District, Chile
14	Marte Gutierrez	USA	The Massive February 17, 2006, Leyte, Philippines, Rockslide
15	Tomas Panek	Czech Republic	Giant landslides in the foreland of Patagonian Andes: effects of deglaciation and drawdown of glacial lakes

Session 5.4. Landslides triggered by extreme rainfall and other effects of climate change
Convener: Fawu Wang (wangfw@tongji.edu.cn) & Ying Guo (samesongs@163.com)
5th Nov. 9:00-11:30 JST

1	Ken Ho	China	Enhancing Preparedness against Impact of Climate Change on Slope Safety in Hong Kong
2	Wei Shan	China	Climate Change and Surface Deformation Characteristics in Degradation Area of Permafrost in Lesser Khingan Mountain, China
3	Nejc Bezak	Slovenia	Climate change impact evaluation on the water balance of the Koroška Bela area, NW Slovenia
4	Qiang Zou	China	Characteristics and causes of the debris flow in Shelong Gully, China
5	Kounghoon Nam	China	Extreme rainfall induced landslide susceptibility assessment using Autoencoder combined with Random forest
6	Hongjuan Yang	China	Rainfall-induced landslides and debris flows in Mengdong town, Yunnan province, China
7	Swapna Acharjee	India	Landslide triggered by rainfall and Land use change: A case study of Laptap Landslide, Arunachal Pradesh, India
8	Komatsubara Taku	Japan	Relationships between antecedent rainfall and volume of earthquake-induced □landslides in historical era of Japan
9	Gianvito Scaringi	Czech Republic	Looking for a Temperature Control on Slope Stability
10	Jeffrey A. Coe	USA	Bellwether sites for evaluating changes in landslide frequency and magnitude in cryospheric mountainous terrain

Session 5.5. Frontiers of landslide science
Convener: Sabatino Cuomo (scuomo@unisa.it) & Junichi Koseki (koseki@civil.t.u-tokyo.ac.jp)
5th Nov. 11:45-12:30 JST

1	Sabatino Cuomo	Italy	Numerical Modelling of Landslide-Structure-Interaction
2	Tazio Strozzi	Switzerland	Accelerating Landslide Hazard at Kandersteg, Swiss Alps; Combining 28 years of satellite InSAR and single campaign terrestrial radar data
3	Ying GUO	China	Identification old landslides in permafrost degradation area in Northeast China by difference distribution of surface trees
Session 5.5. Frontiers of landslide science (continue) **Convener: Sabatino Cuomo (scuomo@unisa.it) & Junichi Koseki (koseki@civil.t.u-tokyo.ac.jp)** **5th Nov. 13:30-17:00 JST**			
4	Paula Hilger	Norway	A landform evolution model for the Mannen area in Romsdal valley, Norway
5	Guglielmo Grechi	Italy	Multimethodological study of non-linear strain effects induced by thermal stresses on jointed rock masses
6	S.O.A.D. Mihira Lakruwan	Japan	Economizing the Soil Nailing Design by Drainage Improvement – Case History at Ginigathhena
7	Sandro Moretti	Italy	Large and small scale multi-sensors remote sensing for landslide characterisation and monitoring
8	Gabriel Legorreta Paulin	Mexico	Modeling landslide volumes: A case study in Whatcom County, Washington, USA
9	Pietro Rimoldi	Italy	Geosynthetic reinforced soil structures for slope stabilization and landslide rehabilitation in Asia
10	Wen-Chieh Cheng	China	Mobility characteristics in loess landslide over erodible bed: insights from sandbox experiments
11	Costanza Morino	France	Different dynamics of permafrost degradation-induced landslides revealed by molards
12	Yoshinori Otani	Japan	Recent Development of the Mechanically Stabilized Earth Walls with Geosynthetic Strap Reinforcements
13	Junichi Koseki	Japan	Japanese case histories on use of geosynthetics in reconstructing failed slopes
14	Mario Valiante	Italy	A spatiotemporal object-oriented data model for landslides (LOOM): some first pilot applications from the Cilento Geopark (Italy)
15	Motohiro Ito	Japan	Emeagency mitigation measures of a dip slope slide with uplifted toe caused by heavy rain in Chichibu, east Japan
16	Reshad Md. Ekram Ali	Bangladesh	Influence of geology and geological structures in triggering landslides: Bangladesh perspective
17	Hans-Balder Havenith	Belgium	3D landslide models in VR

Theme 6 Specific Topics in Landslide Science and Applications

Contact: Zeljko Arbanas <zeljko.arbanas@gradri.uniri.hr>

Session 6.1 Impact of large ground deformations near seismic faults on critically important civil-infrastructures
Convener: Kazuo Konagai (kaz3776k@gmail.com) & Junji Kiyono (kiyono.junji.5x@kyoto-u.ac.jp)
4th Nov. 9:00-10:30 JST

1	Kazuo Konagai	Japan	Recent earthquakes that hit areas covered and/or underlain by pyroclastic matters and their impacts on lifelines
2	Alex Tang	Canada	Lessons Learned – Landslide Induced Lifelines Disasters from Past Earthquakes

3	Susumu Nakamura	Japan	Risk Assessment of Structural Damage for Rock Collision due to Earthquake-Induced Landslide
4	Junji KIYONO	Japan	Seismic response of buried pipeline to strong ground motion of strike-slip fault
5	Vishnu Dangol	Nepal	Impact on Infrastructure by 2015 Gorkha Earthquake Induced Landslides
6	Tara Nidhi Bhattarai	Nepal	Reconstruction Strategies for Mw 7.8 Earthquake-induced Landslide-affected Settlements in Nepal
7	Chih-Hsuan Liu	Chinese Taipei	Relationship between Arias intensity and the earthquake-induced displacements of slopes

Session 6.2 Recent Progress in the Landslide Initiating Science
Convener: Ikuo Towhata (towhata.ikuo.ikuo@gmail.com) & Yifei Cui (yifeicui@mail.tsinghua.edu.cn)
4th Nov. 10:45-12:30 JST

1	Haijun Qiu	China	Controls on landslide size: insights from field survey data
2	Ikuo Towhata	Japan	Geologic and hydrologic investigations on slope failures triggered by extreme rainfall on Izu Oshima Island, Japan
3	Yifei Cui	China	Investigation of internal erosion of wide grading loose soil – a micromechanics-based study
4	Huayong Chen	China	Experimental study on formation and propagation of debris flow triggered by the glacial lake outburst flood
5	Yan Yan	China	Quantitative analysis of landslide processes based on seismic signals - a new method for monitoring and early warning of landslide hazards
6	Amin Askarinejad	Netherlands	Water exfiltration from bedrock: a drastic landslide triggering mechanism

Session 6.3 Earth Observation and Machine Learning
Convener:Giulia Bossi (giulia.bossi@irpi.cnr.it)
4th Nov. 13:30-14:45 JST

1	Christopher Gomez	Japan	High-resolution point-cloud for Landslides in the 21st Century: from data acquisition to new processing concepts
2	Daniele Giordan	Italy	Automatized dissemination of landslide monitoring bulletins for early warning applications
3	Giulia Bossi	Italy	Detecting change of patterns in landslide displacements using machine learning, an example application
4	Elahe Jamalinia	Netherlands	Predicting rainfall induced slope stability using Random Forest regression and synthetic data
5	Ivan Depina	Norway	Hybrid Analytics of Rainfall Infiltration with Physics-informed Neural Networks

Session 6.4 General Landslide Studies
Convener: Zeljko Arbanas (zeljko.arbanas@gradri.uniri.hr) & Daisuke Higaki (a9024@n-koei.co.jp)
4th Nov. 15:00-16:45 JST

1	Tonglu Li	China	Loess Stratigraphy and Loess Landslides in the Chinese Loess Plateau
2	Hermanns Reginald L	Norway	Mapping, hazard and consequence analyses for unstable rock slopes in Norway
3	Martina Böhme	Norway	Landscape formation and large rock slope instabilities in Manndalen, northern Norway
4	Francis Rengers	USA	Landslides after wildfire: initiation, magnitude, and mobility

5	Peng Cui	China	Disaster Risk Assessment of the Silk Road
6	Daisuke Higaki	Japan	Rehabilitation of gully-dominant hill slopes by using low-cost measures-a case study in Nepal
7	Chinthaka Ganepola	Sri Lanka	Site Suitability Analysis for Nature-based Landslide Risk Mitigation
8	Jana Eichel	Netherlands	Biogeomorphic feedbacks between plants and mass movement processes in periglacial environments
Session 6.4 General Landslide Studies (continue) **Lin Wang (wang@ckcnet.co.jp)** **Nov. 9:00-10:30 JST**			
9	Oleg V. Zerkal	Russia	Classification of Cryogenic Landslides and Related Phenomena (by Example of the Territory of Russia)
10	Hiroshi P. Sato	Japan	Relation between horizontal direction of crustal deformation surveyed on the control points and area ratio of the slope failures triggered by the 2016 Kumamoto earthquake (Mj7.3)
11	Weile Li	China	Precursor of large rockslides and its application on landslide early detection
12	Michiyo Nakashima	Japan	Report on a landslide in Kyotango city, Kyoto prefecture
13	Yasunori Katsume	Japan	Three-dimensional shape of mountainous landslide and the ground deformation caused by snow melting - Jin'nosuke-dani landslide, Mount Hakusan,Central Japan
14	Yu Zhao	China	Measuring colloidal forces between clay microparticles with optical tweezers

Session 6.5 The Japanese Geotechnical Society Session
Convener: Kazunari Sako (sako@oce.kagoshima-u.ac.jp) & Noriyuki Yasufuku (yasufuku@civil.kyushu-u.ac.jp)
5th Nov. 10:45-12:30 JST

1	Kazuya Yasuhara	Japan	Contribution of geotechnical engineering to climate change and IPCC
2	Motoyuki Suzuki	Japan	Urgent issues and new suggestions for geo-disaster prevention in Japan
3	Tatsuya Ishikawa	Japan	Lessons from recent geo-disasters in Hokkaido under heavy rainfall
4	Noriyuki Yasufuku	Japan	Lessons from recent geo-disasters caused by heavy rainfall in recent years in Kyushu Island, Japan
5	Shima Kawamura	Japan	Lessons from recent geo-disasters in Hokkaido under earthquake
6	Kiyonobu Kasama	Japan	Lessons from recent earthquake-induced Geo-disaster in Kyushu
7	Kumiko Fujita	Japan	Starting International Joint Research for Landslide Disaster Risk Reduction: The Use of Japanese Warning Technology Considering the Social Differences in Sri Lanka and Japan
Session 6.5 The Japanese Geotechnical Society Session (continue) **Convener: Kazunari Sako (sako@oce.kagoshima-u.ac.jp) & Noriyuki Yasufuku (yasufuku@civil.kyushu-u.ac.jp)** **5th Nov. 13:30-14:00 JST**			
8	Yamashita Yuichi	Japan	Daily education for disaster risk reduction and victim support in disaster
9	YongSu Kim	Japan	A Study For Improving Disaster Prevention Of Community

Session 6.6. Landslide Remediation and Mitigation Studies
Convener: Kazuo Konagai (kaz3776k@gmail.com) & Sangjun Im (junie@snu.ac.kr)
5th Nov. 14:15-15:15 JST

1	Stavroula Fotopoulou	Greece	Towards a probabilistic performance-based methodology for the vulnerability assessment of buildings subjected to seismically induced landslides
2	Jose A. Chavez	El Salvador	Slope Behavior Improvement of Partially-Saturated Pyroclastic in Data Scarse Regions
3	Vishnu Dangol	Nepal	Geotechnical Investigation for Landslide Stabilization Works in Narayanghat-Mugling Road, Central Nepal
4	Christophe Balg	Switzerland	Applying over ten years of experience in debris flow barriers to examples in South Africa and India for permanent protection

Korean Session in Theme 6
Convener: Kazuo Konagai (kaz3776k@gmail.com) & Sangjun Im (junie@snu.ac.kr)
5th Nov. 15:30-16:15 JST

1	Lee Jin-Ho	Republic of Korea	Development of Engineering Techniques for Exploring Land Creep Susceptible Zones in South Korea
2	Namgyun Kim	Republic of Korea	Stability analysis for cut-slope collapse by earthquake
3	Sangjun IM	Republic of Korea	Quantitative Evaluation of Erosion Control Dam on Sediment Trapping Efficiency with a Simulation Approach

The Japan Landslide Society E-proceedings sessions
Contact: Daisuke Higaki <a9024@n-koei.co.jp>

Session 6.E1 International Cooperation in Landslide Disaster/Risk Reduction (Japan)
Convener: Daisuke Higaki (a9024@n-koei.co.jp)
4th Nov. 9:00-12:35 JST

1	Haruki Ogasa	Japan	JICA's support in landslide disaster risk reduction
2	Kiyoharu Hirota	Japan	Preliminary report of simple hazard mapping methods for slope stability in Tegucigalpa, Honduras
3	Lidia Elizabeth Torres Bernhard	Honduras	AHP Method Applicated to Landslide Susceptibility Mapping in pilot sites of Tegucigalpa
4	Elias Garcia-Urquia	Honduras	Coupling antecedant rainfall and intensity-duration thresholds for landslide occurrence in Tegucigalpa, Honduras, 2010
5	Takeshi Kuwano	Japan	Slope disaster and countermeasures in Honduras
6	Masanori Tozawa	Japan	Introduction of Preventive Measures in the Road Infrastructure Development in Tajikistan, in cooperation with a JICA technical project
7	Tomoharu Iwasaki	Japan	Technical cooperation project: Landslide adviser for Mauritius
8	Mukteshwar Gobin	Mauritius	Structural and non-structural countermeasures against landslides implemented in Mauritius with the assistance of the Government of Japan
9	Mikihiro MORI	Japan	Risk Estimation and Cost-Benefit Analysis of Road Geohazard Risk Reduction by comprehensive assessment for seismic and non-seismic hazards.
10	Alonso Armado Alfaro	El Salvador	Rockfall and landslides events and its study in Los Chorros Segment of the CA01 route, El Salvador.
11	Tempa Thinley	Bhutan	Landslide disaster management and capacity development for roadside slope risk reduction in Bhutan

12	Hara Takashi	Japan	Rockfall protection on road in Bhutan
13	Naoto Iwasa	Japan	Application on slope stabilization method aimed an environment and landscape conservation
Session 6.E1 International Cooperation in Landslide Disaster/Risk Reduction (Japan) (continue) 4th Nov. 13:30-14:50 JST			
14	Kaoru Nakazato	Japan	Generating Landslide Hazard Map on 2015 Nepal Earthquake and Subsequent Training Activity
15	Daisuke Higaki	Japan	A case study of low-cost measures against landslides by river bank erosion in Nepal
16	Yoji Kasahara	Japan	Road slope disaster countermeasures in Sri Lanka
17	Pucai Yang	Japan	Identification of Debris Flow Hazards in Sri Lanka
18	Hiroshi Ogawa	Japan	Technical transfer for landslide investigation and monitoring at central Asia Kyrgyz Republic

Session 6.E2 Introduction of landslide mitigation measures of Japan
Convener: Daisuke Higaki (a9024@n-koei.co.jp)
5th Nov. 9:00-12:05 JST

1	Toko Takayama	Japan	Landslide interpretation based on precise visualization method using high resolution geospatial data
2	Wataru Takeshita	Japan	Use of UAV-SfM point cloud for emergency response to landslide disasters
3	Tomoya Hayakawa	Japan	Large landslide dam in Hidakahoronai, Hokkaido
4	Senro Kuraoka	Japan	Development of methods to assess the annual expected loss of earthquake-induced landslides
5	Wataru Sagara	Japan	Relationship between water quality and ground condition in earthquake-induced landslide areas
6	Yoshinori Ito	Japan	Prediction of groundwater level fluctuation in deep-seated landslide area using genetic algorithm
7	Akihiro Miyagi	Japan	Relationship between bamboo rhizome and surface failure
8	Kazunori Hayashi	Japan	Small and simple water drainage drilling method for landslide disaster prevention
9	Yoshitsugu Kimura	Japan	Performance Verification of sediment capture by Flexible Barrier
10	Masayuki Ujihara	Japan	The Geofiber method-protecting slopes with environment-conscious continuous fiber reinforced soil-
Session 6.E2 Introduction of landslide mitigation measures of Japan (continue) 5th Nov. 13:30-14:30 JST			
11	Hiroaki KOJIMA	Japan	Case studies of installation of measuring instruments on overseas landslide countermeasures and their problems: examples of Sri Lanka and Honduras
12	Yusuke Koyama	Japan	Disaster risk coverage of TV media for citizens
13	Go SATO	Japan	Creating an archive of landslide interpretation using the human eye via an eye-tracking system
14	Lin Wang	Japan	Microseism and Vibration Sensor Array Monitoring System

Session 6.E3 Activities of Landslide-prevention engineers to enhance local capacity for disaster reduction in Japan
Convener: Katsuo Sasahara (sasahara@kochi-u.ac.jp)
4th Nov. 15:10-16:50 JST

1	Noriko Ohnuma	Japan	Process of preparing Community Disaster Management Plan: Case study of communities on Ichinichi-Mae Project and CDMP that Have Experienced Recent Disaster
2	Kiyomi Nakamura	Japan	Extraction of subjects for regional disaster risk reduction by teaching materials simulating evacuation behaviors
3	Shunitsu Fujii	Japan	An easy way to learning rainfall-induced landslides and its prevention using analog modelling
4	Akihiko Tadokoro	Japan	The workshop program of disaster prevention learning for primary school children and junior high school students
5	Kouichi Ikebe	Japan	Approaches and actions for information dissemination and education for disaster resilience in the Chubu Branch of Japan Landslide Society
6	Takemine Yamada	Japan	Collaboration of the City of Yokohama and the JAGE's chartered engineers for geotechnical evaluation consultation with local residents

Session 6.E4 Challenges in international unification of slope disaster prevention technologies
Convener: Mitsuya Enokida enokida@jce.co.jp)
6th Nov. 10:00-11:20 JST

1	Yuuichi Ueno	Japan	International Comparison of the Classification of Soils and Rocks for Determining the Stable Cut Slope Angles
2	Naoto Iwasa	Japan	Technical Terms of Structure for Slope Protection
3	Mitsuya Enokida	Japan	International differences in methods for calculating the deterrent effect of ground anchoring and soil nailing
4	Daisuke Higaki	Japan	Definition of Technical Terms for Landslide Disaster Management
5	Kiyoharu Hirota	Japan	Vegetation Methods Based on the Japanese Standard Cut Slope in Bhutan
6	Shiho Asano	Japan	Role of forestry conservation for landslide prevention

Session 6.E5 Countermeasures conducted by the Japanese government against landslide disasters
Convener: Katsuo Sasahara (sasahara@kochi-u.ac.jp)
5th Nov. 14:45-16:10 JST

1	Masakazu Nagano	Japan	Outline of measures for sediment disaster by Sabo Department of MLIT, Japan
2	Masaru Touhei	Japan	Introduction of Construction Information Modeling / Management in the Yui Landslide Countermeasures
3	Teruyoshi Takahara	Japan	Mitigation works for the Aruse I-3 block landslide in Miyoshi, Tokushima, Japan
4	Yuki Yamana	Japan	Efforts and results of mountain area conservation by Forestry conservancy projects
5	Kojiro Shiraki	Japan	Examples of recent landslide countermeasures by conservancy projects
6	Mayuko Shida	Japan	Agriculture and landslides in Japan
7	Tooru Sato	Japan	National Project for Landslide Prevention in the Takase Area

Thematic issue “Sendai Landslide Partnerships 2015-2025” / “Kyoto Landslide Commitment 2020”
Convener: Binod Tiwari (btiwari@fullerton.edu) & Khang Dang (khangdq@gmail.com)
6th Nov. 9:00-11:30 JST

1	Masahiro Shinoda	Japan	Regional landslide susceptibility following the 2016 Kumamoto earthquake using back-calculated geomaterial strength parameters
2	Ting-kai Nian	China	Experimental investigation on the formation process of landslide dams and a criterion of river blockage

3	Ben Leshchinsky	USA	The Hooskanaden Landslide: historic and recent surge behavior of an active earthflow on the Oregon Coast
4	Changdong Li	China	Recent rainfall- and excavation-induced bedding rockslide occurring on 22 October 2018 along the Jian-En expressway, Hubei, China
5	Karel Šilhán	Czech Republic	Dendrogeomorphology of landslides: principles, results and perspectives
6	Guruh Samodra	Indonesia	Characterization of displacement and internal structure of landslides from multitemporal UAV and ERT imaging
7	Sudesh Kumar Wadhawan	India	Causative Factors of Landslides 2019: Case Study in Malappuram and Wayanad Districts of Kerala, India
8	Amin Askarinejad	Netherlands	Ultimate lateral pressures exerted on buried pipelines by the initiation of submarine landslides
9	Kun SONG	China	Successful disaster management of the July 2020 Shaziba landslide triggered by heavy rainfall in Mazhe Village, Enshi City, Hubei Province, China
10	Raymond Cheung	Hong Kong	Landslide risk management in Hong Kong

World Tsunami Awareness Day Special Event
Contact: Shinji Sassa <sassa_pari@hotmail.co.jp>
Convener: Shinji Sassa (sassa_pari@hotmail.co.jp)
5th Nov. 9:00-12:30 JST

1	Jia-wen Zhou	China	Numerical simulation of landslide-generated waves during the 11 October 2018 Baige landslide at the Jinsha River
2	Finn Løvholt	Norway	Tsunami uncertainty due to landslide dynamics
3	Do Minh Duc	Vietnam	Analysis and modeling of a landslide-induced tsunami-like wave across the Truong river in Quang 5Nam province, Vietnam
4	Jan Blahůt	Czech Republic	Tsunami from the San Andrés Landslide on El Hierro, Canary Islands: first attempt using simple scenario
5	Ken Ikehara	Japan	The link between upper-slope submarine landslides and mass transport deposits in the hadal
6	Shinji Sassa	Japan	Review of Submarine Landslide-induced Tsunamis: The importance of cascading mechanisms and multi-phased physics
7	Nicola Casagli	Italy	Monitoring and Early Warning of Landslides including Stromboli landslide induced tsunami
8	Kyoji Sassa	Japan	Simulation of Tsunami waves induced by coastal and submarine landslides in Japan
9	Luciano Picarelli	Italy	The impact of climate change on landslide hazard and risk
World Tsunami Awareness Day Special Event (continue) **Convener: Shinji Sassa (sassa_pari@hotmail.co.jp)** **5th Nov. 13:30-17:00 JST**			
10	Kazuo Konagai	Japan	Early Warning of rain-induced rapid and long-travelling landslides in Sri Lanka
11	Stephan Grilli	USA	Tsunami generation by Volcanic flank collapse: Case study of Anak Krakatau
12	David Tappin	UK	The continuing underestimated tsunami hazard from submarine landslides

13	Viacheslav Gusiakov	Russia	December 11, 2018 landslide and 90-m icy tsunami in the Buryea water reservoir
14	Dwikorita Karnawati	Indonesia	Innovation in Tsunami Early Warning System in Indonesia
15	Toyohiko Miyagi	Japan	Explanation of submarine landslides distributions around Japanese islands and stereo photo of submarine landslides on the floor
16	Break: Observation of stereo photo of submarine landslides by participants		
17	Panel Discussion: Understanding and reducing disaster risk of landslide-induced Tsunami along with the Kyoto Landslide Commitment 2020		
18	Short talks and comments from panelists and floor		
19	Concluding remarks on World Tsunami Awareness Day Special Event in WLF5		

E-Poster Presentation
Convener: Binod Tiwari (btiwari@fullerton.edu) & Khang Dang (khangdq@gmail.com)
6th Nov. 11:40-12:25

1	Andrea Fabiánová	Czech Republic	Dendrogeomorphic dating vs. low-magnitude landsliding
2	Vaclav Skarpich	Czech Republic	Understanding Complex Slope Deformation through Tree-Ring Analyses: Case from the Vsetínské Vrchy Mts (Outer Western Carpathians, Czech Republic)
3	Dominik Krengel	Japan	Avalanching of variously shaped DEM-particles
4	Makoto INOMOTO	Japan	Landslides induced by heavy rains in July 2018 in Shikoku Island, Japan
5	Ching-Fang Lee	Chinese Taipei	Combination of rainfall thresholds and susceptibility maps for early warning purposes for shallow landslides at regional scale in Taiwan
6	Naoki NISHIMURA	Japan	Sediment dynamics monitoring at the Osawa Failure of Mt. Fuji
7	Mihira Lakruwan	Japan	Variation of Performances of Horizontal Drains and Slope Stability with Perforation Arrangement and Envelope Permeability
8	Genya Takenaka	Japan	Shaking table test on decreasing of Factor of safety and softening of saturated pyroclastic fall layer
9	Shinro Abe	Japan	Geological background of landslide occurrence areas in Vietnam
10	Hiroomi Nakazato	Japan	Observation method of pore water pressure at slip surface by recycling of broken borehole inclinometer
11	Jun Takiguchi	Japan	Features and measurement examples of "pipe inclinometer ", underground displacement measurement technology using gravitational acceleration sensor
12	Ngoc Ha Do	Japan	Shear band formation observed in a rainfall-induced landslide in a flume experiment on weathered granite sand
13	Taku Komatsubara	Japan	Relationships between antecedent rainfall and volume of earthquake-induced landslides in historical era in Japan
14	Masashi Sekiguchi	Japan	Repair and Regeneration Technology of Load Cell
15	Junpyo Seo	Korea	A Study on the Bedload Transport Characteristics of Damaged Forest Watershed in the Republic of Korea

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Progress in Landslide Research and Technology
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Figures and figure captions

Figures are allowed either in greyscale or in colour. It is possible to insert column-wide figures (half-page width) with maximum width of 77 mm and double-column-wide figures as well with a max allowed dimension of 160 mm. In any case, the max height is 230 mm. Figure should be directly attached within the document at the right place using preferentially the "insert -> image -> from file" option of Microsoft Word using a recommended resolution of ate least 400 dpi for greyscale images and of at least 300 dpi for colour images. TIFF format is recommended.

The following is an example of column-wide figure. The figure line (the line of text in which the figure has to be placed) should be formatted choosing the appropriate Style "Figure" from the Template Style List. This will ensure proper distancing between figure and surrounding text. However, authors are free to add one or two empty rows of normal text to adjust formatting and visual appearance.

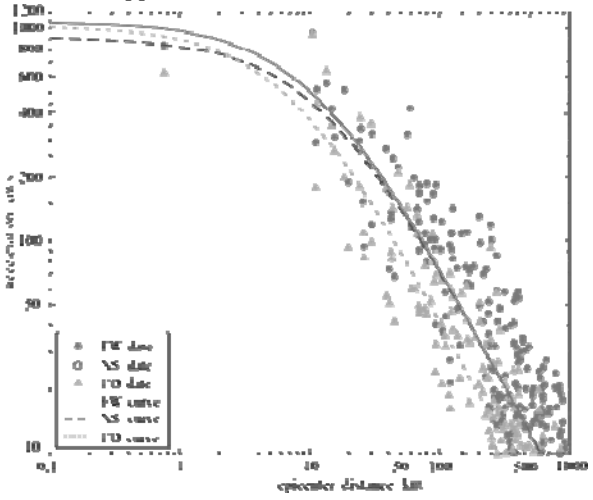

Fig. 1 Example of half page figure. Captions which are 2 or more rows long must be justified. Shorter caption must be column-centred. Please ensure to select the style "Figure Caption" and to place caption below figure.

Figures should be cited in text using the short: "Fig.".

Title, authors, affiliations and other issues

Title and authors

The paper should start with the title section which has a special single-column formatting (see top of first page). Please make sure to maintain section separation to ensure proper column formatting of the document. In case you inadvertently delete the section break, insert a new one on top of the beginning of manuscript main body using Microsoft Word option "insert -> break -> section break -> continuous".

Author's names should precede paper title as in the example above. Please use style "Authors" for this part of paper, which uses the following formatting: font Calibri, font size 12, typeface bold, colour black, left indent 5 cm, vertical spacing after 3 pts. Each author has to be followed by a superscript number in parentheses corresponding to the author's affiliation (see also below). The title has to be formatted using the style "Title" reflecting the following format: font Calibri, font size 16, typeface bold, left indent 5 cm, justified, vertical spacing before 6 pts, after 12 pts, colour blue RGB=(0, 102, 153).

The title should follow, according to the ICL journal "Landslides" style, the author's names.

Finally, Affiliations conclude the first section of the paper, according to the style "Affiliation" in the Style List of paper Template. Each affiliation must be preceded by the relevant number between parentheses as in the example at the top of this file. Affiliation formatting is: font Calibri, font size 9, typeface bold, colour black, left indent 5 cm, vertical spacing after 3 pts. Each affiliation must be placed on a separate line, using the following order Department/Branch/Office, Institution/University, Address, Country. For the affiliation of the corresponding author also the following information must be included: email and/or telephone number.

Each author should also define a short or "running" title to be used in the right page heading (see example above in the page heading where the Template has the sentence "F. Author, S. Author, T. Author – Running title of contribution"). The running title should be limited to a maximum of 20 characters, blank spaces included. The page headings have a specific style "Page heading" to be used.

Math and formulas

All mathematical notations should be kept outside normal text paragraphs with the exception of single (or very simple combination of) symbols. An example of use of in-text symbols is this: β is defined as the slope angle in degrees. More complex expressions should be placed under the style "Equation" and inserted in the

manuscript as equation objects using the proper object -> Mathtype"). Please avoid copy-pasting of equations as images. If equation numbering is necessary, please use a right-sided numbering between squared parentheses as in the following example.

$$G = (\frac{e^2}{\sum r_i}).[\cos\alpha \cos\beta]^{-1.3} \quad [1]$$

All the units of measurement used in the paper should be in the SI system and every time a new symbol, group of symbols or specific operator is introduced, it should be explained and described along with its unit of measurement if appropriate

Tables

In the manuscript, tables have to be formatted according to the following example. It is possible to insert a single- or a double-column table (if needed) provided that the author insert the proper section breaks to ensure column formatting separation between sections.

Microsoft Word commands (such as e.g. "insert -> Table format has to be copy-pasted from the example below, using font Calibri, font size 9, column heading colour white, text colour black.

Table caption must precede the table, and has to be formatted according to the style "Table caption". Maximum table width is 82 mm for single column tables and 170 mm for page-wide tables.

Table 1 Example of table. Colours, formatting and fonts are as per template (Calibri 9 pt). Please ensure left justification for alphanumeric text and right justification for numbers. Use same number of decimals with floating point numbers. Table should be cited in text using the short: "Tab.".

Col Head 1	Col Head 2	Col Head 3	Col Head 4
Text	34.90	17/11/2011	Descr 1
Text	12.98	01/06/1998	Descr 2
Text	3.64	31/02/1900	Descr 3

In particular, Table colour is as follows: heading row and grid: blue RGB=(0,102,153); normal text rows: light cyan RGB=(204,236,255).

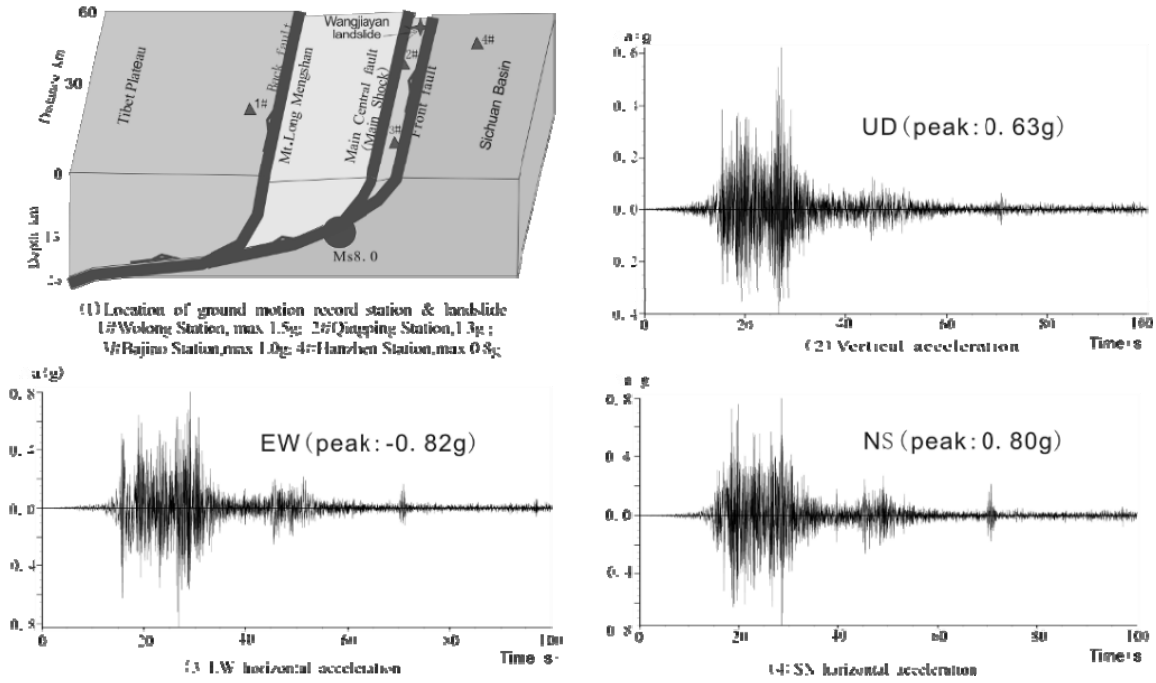

Fig. 2 Example of two-column figure. In case the caption of the figure is only one row, it must be centred.

It is possible to add page-wide sections (using the appropriate section breaks as explained and as exemplified below, to insert large figures. The maximum allowed width is 170 mm. Also, that max allowed height for both figures and tables is limited to 230 mm. Please remember that is this case you need to insert two section breaks (continuous): one just before the figure which starts single-column style, and the other one just after the figure caption, which tells the system to stop single column formatting and go back to double-column.

Please position your large figures in the best way, as to avoid large empty spaces on page.

In case this is not possible, add empty rows typing carriage-return characters until the visual appearance of the page is maintained, as in the following example.

As in the figure above, use row spacing also to ensure a proper distance between figure and text according to the overall dimension of your image and caption length.

We suggest that each paper will have at least one Introduction section laying out the state of the art and the motivations for the study to be reported, a Materials and Methods section, one of Results and one incorporating Discussion and relevant conclusions as derived from the research outcomes.

As in the figure above, use row spacing to ensure a proper distance between figure and text according to the overall dimension of your image and caption length. We suggest that each paper will have at least one Introduction section laying out the state of the art and the motivations for the study to be reported, a Materials and Methods section, one of Results and one incorporating Discussion and relevant conclusions as derived from the research outcomes.

The papers contribute to the Progress in Landslide Research and Technology book series should follow the rules depicted in this Template Guideline and, furthermore.

Acknowledgments

In the Acknowledgments section, appearing just before the References, the authors may credit others for their guidance or help. Also, funding sources may be stated. The Acknowledgments section does have a section heading at level 1, as in this example. Following this section the References section begins for which authors must use the style “Reference” (Font Calibri, font size 9, first row left indented 0.4 cm) and use reference citation rules as per the journal *Landslides*. Please follow the rules of the same journal also for citations within the textbody.

In the following section we present some example of formatting for references related to edited books, conference proceedings, periodic journal papers, scientific reports and web sites. References must be, firstly, in alphabetical order and then in date order, descending.

For any other formatting issue please refer to the editorial guidelines and style used by the ICL journal “Landslides”, edited by Springer.

References (in the alphabetical order)

Book_or_book_chapter__author_surname A A, Author_surname B B, Author C, (2009) Title of book. EditorSurname A (eds). Publisher and location. (ISBN _number_). 450p. Doi number.

CD-ROM_author_surname A A, Author_surname B B, Author C, (2009) Title of CD ROM. (CD-ROM), ASCE Press,Reston, Va.

Conf_paper_author_surname A A, Author_surname B B, Author C, (2009) Title of paper. Proceedings of 30th Canadian Symposium on Remote Sensing, 22-25 June 2009. Lethbridge AB., Canada. pp. 310-321.

Journal_paper_author_surname N P, Anotherone K, Thelastone P O (2009) Title of paper. Canadian Journal of Remote Sensing. 35(2): 244-253. Doi number.

Report_author_surname A A, Author_surname B B, Author C, (2009). Title of report. Publisher and location. (ISBN _number_). 50p.

Theses and dissertations _author_surname A A, Author_surname B B, Author C, (2009) Title of Theses and/or dissertations. MS thesis, DPRI Kyoto Univ., Kyoto,Japan.

Web_site_author_name_surname A A, Author_surname B B, Author C, (2009). Title of Page. URL: http://_ [Last accessed: full data

Official Promoters

The Kyoto Landslide Commitment 2020 (KLC2020)

Kyoto 2020 Commitment for Global Promotion of Understanding and Reducing Landslide Disaster Risk

-A Commitment to the Sendai Landslide Partnerships 2015-2025, the Sendai Framework for Disaster Risk Reduction 2015-2030, the 2030 Agenda Sustainable Development Goals, the New Urban Agenda and the Paris Climate Agreement-

KLC2020 Official promoters are public and private organizations who promote the Kyoto Landslide Commitment 2020 and provide financial support for the implementation of the KLC2020 activities including the Open Access Book Series "Progress in Landslide Research and Technology".

Host organization

International Consortium on Landslides (ICL) / Nicola Casagli

Public sectors: KLC2020 Official Promoters-public

International Unions/Associations, Governmental organizations, Universities and Research institutes

- The International Union of Geological Sciences (IUGS) / John Ludden
- The International Association for the Engineering Geology and the Environment /Rafig Azzam
- International Geosynthetics Society (IGS) / John Kraus
- Geological Survey of Canada, Natural Resources Canada, Canada / Daniel Lebel
- Faculty of Civil and Geodetic Engineering, University of Ljubljana, Slovenia / Matjaž Mikoš
- China University of Geosciences, Wuhan, China / Huiming Tang
- Department of Civil Engineering, National Taiwan University, Chinese Taipei /Shang-Hsien Hsien
- Institute of Rock Structure and Mechanics, the Czech Academy of Sciences / Josef Stemberk
- Institute of Cold Regions Science and Engineering, Northeast Forestry University/ Wei Shan

Private sectors: KLC2020 Official Promoters-private

Companies and corporation.

- Marui & Co. Ltd, Japan
- Nippon Koei Co., Ltd, Japan
- Ellegi srl, Italy
- IDS GeoRadar s.r.l., Italy
- Chuo Kaihatsu Corporation, Japan
- Godai Corporation, Japan
- Kiso-Jiban Consultants Co., Ltd, Japan
- Kokusai Kogyo Co., Ltd., Japan
- Osasi Technos, Inc., Japan

Geological Survey of Canada, Natural Resources Canada

Firstname Firstsurname, Secondname Secondsurname

GEOLOGICAL SURVEY OF CANADA – WHO WE ARE

The Geological Survey of Canada (GSC) is part of the Earth Sciences Sector of Natural Resources Canada. The GSC is Canada's oldest scientific agency and one of its first government organizations. It was founded in 1842 to help develop a viable Canadian mineral industry by establishing the general geological base on which the industry could plan detailed investigations. Throughout its long and colourful history, the GSC has played a leading role in exploring the nation.

Today, the GSC is Canada's national organization for geoscientific information and research. Its world-class expertise focuses on the sustainable development of Canada's mineral, energy and water resources; stewardship of Canada's environment; management of natural geological and related hazards; and technology innovation.

Fig.1 Paleotsunami investigations in order to understand regional earthquake cycles and submarine landslide hazards.

The GSC celebrated its 175th anniversary in 2017 which coincided with Canada's 150th anniversary of Confederation.

The GSC co-leads the Canada-Nunavut Geoscience Office and works with dozens of universities and research institutes, industry organizations, other federal departments, provinces, territories and municipalities in Canada and across the world. In particular, we work closely with other geological survey organizations in Canada through the unique Intergovernmental Geoscience Accord.

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Every year, we publish hundreds of maps, Open Files, peer-reviewed papers and other reports. Our scientists are recognized worldwide and sought after for their expert advice on locating mineral, energy and groundwater resources, reducing risk from natural hazards and reviewing environmental assessments.

STRATEGIC PRIORITIES

The GSC has attempted to plot a course through this changing, uncertain world.

First, we identify three core areas of persistent scientific endeavour, which reflect stable, long-term needs of society:

- **Geological knowledge for Canada's onshore and offshore lands**
- **Geoscience for sustainable development**
- **Geoscience for keeping Canada safe**

Next, we outline a new, fourth area of endeavour, Geoscience for society, which is the need to address the uncertainties of the changing world by expanding the reach and impact of geoscience knowledge in land-use decision making and in efforts to reduce the risk of disasters.

Finally, we recognize that our strength lies in a fifth area of endeavour, Our people, Our science, which we need to nurture to maintain a high-performing workforce capable of world-leading innovative geoscience for the benefit of Canada.

a) Geological knowledge for Canada's onshore and offshore lands

Fig.2 The GSC studies the sea floor of the Arctic to understand its geology and geohazards. Here a small craft surveys the bottom of Southwind Fjord (Baffin Island, N Nunavut).

Geoscientific knowledge is fundamental to managing our onshore and offshore lands and their abundant resources. With its 10 million km^2 of onshore land and an additional 7

Faculty of Civil and Geodetic Engineering, University of Ljubljana

Matjaž Mikoš

Summary

In 2019, the Faculty of Civil and Geodetic Engineering of the University of Ljubljana (ULFGG) celebrated its centennial: The precursor of the faculty was the Technical Faculty established in 1919 as one of five founding faculties of UL.

ULFGG, covering technical disciplines of civil and geodetic engineering, as well as water science and technology, has been involved in landslide risk reduction activities at the national level in Slovenia (former Yugoslavia, until 1991) for decades (Fig. 1). In 2008, ULFGG became an ICL Full Member and has gradually developed its ICL engagement. ULFGG has been awarded the title of the World Centre of Excellence (WCoE) in Landslide Risk Reduction for 5 consecutive periods (2008–2011, 2011–2014, 2014–2017, 2017–2020, 2020-2023). Together with the Geological Survey of Slovenia, another ICL member in Slovenia, ULFGG hosted the 4th World Landslide Forum in Ljubljana, Slovenia, from May 29 to June 2, 2017. ULFGG strongly supports diverse activities of the International Consortium on Landslides, Kyoto, Japan, and thus contributes to the 2030 Agenda for Sustainable Development, as well as to the Sendai Framework for Disaster Risk Reduction 2015–2030 (SF DDR). ULFGG was a signatory of the Sendai Landslide Partnerships 2015 – 2030, and is a strong promoter of the Kyoto Landslide Commitment 2020, a SF DRR voluntary commitment by ICL.

In 2019, ULFGG hosted, together with the Slovenian Chamber of Engineers, the World Construction Forum 2019 (WCF 2019; www.wcf2019.org) in Ljubljana under the forum motto “Buildings and Infrastructure Resilience.” The Forum with one of the themes on Disaster Risk Management and Governance for Resilient Communities was co-organized by the World Federation of Engineering Organizations (WFEO) in support to the implementation of the 2030 Agenda for Sustainable Development. All lectures given at the WCF2019 are available for free on the forum web page, as a contribution to Open Science efforts.

In the field of capacity building, ULFGG offers several courses for graduate and postgraduate students in landslide mechanics and dynamics, landslide stabilization and landslide risk mitigation. In this paper, a short overview of the past activities of ULFGG as ICL Full Member is shown.

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World Centre of Excellence on Landslide Risk Reduction and IPL projects

WCoE activities

The title of World Centre of Excellence (WCoE) on Landslide Risk Reduction is given to a governmental or non-governmental entity, which contributes to the landslide disaster risk reduction at a regional and/or global level in a specific unique field of expertise, as well as helps promoting International Programme on Landslides (IPL) and landslide research intellectually, practically and financially (https://iplhq.org/category/iplhq/world-centre-of-excellence-wcoe/). ULFGG was granted the title of WCoE five consecutive times:

- WCoE 2008–2011 & 2011–2014: Mechanisms of landslides in over -consolidated clays and flysch.
- WCoE 2014–2017: Mechanisms of landslides and creep in over-consolidated clays and flysch.
- WCoE 2017–2020: Landslides in Weathered Flysch: from activation to deposition.
- WCoE 2020–2023: Landslides in Weathered Heterogenous Sedimentary Rock Masses such as Flysch.

The research efforts at ULFGG were focused on:

- Mechanisms of triggering such landslides (mud flows), estimation of debris-flow magnitudes triggered as shallow or deep-seated landslides (debris slides), and triggering of shallow rainfall-induced landslides using advanced statistical methods.
- Field and laboratory investigations of suction in over-consolidated clays and flysch, such as to improve the understanding of softening in stiff over-consolidated clays and marls, using soil matrix suction as an indicator for mudflow occurrence, and executing suction long-term monitoring of the Slano Blato landslide.
- Laboratory investigations of coarse debris-flow rheological parameters and soil-water characteristic curve of residual soil from a flysch rock mass.
- Mathematical modelling of debris flows (hazard assessment in deposition areas), using different numerical models and different digital terrain models.

The WCoE activities were financially supported by the Slovenian Research Agency through the Research Programme P2-0180 “Water Science and Technology, and Geotechnical Engineering: Tools and Methods for Process Analyses and Simulations, and Development of Technologies,” as well as by several national and international (bilateral) research projects.

ULFGG and the Geological Survey of Slovenia jointly organized 4th World Landslide Forum (WLF4; www.wlf4.org).

China University of Geosciences, Wuhan

Huiming Tang, Changdong Li, Qinwen Tan

Introduction

China University of Geosciences, Wuhan (CUG), founded in 1952, is a national key university affiliated with the Ministry of Education. It is also listed in the National "211 Project", the “985 Innovation Platform for Advantageous Disciplines” and the "Double First-class Plan". CUG, featuring geosciences, is a comprehensive university that also offers a variety of degree programs in science, engineering, literature, management, economics, law, education and arts. Its Geology and Geological Resources & Engineering have both been ranked as national number one disciplines.

CUG has two campuses in Wuhan. The main campus is the Nanwang Mountain Campus, located in the heart of the Wuhan East Lake National Innovation Demonstration Zone, which is popularly known as China Optics Valley. The Future City Campus is located in the east of Wuhan and is 27 km from the main campus. These two picturesque campuses cover a combined area of 1,474,353 m^2. They are ideal places to study, work, and enjoy life. CUG owns a 4A-Level tourist attraction—the Yifu Museum. CUG also boasts four field training centers: Zhoukoudian in Beijing, Beidaihe in Hebei Province, Zigui in Hubei Province, and Badong in Hubei Province.

CUG has established a complete education system. As of December 2020, 30,239 full-time students, including 18,080 undergraduate students, 9,302 master's students, 1,916 doctoral students, and 941 international students have enrolled in its subsidiary 23 schools and 86 research institutes. CUG currently has a faculty of 1,858 full-time teachers, among which there are 539 professors (11 of which are members of the Chinese Academy of Sciences) and 984 associate professors.

CUG is focused on fostering high-quality talent. Among its over 300,000 graduates, many have gone on to become scientific and technological elites, statesmen, business leaders and athletes. And they have made great contributions to the nation and society, represented by former Premier WEN Jiabao and 39 members of the Chinese Academy of Sciences and Chinese Academy of Engineering.

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CUG has strengthened exchanges and cooperation with international universities. It has signed friendly cooperation agreements with more than 100 universities from the United States, France, Australia, Russia and other countries. CUG has actively carried out academic, scientific and cultural exchanges with universities around the world. There are about 1,000 international students from more than 100 countries studying at CUG. It also sponsors more than 900 teachers and students to study abroad or conduct international exchanges, and invites more than 400 international experts to visit, lecture, and teach at CUG every year. In 2012, CUG initiated and co-established the International University Consortium in Earth Science (IUCES) with 11 other world-renowned universities. IUCES is committed to promoting the common development of geosciences education and scientific research through resource sharing, exchange and cooperation among its member institutions. In addition, CUG has partnered with Bryant University from USA, Alfred University from USA, and Veliko Turnovo University from Bulgaria in establishing three Confucius institutes on their campuses.

Strategic plan of building a world-renowned research university in earth sciences - a beautiful China and a habitable earth: towards 2030

Fig.1 Strategic plan of building a world-renowned research university in earth science

CUG reviewed and approved Strategic Plan of Building a World-Renowned Research University in Earth Sciences on December 25 of 2019.

Themed on “A Beautiful China & A Habitable Earth”, the Plan depicts the blueprint of the second goal of the

Institute of Rock Structure and Mechanics, The Czech Academy of Sciences

Firstname Firstsurname, Secondname Secondsurname

Introduction

The Institute of Rock Structure and Mechanics (IRSM) of the Czech Academy of Sciences (CAS) is an academic institution specialising in the study of the structure and properties of rocks and the rock environment. The IRSM is one of the five institutes belonging to the Earth Sciences section of the CAS. As of 2007, the IRSM is a legally constituted public research institution. It is also involved in research into glass, ceramic materials for technical use, composite materials and biomaterials, their properties and application potential, and technological topics relating to the processing of inorganic as well as organic waste. Its research activities are spread across six scientific departments.

- Department of Geochemistry
- Department of Composites and Carbon Materials
- Department of Materials Structure and Properties
- Department of Neotectonics and Thermochronology
- Department of Engineering Geology
- Department of Seismotectonics

The main objectives of the research and educational activities of the IRSM include:

- Acquisition, processing and dissemination of scientific knowledge at conferences, their publishing in monographs and scientific journals
- Cooperation with universities and other scientific and professional institutions and private business companies through joint projects and cooperation agreements
- Teaching and tutoring young researchers at universities
- Management of doctoral and postdoctoral programs
- Contributing to furthering scientific knowledge and to the development of practical applications of research findings
- Involvement in international cooperation
- Management and operation of research infrastructures
- Organizing scientific meetings, conferences and seminars at the national and internationa level.
- Publishing of scientific journals: Acta Geodynamica et Geomaterialia, and in cooperation with the University of Chemistry and Technology, Prague, Ceramics-Silikáty

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Outstanding recent achievements

2015-2019

- The Global Database of Giant Landslides on Volcanic Islands summarizes statistics and knowledge of giant landslides on volcanic islands that are cubic kilometers in size. Landslides on volcanic islands – volcanic collapses – are among the largest on Earth and are fully comparable in size to the extra-terrestrial landslides observed on Mars. (Landslides 16, 2045–2052, 2019).

Fig.1 El Golfo: scarp of a giant landslide – collapse of a volcano. El Hierro, Spain

- Paleoseismic research in the Cheb basin has revealed repeated Quaternary movements at the Mariánské Lázně fault, accompanied by earthquakes that damaged Earth's surface. Dating has shown that even during the Holocene, there were at least two major earthquakes with M = 6.3 to 6.5, the most recent of which occurred around 1000 A.D. (Geomorphology 327, 472–488, 2019)

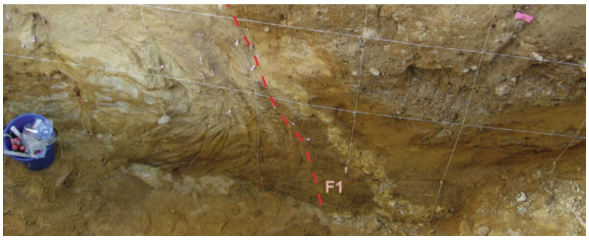

Fig.2 Photograph from the Kopanina paleoseismic trench in the Cheb basin with several types of tectonic deformation of late Quaternary sediments

- Development of advanced ceramic foams based on pyrolyzed polymer precursors. (Ceram. Int. 41, 6237, 2015; J. Eur. Ceram. Soc. 35, 2015).

- The influence of uranium mineralisation and spontaneous combustion processes on the physical and chemical properties of coal components was studied at the "Novátor" mine heap in Bečkov. Uranium minerals have caused local radioactive changes in organic compounds. Organic substances located in burned and burntout zones pose a potential risk to the environment, in particular to local river basins, soil and vegetation. (International Journal of Coal Geology 168, 162–178, 2016).

- In collaboration with the Pacific Nortwest National

Institute of Cold Regions Science and Engineering, Northeast Forestry University

Wei Shan, Ying Guo

Institute of Cold Regions Science and Engineering of Northeast Forestry University (ICRSE-NEFU) is committed to the environmental geology and engineering geology of high latitude permafrost region and deep seasonal frozen area under the background of climate change, and attaches importance to the combination of basic research and applied research. With undergraduate, master, doctor, postdoctoral professional training system and standards, ICRSE-NEFU initiated "Geological environment risk research plan for permafrost degraded areas in Northeast China (GERRP)". With the support of the Chinese government, "Field scientific observation and research station of the Ministry of Education - Geological environment system of permafrost area in Northeast China (FSSE-PFNEC)" was established. Its observation stations cover all kinds of permafrost areas in Northeast China. At the same time, in order to develop and transfer technologies related to environmental governance and infrastructure construction in permafrost regions, “Provincial Collaborative Innovation Centre, Environment and road construction & maintenance in permafrost area of Northeast China(PCIC-PFER)" was established. Over the years, ICRSE-NEFU have continuously established cooperation with academic institutions and organizations at home and abroad, held various academic exchanges and regularly held "Academic Seminar on Engineering Geology and Environmental Geology in the Permafrost Along the Sino-Russian-Mongolian Economic Corridor", edited and published research cases of geoenvironmental disasters in permafrost regions in Northeast China, and shared the research results of GERRP. At present, the research results of GERRP are gradually enriched, some of them have highly academic value, and have been put into engineering practice.

ICRSE-NEFU has gradually shown its unique research charm since it became an ICL member in 20032002. In 2012, ICRSE-NEFU established a landslide research network in cold regions (ICL-CRLN), and then Research Center of Cold Regions Landslide was build.

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Permafrost as one of the elements of the cryosphere, the change of thermodynamic stability of permafrost will directly affect the changes of hydrosphere, biosphere and lithosphere. Under the trend of global warming, the frequency and intensity of environmental and engineering geological disasters caused by permafrost degradation are getting higher and higher (Fig.1 and Fig.2). Taking the cold aera in the southern boundary of the permafrost zone in Northeast China as study area, disasters such as ground subsidence, slope icing, landslides and other disasters caused by permafrost melting were studied. At the same time, we found melting permafrost also leads to seasonally high concentrations of greenhouse gases, triggering wildfires that may further accelerate permafrost degradation and environmental changes of terrestrial ecosystems and roads.

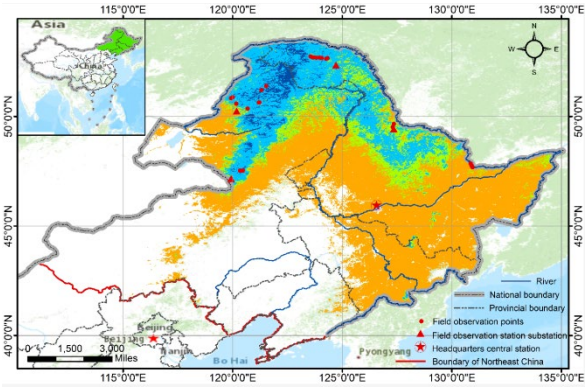

Fig.1 Permafrost distribution in NE of China(2014-2019)

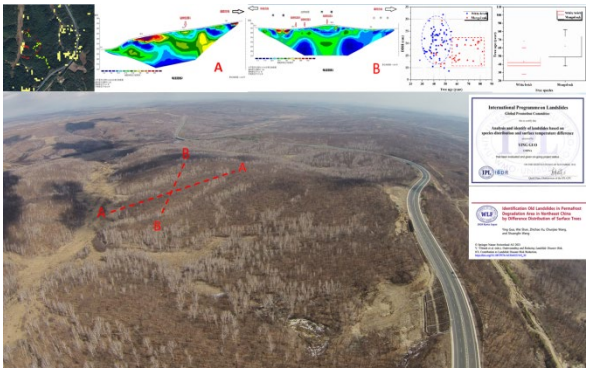

Fig.2 Different tree species and ages in the landslide area caused by permafrost degradation

Marui & Co. Ltd.

Firstname Firstsurname, Secondname Secondsurname

Marui & Co. Ltd.

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Introduction

Marui & Co. Ltd. celebrates its 100th anniversary in 2020. Marui, as one of the leading manufacturers of testing apparatuses in Japan, has been constantly striving to further improve its service since its foundation in 1920, thus contributing to the sustainable development of our nation and society. Our main products cover a wide variety of destructive and non-destructive testing apparatuses in the fields of geotechnical engineering, concrete engineering (mortar, aggregates, etc.), and ceramic engineering (Fig. 1). Of special note is that Marui has been helping to manufacture ring-shear apparatuses (Fig. 2) for the past half-century based on the leading-edge ideas of Dr. Kyoji Sassa, Professor Emeritus at the Kyoto University. Marui has delivered a total of seven ring-shear apparatuses to the Disaster Prevention Research Institute, Kyoto University, and two to the International Consortium on Landslides. Also, the apparatuses have been exported to the United States of America, China, Croatia and Vietnam.

Since 2002, Marui has been a supporter of the International Consortium on Landslides (ICL) and has gradually been intensifying its contribution to the ICL worldwide efforts for landslide risk reduction and international promotion of landslide research. According to NASA, more frequent and intense rainfall events due to climate change have been causing frequent landslides particularly in mountains of Asian regions including Japan where waters can be stored in various ways. Summer monsoon rains as well as snow and glacier melt waters can destabilize steep mountainsides, triggering landslides, which are down-slope movements of rocks, soils, water, trees, etc. Marui, as an engineering supporter, commits deeply to various activities of research particularly on triggering mechanisms of landslides

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Marui & Co. Ltd. takes great pleasure in developing, manufacturing, and providing new products of high value sharing the delight of achievement with our customers, and thus contributing to the social development. The entire staff of Marui & Co. Ltd. is determined to devote ceaseless efforts to keep its organization optimized for its speedy and high-quality services, by the motto “Creativity and Revolution”, and strive hard to take a step further, as a leading manufacturer of testing apparatuses, to answer our customer's expectations for the 22nd century to come.

Marui continuously contributes to the 2030 Agenda for Sustainable Development, as well as to the Sendai Framework for Disaster Risk Reduction 2015–2030. In line with this, Marui signed KLC 2020 in 2019 and will strongly support its actions, especially KCL2020 actions 3, 4, 5, and 9

Fig.1 Products of testing apparatus such as non-destructive/model-testing for mesuring intensity, physical property, durability, etc. for concrete, soil, building material, etc.

.

Nippon Koei Co., Ltd., Geohazard Management Division

Hiroaki TAUCHI

Nippon Koei Co., Ltd., Geohazard Management Division

URL: https://www.n-koei.co.jp/english/

For the supplemental information, please scan the QR code or visit this link: Nippon Koei Co., Ltd. - 7th Asia-Pacific Climate Change Adaptation Forum (asiapacificadapt.net)

Introduction

The Nippon Koei Group (NK) has been a leading international consultant in providing engineering consulting services to over 5500 multi-disciplinary infrastructure and development projects in 160 countries all over the world. The landslide prevention specialist team (at present called Geohazard Management Division) was established in 1966 to specifically provide countermeasures against sediment disasters. Over the last 50 years, we have significantly improved the capacity of countries to respond and reduce risk from debris flows, slope instabilities, landslides, avalanches and rock falls due to torrential rains, large-scale earthquakes, and volcanic eruptions that threaten a country's vital economic infrastructure lifelines, especially the road networks. At present, approximately 160 engineers provide engineering consulting services to protect communities from a variety of disasters (Fig1&2). During disasters, we provide experienced professional engineers to quickly make a risk assessment and promptly respond with a series of engineering design analyses, emergency and permanent measures based on our extensive experience and know-how. To maximize the effectiveness of infrastructures, we address efficient countermeasure plans, design and research in terms of cost reduction and cost-effectiveness using various numerical analyses such as finite element method (FEM) and discrete element method (DEM), etc.

In Japan, we have worked hard to restore and recover from sediment-related disasters caused by earthquakes and heavy rainfalls that have frequently occurred in recent years (the 2011 Great East Japan Earthquake, the Northern Kyushu Flood in 2017, etc.). We have received letters of appreciation for our efforts from the national and local governments.

Our major international projects include "The Project for Countermeasure Construction Against the Landslides on Sindhuli Road Section II, Nepal," "The project for the rehabilitation of Sindhuli road affected by the 2015 Gorkha Earthquake, Nepal," and "The project for landslide prevention for National Road 6 in Honduras"; all funded by the Japan International Cooperation Agency (JICA) grants-in-aid. Through these projects, we are contributing to the socioeconomic development of each country by improving vulnerable locations in road networks against sediment disasters, promoting traffic safety, and providing logistics assistance for road users. In particular, the 1st of the three NK's projects mentioned above won the "3rd JAPAN Construction International Award" from the Ministry of Land, Infrastructure, Transport and Tourism as the project that has realized "high-quality infrastructures" through its excellent know-how, technical capabilities, and project management capabilities.

NK is an ICL member and has been using its technology to reduce geohazard risk. Through various projects, NK is continuously contributing to the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Reduction 2015–2030. Using our full capability with abundant experiences in Japan and Asia prone to natural disasters, we hope to contribute much more to a reduction of global sediment disasters including landslides. In line with this, NK has signed the KLC 2020, and will strongly support its actions, especially KCL2020 actions 1, 2, 3, 5, 6, and 8.

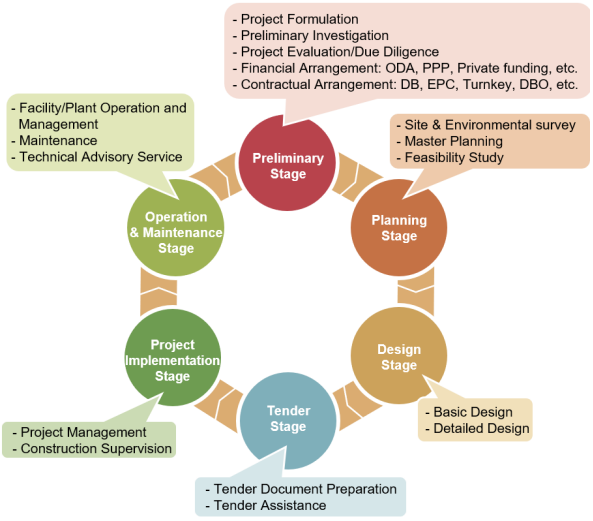

Fig. 1 Our service for Geohazard Management

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Godai Corporation

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Godai Corporation

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Introduction

Ever since its foundation in 1965, Godai Kaihatsu Co.Ltd. a civil engineering consulting firm, has long been providing a variety of software and measures particularly for natural disaster mitigation. With its rich expertise in both civil engineering and information technology (IT), the company has its primary goal to address real-world needs of disaster mitigation. All the staff of Godai Kaihatsu Co. Ltd. feels it more than happy that their cutting-edge technologies help mitigate natural disasters.

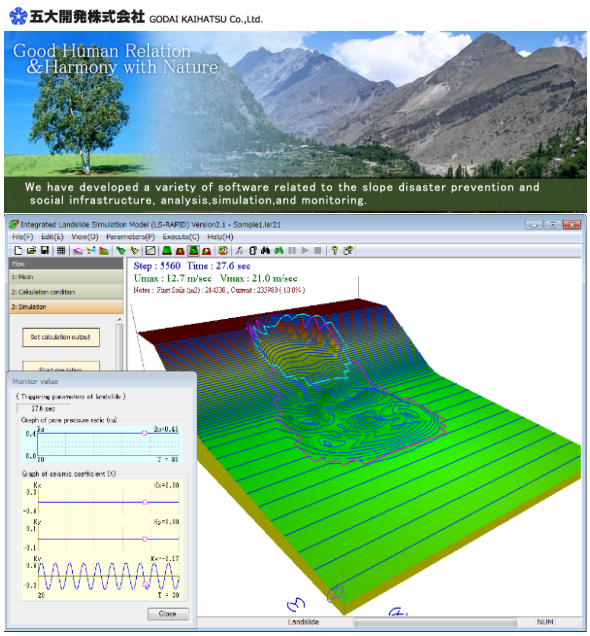

Fig1. Integrated model simulating of earthquake & rain induced rapid landslides (LS-RAPID)

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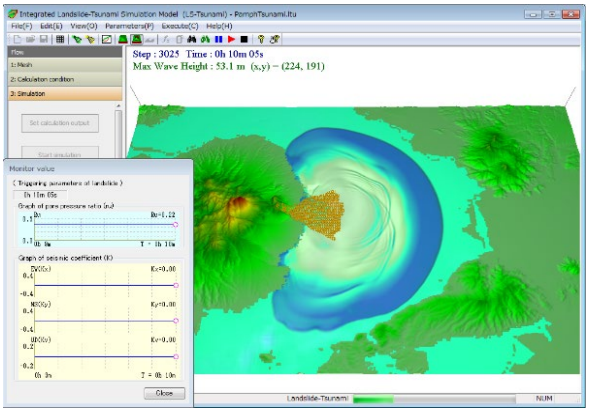

Fig 2. Tsunami model (LS-Tsunami)

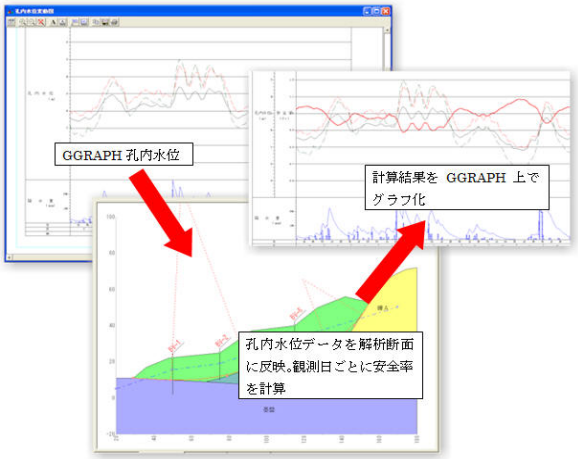

Fig.3 Power SSA PRO-Two-dimensional slope stability calculation of earthquake and rain induced landslide.

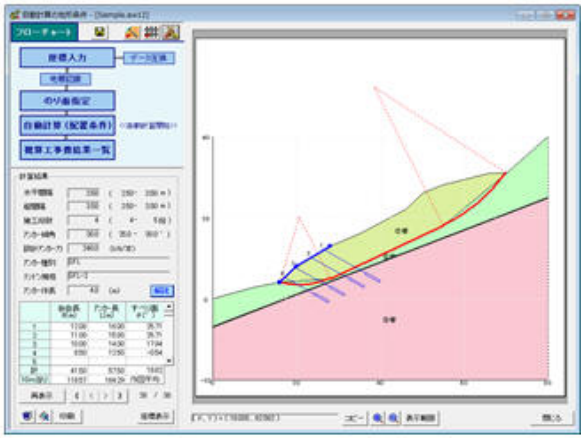

Fig 4. Anchor software- Slope stability analysis for ground anchor

Chuo Kaihatsu Corporation

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Contact: https://www.ckcnet.co.jp/contactus/

Introduction

Chuo Kaihatsu Corporation (CKC) was founded in 1946, and has been aiming to become the “Only One” consultant for our customers. We engage in the hands-on work that will “Remain with the earth, Remain in people’s hearts, and Lead to a prosperous future”. We focus on road, river and dam engineering to flesh out industrial infrastructures specifically by means of geophysical/geotechnical/geological investigations, civil engineering surveys and project implementations. In recent years, we make significant efforts on earthquake disaster mitigation, sediment disaster prevention/mitigation and ICT information services. Many achievements of ours have already contributed to the mitigation of natural disasters such as landslides, earthquakes and slope failures in Japan, Asia and the Pacific Region. We aim to provide technological contributions so that a sustainable society will continue to develop in the future.

Fig1. Design for various structures

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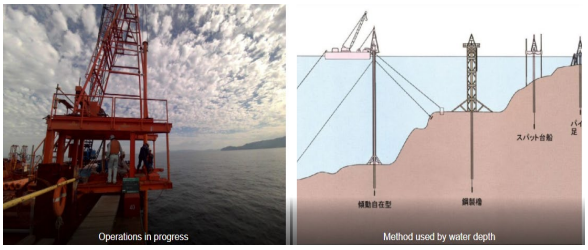

Fig 2. Deepwater drilling surveys

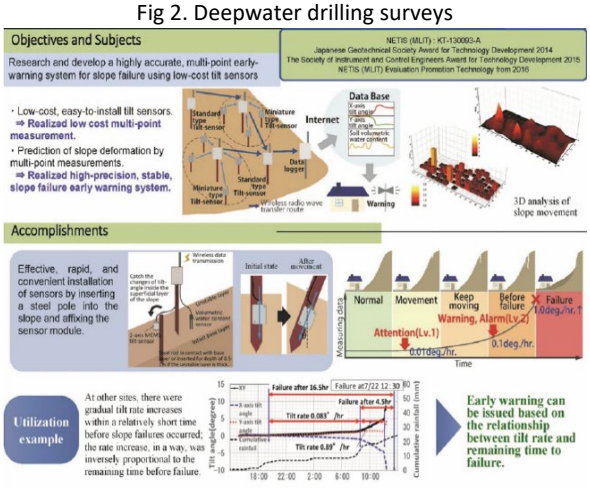

Fig.3 The early warning monitoring system of slope failure using multi-point tilt change and volumetric water content

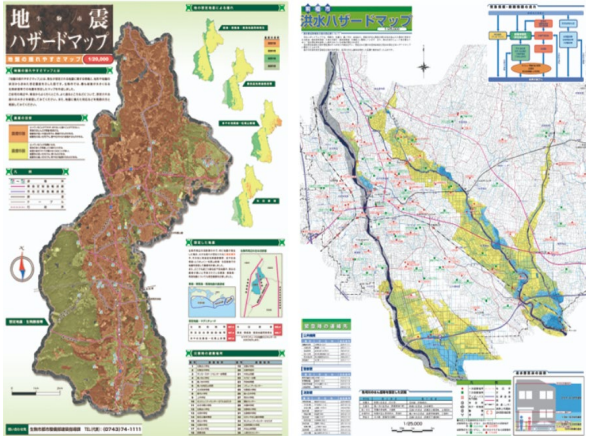

Fig 4. Making hazard map for sediment disaster, tsunami, flood, earthquake, liquefaction , etc…

Kokusai Kogyo Co. Ltd.

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Introduction

Kokusai Kogyo Co. Ltd. as a leading company of geospatial information technologies has long been providing public services with its comprehensive expertise to address real-world needs and cutting-edge measurement technologies. Kokusai Kogyo Co. Ltd. helps rebuild "Green Communities," which has been of our great concern in terms of "environment and energy," "disaster risk reduction" and "asset management". Kokusai Kogyo Co. Ltd. offers advanced and comprehensive analyses of geospatial information for developing new government policies, maintaining and operating social infrastructures safe and secure, and implementing low-carbon measures in cities. Influenced by the recent global climate change, extreme rainfall events have become more frequent worldwide and resultant hydro-meteorological hazards are creating more deaths and devastations particularly in many developing countries where effective advanced countermeasures are not readily available. Kokusai Kogyo Co. Ltd. is proud of its achievements in establishing resilient infrastructure systems and implementing effective monitoring/early warning systems in developing countries, which have long been helping reduce the risks from natural hazards.

Fig.1 Our Realtime Hazard Map reflects up-to-date information of soil natures and precipitations at landslide hazard sites, etc. that can constantly be changing, and evaluates area-wide hazard risk in real-time

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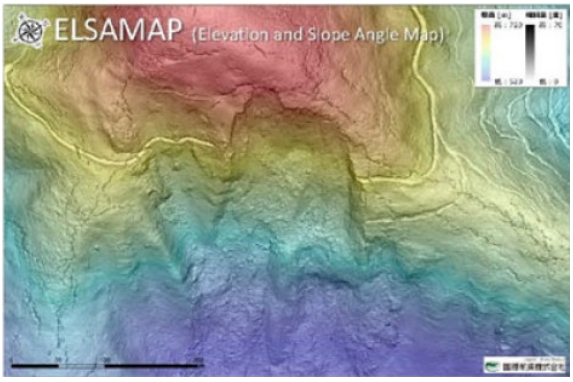

Fig 2. ELSAMAP is our cutting-edge 3D terrain visualization method allowing great geomorphological details to be visualized in one glance with gray-scaled slope inclinations and colored altitudes. ELSAMAP has been used to interpret micro-topographies, landslides and some other things.

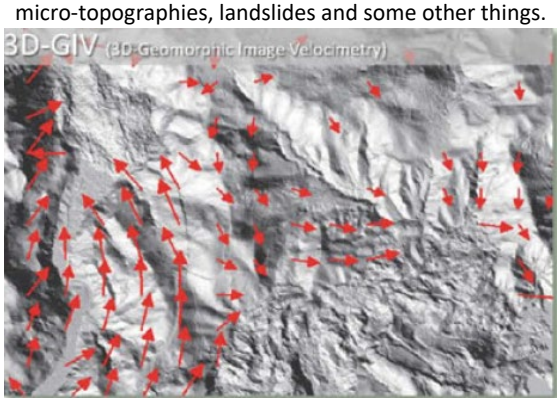

Fig.3 3D-GIV can help grasp the ground surface displacement caused by natural phenomena such as landslide by analyzing differences between digital geomorphic images obtained through ad hoc Airborne Laser Surveys

Fig 4. "Shamen-net" is a total monitoring system integrating GNSS and other monitoring device (Measurement precision: ±mm, on a real time basis)

OSASI Technos, Inc.

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Contact: cs@osasi.co.jp

Introduction

OSASI Technos, Inc. has been making its best efforts to develop its cutting-edge technologies for landslide early warning. Its unique compact and lightweight sensors making up the Landslide Early Warning System enable long-term monitoring of unstable landslide mass movements, precipitations, porewater pressure buildups, etc. in a remote mountainous area where commercial power is often unavailable. OSASI Technos, Inc. is also proud of its advanced technology to transfer observed data even in areas with poor telecom environments as proven in the successful implementations in South Asia. All staff members of OSASI Technos work together for mitigation of landslide disasters worldwide.

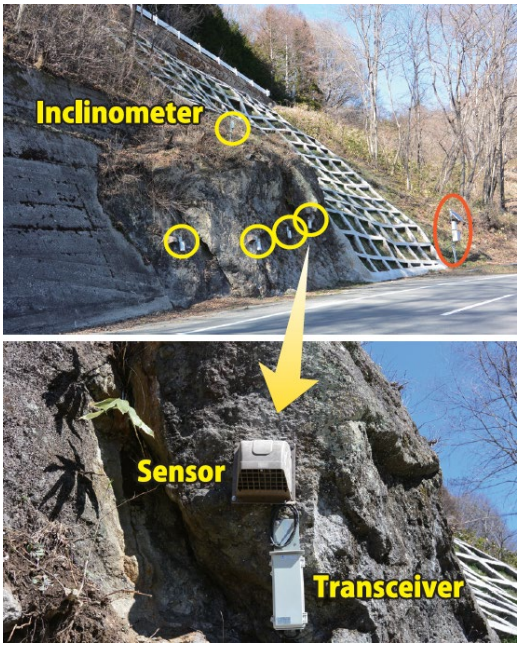

Fig1. Bedrock slope monitoring (maintenance control)

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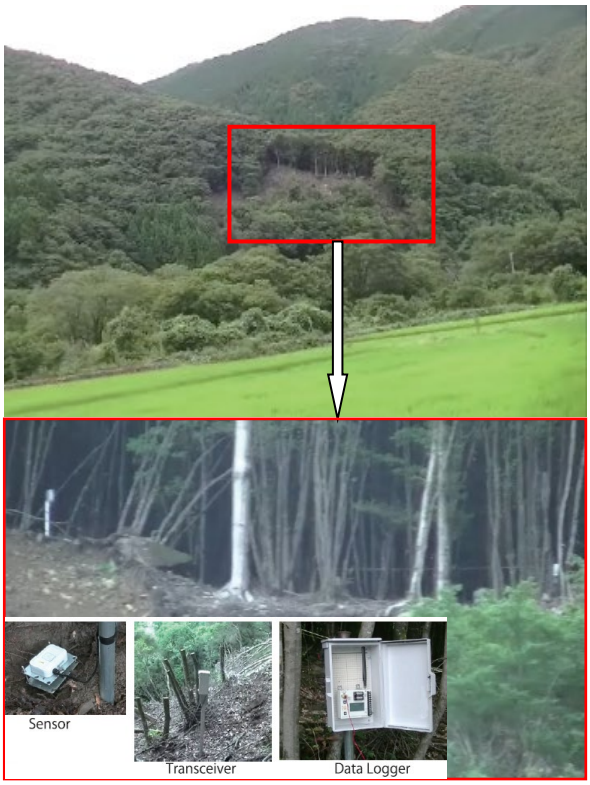

Fig 2. Measurement of the dynamic state of landslide using inclinometers with a wireless function

Fig3. Cut slope monitoring

Kiso-Jiban Consultants Co. Ltd.

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Introduction

Kiso-Jiban Consultants, established in 1953, is an engineering consulting firm especially well known in the field of geotechnical engineering. The areas of its comprehensive services are listed below

- Geological and Geotechnical Survey
- Geotechnical Analysis and Design
- Disaster Prevention and Management
- GIS (Geographic Information Systems)
- Soil and Rock Laboratory Tests
- Instrumentation and Monitoring
- Geophysical Exploration and Logging
- Distribution of Geosynthetics Products.

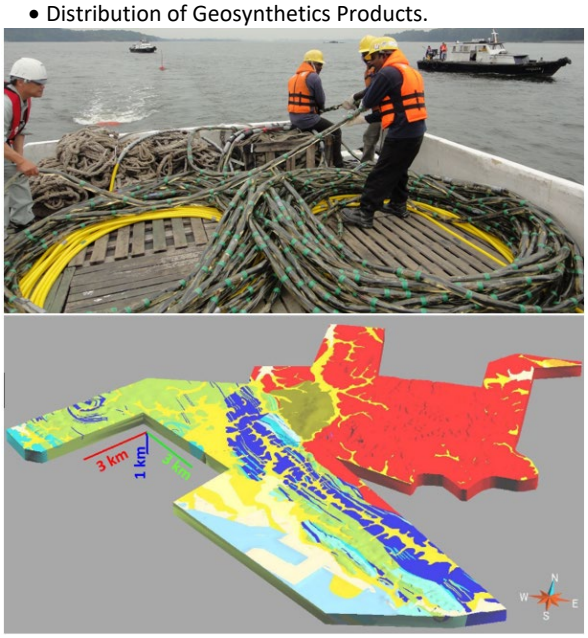

Fig.1 Nationwide geological survey and 3D-Geolofical model

Much-talked-about new service is the Kiso-SAR System allowing accurate estimation of both extent and rate of landslide movements based upon a comprehensive interpretation of InSAR results from geotechnical and landslide engineering viewpoints. With the Kiso-SAR system, the following pieces of important geotechnical information can be provided:

1) The extent of a deforming landslide mass (and the rate of its movement
2) Consolidation buildup in soft clay underlying a fill
3) Deformation buildups induced by slope cutting.

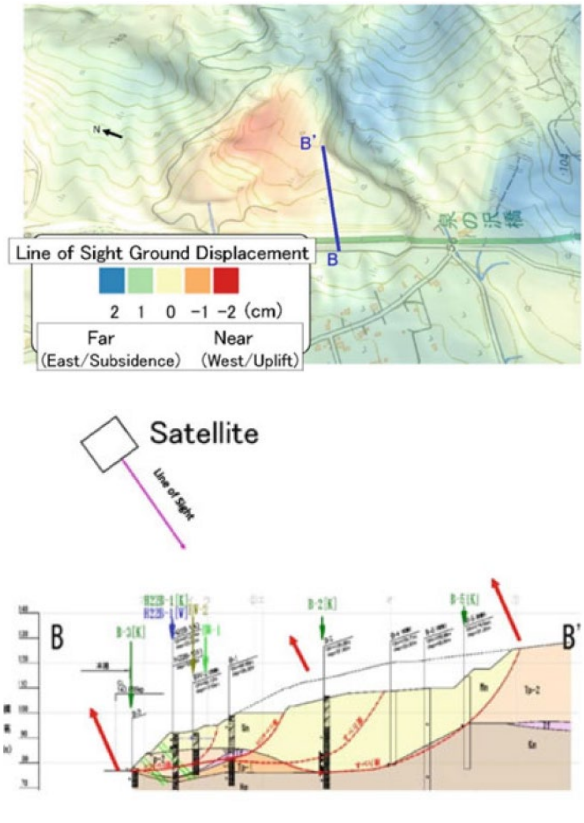

Fig.2 Ground deformation of landslide observed by Kiso-SAR system

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Ellegi Srl

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Ellegi Srl.

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Contact: info@lisalab.com

Introduction

Ellegi srl provides worldwide monitoring services and produces Ground Based synthetic aperture radar (GBInsAR) for remote measurement of displacements and deformations on natural hazards and manmade buildings using its own designed and patented LiSALab system.

Its activities started in 2003 as a spin off project to exploit commercially the Ground Based Linear Synthetic Aperture Radars technology developed by European Commission's Ispra Joint Research Centre and based on the results of more than 10 years of research. Since then, Ellegi has industrialized and developed the core technology of the LiSALab system and latest LiSAmobile system represents the 5th generation of development.

In 2003 it was the first commercial company in the world to provide GBInSAR measurements of natural hazards and structure.

Ellegi srl offers:

- Displacement fields measurement, control and monitoring of the deformation caused by natural hazards, like landslides, rockslides, sinkhole, volcanic deformation in every operative condition, including emergencies,
- Structural strain fields measurement, control, monitoring and diagnosis of the deformation affecting buildings, bridges, viaducts, dams.
- GBInSAR monitoring systems, installation, management and maintenance in order to provide information about natural hazards or anthropic activity, that can generate or cause slopes failures or buildings instabilities.

In all the above-mentioned activities Ellegi srl uses the GBInSAR LiSALab technology that represents a real "break-through".

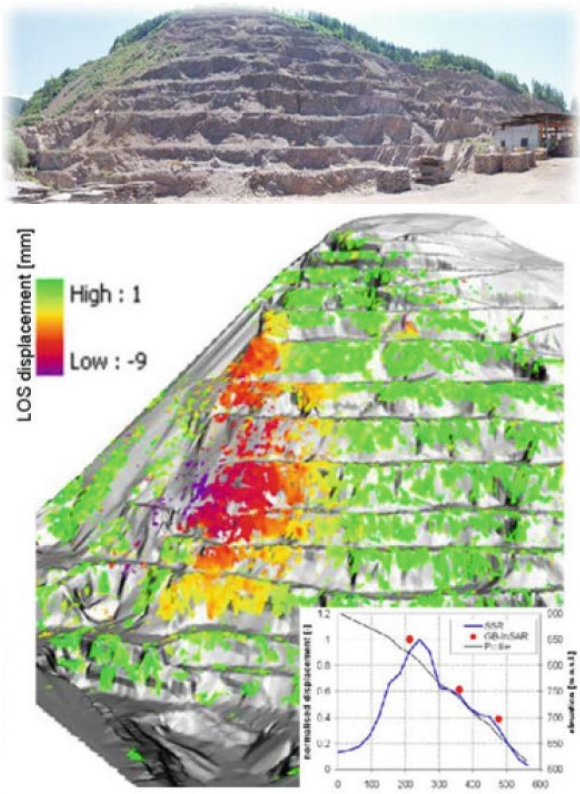

Fig.1 GBInSAR LiSALab technology quarry monitoring example and displacements' field comparison between the GBInSAR measurement and FEM model results

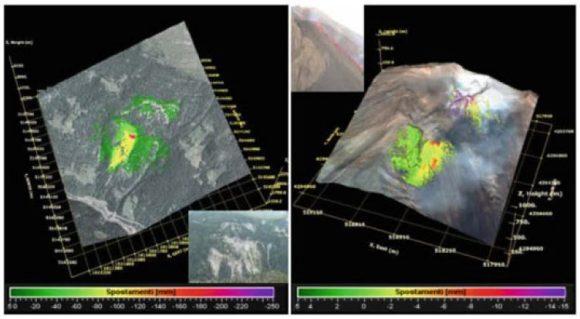

Fig.2 GBInSAR LiSALab technology result in monitoring a slope affected by a landslide (left) and a volcanic slope affected by deformation (right). Landslide or moving area mapping and boundaries identification is made easy by GBInSAR LiSALab technology

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Introduction

IDS GeoRadar, part of Hexagon, provides products and solutions, based on radar technology, for monitoring applications including landslides, rockfalls, complex structures, mining and civil engineering. The company is a leading provider of Ground Penetrating Radar (GPR) and Interferometric Radar solutions worldwide.

IDS GeoRadar is committed to delivering best-in-class performance solutions and to the pursuit of product excellence, through the creation of application-specific, innovative and cost-efficient systems for a wide range of applications:

- Utility mapping and detection
- Civil engineering
- Railway and road engineering
- Geology and environment management
- Archaelogy
- Forensics
- Landslide monitoring
- Mining safety

Natural hazard monitoring solution

The use of slope monitoring radar is now the standard practice for the active monitoring of slope in open pit mines and for safety critical landslide monitoring with the aim of providing alerts in the event of progressive movements which could potentially lead to slope failure and assessing worker safety. The unique IBIS-FM radar system accurately monitors multiple scales of displacements in real time, from early detection of slow movements to fast accelerations associated with slope collapse. The great operative range, up to 4500 m, allows to safely deploying the system in comfortably accessible areas, without exposing people and equipment to hazardous zones.

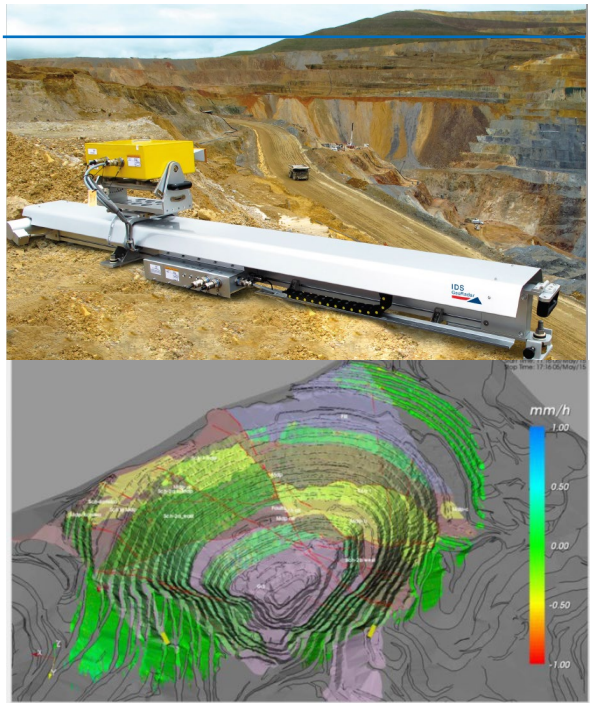

Fig.1 IDS GeoRadar: Innovative Interferometric Radar for Mining, Environmental and Civil Engineering

IDS GeoRadar cooperate with TRE ALTAMIRA, the worldwide leader in ground monitoring services using satellite InSAR offer a comprehensive solution – InSAR Service – to fulfill all mine stability needs, ranging from monitoring large-scale mining operations over hundreds of square kilometers, to specific movements at the pit scale. With the large spatial coverage of satellite data, mining engineers can identify unstable areas over wide areas, also with the ability to extend the analysis of deformation back in time. All mining assets can be monitored regularly and precisely for deformation.

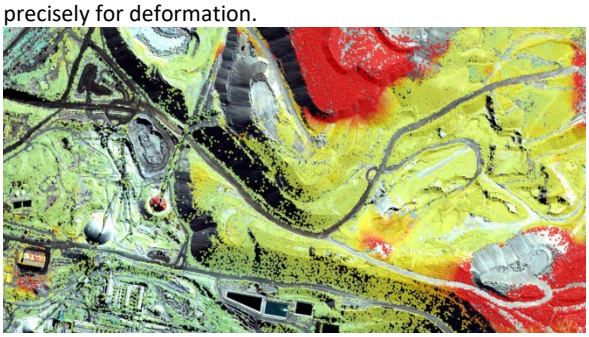

Fig.2 InSAR Service - Ground motion monitoring for mining operations

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ICL Contribution to Landslide Disaster Risk Reduction

Kyoji Sassa
Matjaž Mikoš
Shinji Sassa
Peter T. Bobrowsky
Kaoru Takara
Khang Dang
Editors

Understanding and Reducing Landslide Disaster Risk

Volume 1 Sendai Landslide Partnerships and Kyoto Landslide Commitment

Springer

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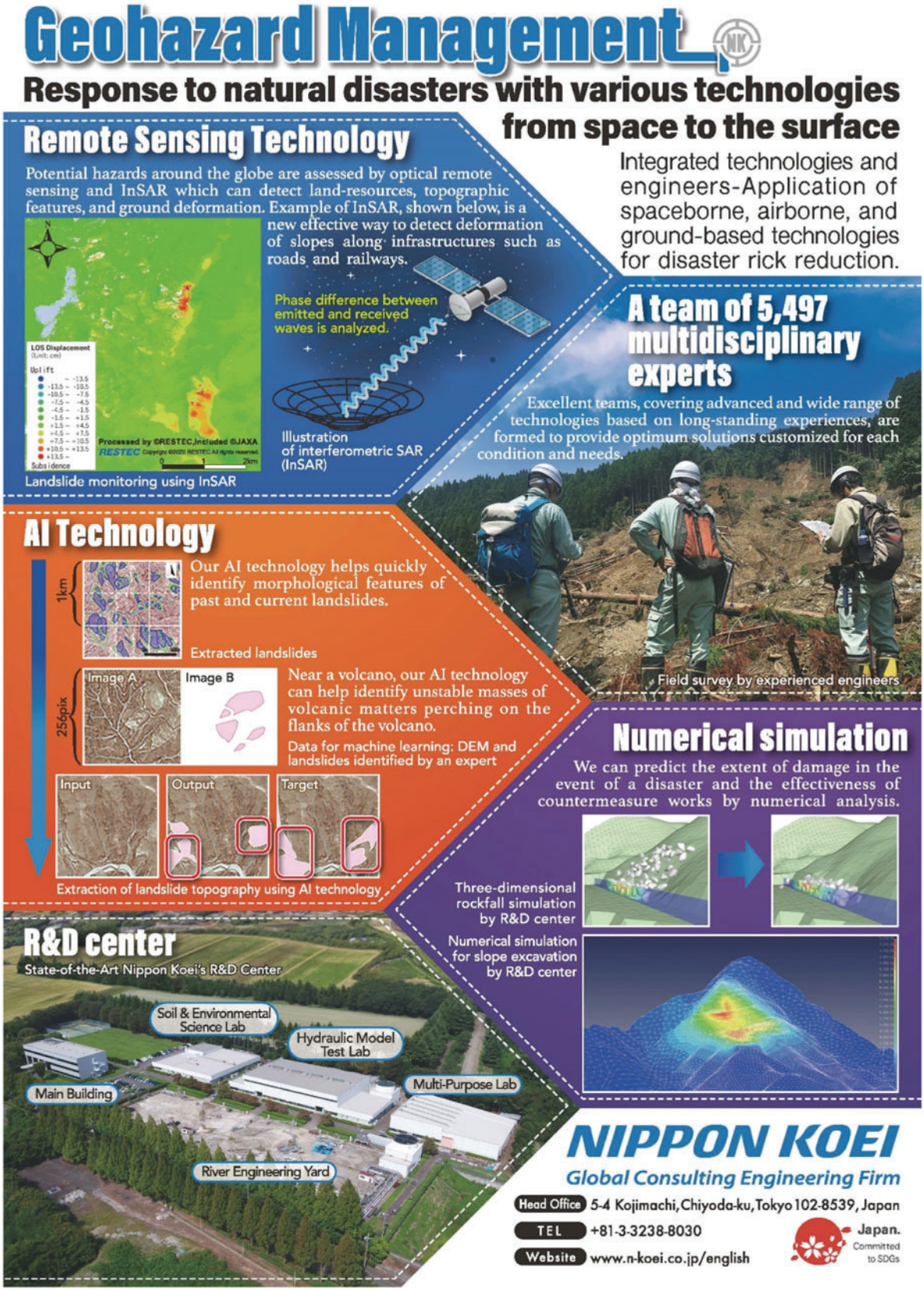
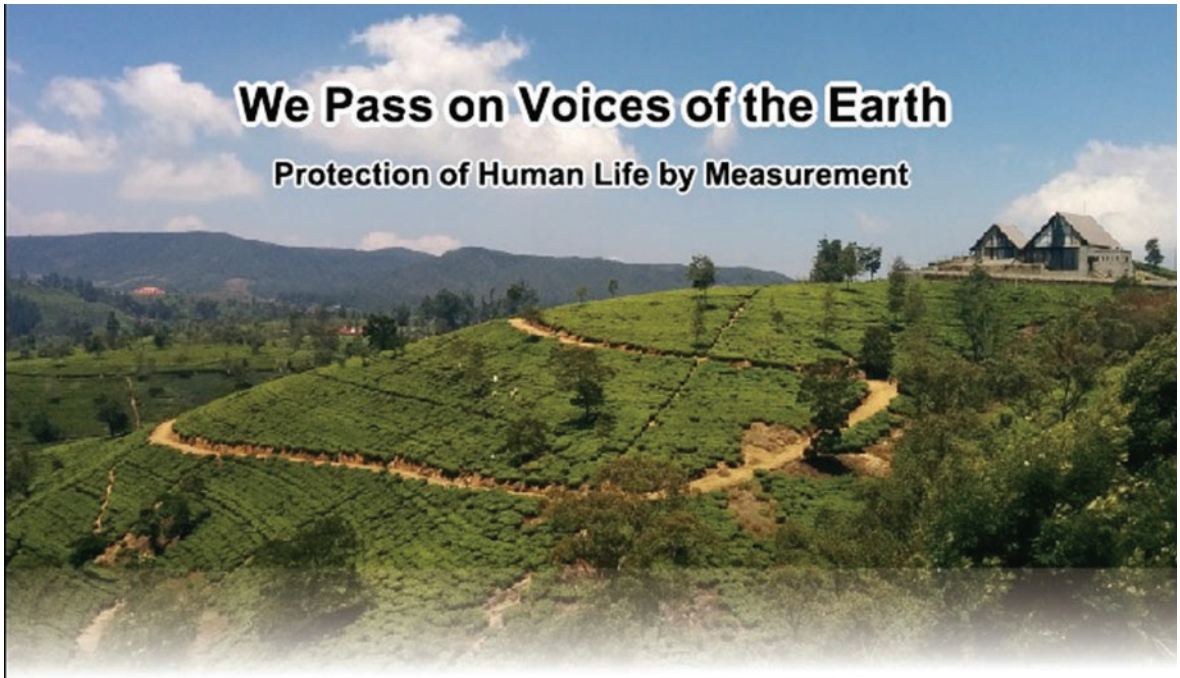

Geohazard Management
Response to natural disasters with various technologies from space to the surface
Remote Sensing Technology
Potential hazards around the globe are assessed by optical remote sensing and InSAR which can detect land-resources, topographic features, and ground deformation. Example of InSAR, shown below, is a new effective way to detect deformation of slopes along infrastructures such as roads and railways.
Phase difference between emitted and received waves is analyzed.
Illustration of interferometric SAR (InSAR)
Landslide monitoring using InSAR
Integrated technologies and engineers-Application of spaceborne, airborne, and ground-based technologies for disaster rick reduction.
A team of 5,497 multidisciplinary experts
Excellent teams, covering advanced and wide range of technologies based on long-standing experiences, are formed to provide optimum solutions customized for each condition and needs.
Field survey by experienced engineers
AI Technology
Our AI technology helps quickly identify morphological features of past and current landslides.
1km
Extracted landslides
Image A
Image B
256pix
Near a volcano, our AI technology can help identify unstable masses of volcanic matters perching on the flanks of the volcano.
Data for machine learning: DEM and landslides identified by an expert
Input
Output
Target
Extraction of landslide topography using AI technology
Numerical simulation
We can predict the extent of damage in the event of a disaster and the effectiveness of countermeasure works by numerical analysis.
Three-dimensional rockfall simulation by R&D center
Numerical simulation for slope excavation by R&D center
R&D center
State-of-the-Art Nippon Koei's R&D Center
Soil & Environmental Science Lab
Hydraulic Model Test Lab
Main Building
Multi-Purpose Lab
River Engineering Yard
NIPPON KOEI
Global Consulting Engineering Firm
Head Office 5-4 Kojimachi, Chiyoda-ku, Tokyo 102-8539, Japan
TEL +81-3-3238-8030
Website www.n-koei.co.jp/english
Japan. Committed to SDGs



Measurement technology × Transmission technology

Early Warning System

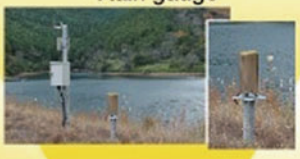
Extensometer

Communication device

Multi-point Inclinometer

Alarm device

Rain gauge



OSASI
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TEL:+81-3-5510-1391 E-mail : cs@osasi.co.jp

We aim to establish a sustainable country by various technology related to earth, water, and vegetation.

Consulting Services

Slope Disaster Management/
Forest Conservation and Afforestation/
Community Based Disaster Risk Reduction/
Disaster Risk Assessment Technology Transfer

Construction and Supervision

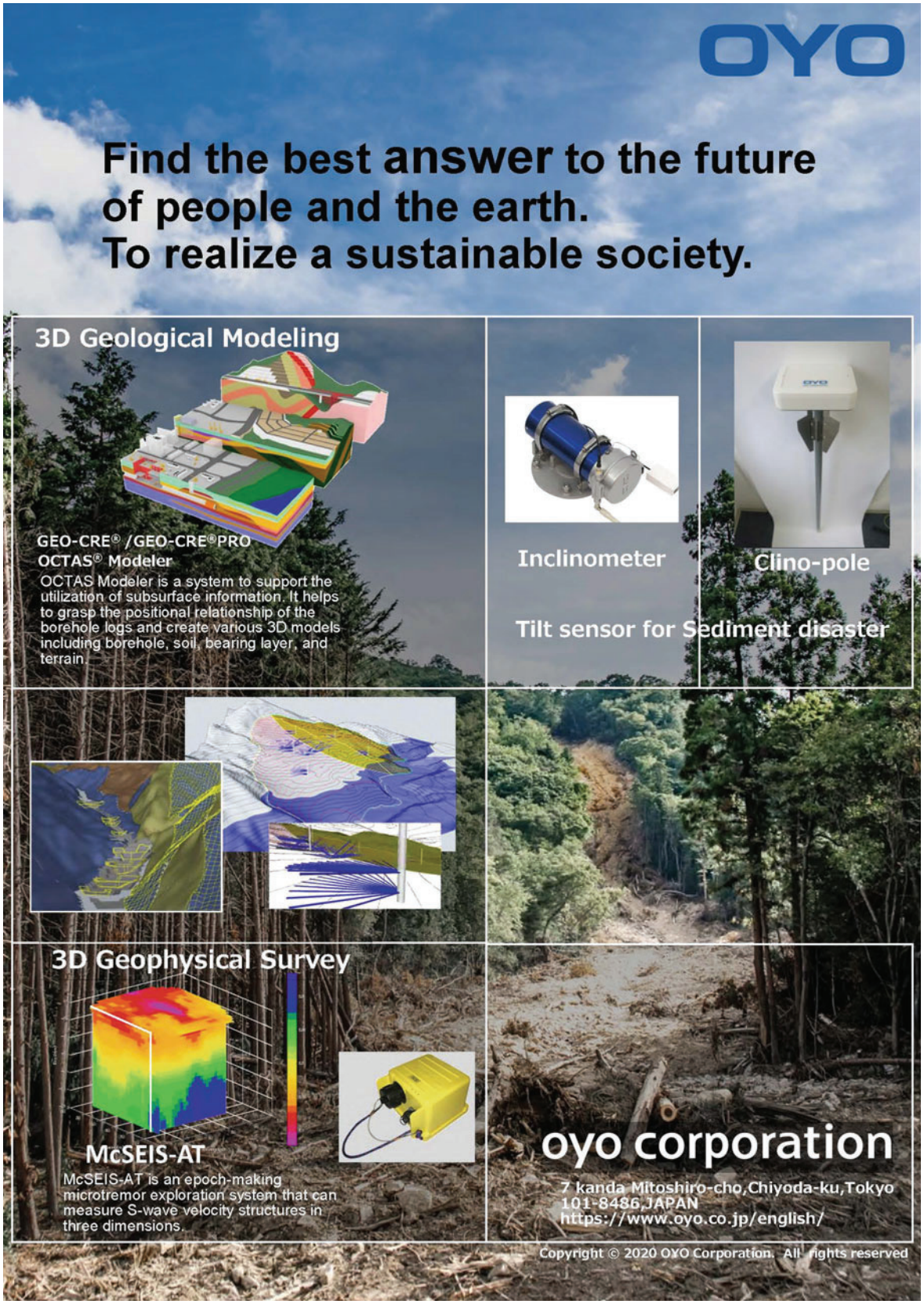
Construction of Landslide and Slope Disaster Prevention Measures/
Countermeasures Against Aging Infrastructure

Research and Development

Slope Protection Technology/
Afforestation Technology/
Geospatial Information Technology/
3D Simulation Technology/
Laboratory Testing of Soil and Rocks

JAPAN CONSERVATION ENGINEERS & CO.,LTD.

3-18-5, Toranomon, Minato, Tokyo,Japan 105-0001
Tel: +81.3.3436.3673 E-mail: go_info@jce.jp URL https://www.jce.co.jp/en


OYO
Find the best answer to the future
of people and the earth.
To realize a sustainable society.
3D Geological Modeling
GEO-CRE® /GEO-CRE®PRO
OCTAS® Modeler
OCTAS Modeler is a system to support the utilization of subsurface information. It helps to grasp the positional relationship of the borehole logs and create various 3D models including borehole, soil, bearing layer, and terrain.
Inclinometer
Clino-pole
Tilt sensor for Sediment disaster
3D Geophysical Survey
McSEIS-AT
McSEIS-AT is an epoch-making microtremor exploration system that can measure S-wave velocity structures in three dimensions.
oyo corporation
7 kanda Mitoshiro-cho,Chiyoda-ku,Tokyo
101-8486,JAPAN
https://www.oyo.co.jp/english/
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Green Communities

~Towards a better future,
for people and the environment~

Participations

SUSTAINABLE DEVELOPMENT GOALS

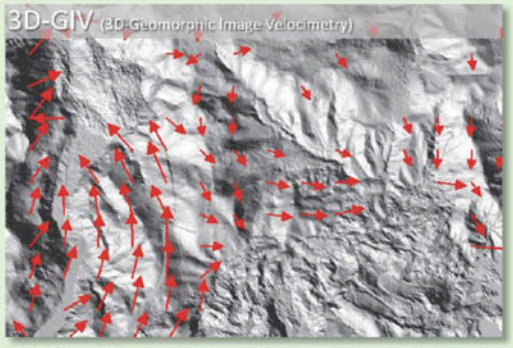
SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION 2015-2030

PARIS2015 UN CLIMATE CHANGE CONFERENCE COP21・CMP11

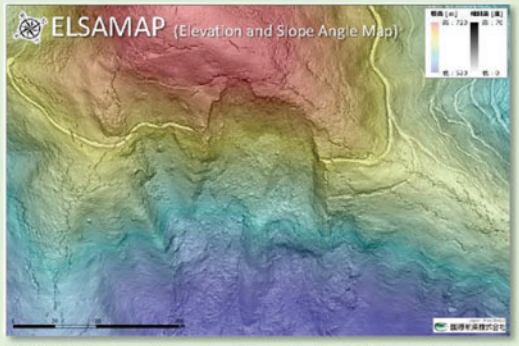
Japan Asia Group

KOKUSAI KOGYO

Kokusai Kogyo as a leading company of geospatial information technologies, has been contributing to the improvement of public services with advanced measurement technologies and a wide range of consulting technologies. Kokusai Kogyo supports the development of "Green Communities" representing the new era public concerns on "environment and energy," "disaster risk reduction" and "asset management". Kokusai Kogyo offers the advanced analysis of geospatial information consultancy for developing new government policies, maintaining and operating social infrastructures with safe and secure city planning, and building low-carbon cities.



3D-GIV can help grasp the ground surface displacements caused by natural phenomena such as landslides by analyzing differences between digital geomorphic images obtained through ad hoc Airborne Laser Surveys.



ELSAMAP is our cutting-edge 3D terrain visualization method allowing great geomorphological details to be visualized in one glance with gray-scaled slope inclinations and colored altitudes. ELSAMAP has been used to interpret micro-topographies, landslides and some other things.

Our Realtime Hazard Map reflects up-to-date information of soil natures and precipitations at landslide hazard sites, etc. that can constantly be changing, and evaluates area-wide hazard risk in real time.

"shamen-net" is a total monitoring system integrating GNSS and other monitoring devices (Measurement precision: +/-1mm, on a real time basis)

2 Rokubancho,Chiyoda-ku,Tokyo,Japan 102-0085 https://www.kkc.co.jp/english/ info_overseas@kk-grp.jp

LiSALab
...a step ahead in monitoring structures and natural hazards
Powered by **Ellegi srl**

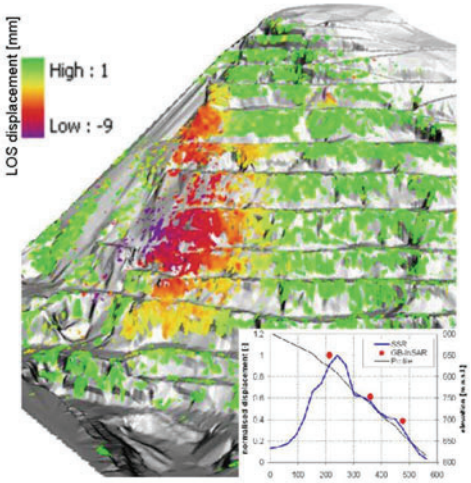
... A step ahead in monitoring structures and natural hazards ....

by Ground Based Interferometric Synthetic Aperture Radar LiSALab technology

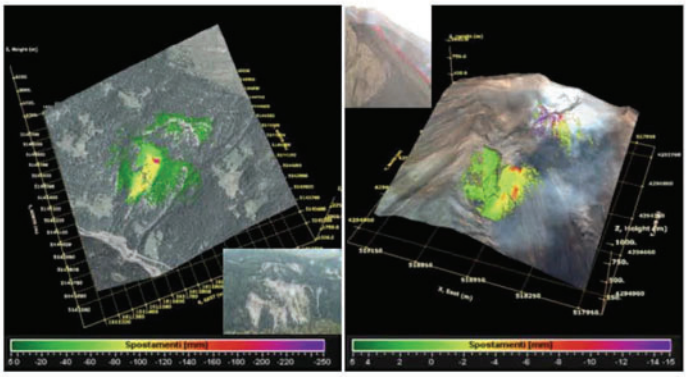
Ellegi's **provides services and products for remote sensing measurement of displacements and deformations of natural hazards and manmade buildings** using a ground based SAR system, known as **LiSALab system**, in software production and system integration, production and developments of data acquisition, visualization and data-analysis systems.

LiSALab system at present is at its 5th generation of development since 2003.

One of the biggest point of strength of Ellegi is based on its **high vertical integration**. It can internally design, produce, sell, maintains and provide services and products using GBInSAR LiSALab technology, **the customer can have all the answers**.



GBInSAR LiSALab technology quarry monitoring example and displacements' field comparison between the GBInSAR measurements and FEM model results.



GBInSAR LiSALab technology results in monitoring a slope affected by a landslide (left) and a volcanic slope affected by deformation (right).
Landslide or moving areas mapping and boundaries identification is made easy by GBInSAR LiSALab tecnology.

Ellegi srl offers:

- **displacement fields measurement, control and monitoring** of the deformation caused by natural hazards, in every operative conditions, including emergencies;
- **structural strain fields measurement, control, monitoring** and diagnosis of the deformation affecting buildings, bridges, viaducts, dams, etc. etc.;
- **integrated monitoring systems** design, installation, management and maintenance in order to provide information about natural hazards or anthropic activity, that can generate or cause slopes or buildings instabilities.

Since 2003 Ellegi has provided services, systems and technologies in the world to the most important players in the monitoring sector.

Ellegi srl
Via Bandello, 5 I-20123 Milano Italy
Headquarters: via Petrarca, 55 I-22070 Rovello Porro CO Italy
Tel. +39 02 9443 5051 Fax +39 +39 02 9443 5052
info@lisalab.com - www.lisalab.com

Early Warning Monitoring System of Slope Failure using Multi-point Tilt Change and Volumetric Water Content

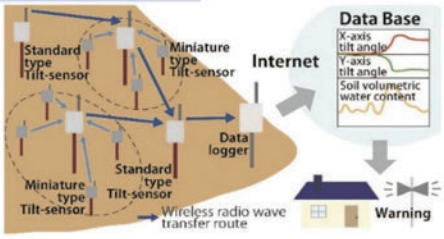
- CHUO KAIHATSU CORPORATION -

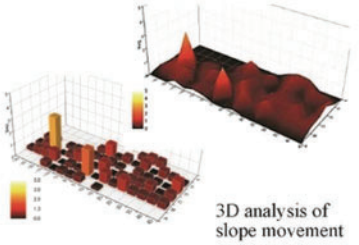
Objectives and Subjects

Research and develop a highly accurate, multi-point early-warning system for slope failure using low-cost tilt sensors

NETIS (MLIT) : KT-130093-A
Japanese Geotechnical Society Award for Technology Development 2014
The Society of Instrument and Control Engineers Award for Technology Development 2015
NETIS (MLIT) Evaluation Promotion Technology from 2016

- Low-cost, easy-to-install tilt sensors.
  ⇒ **Realized low cost multi-point measurement.**
- Prediction of slope deformation by multi-point measurements.
  ⇒ **Realized high-precision, stable, slope failure early warning system.**

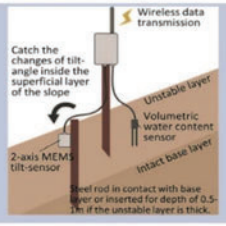


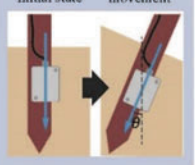


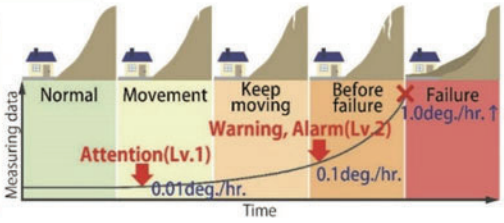
3D analysis of slope movement

Accomplishments

Effective, rapid, and convenient installation of sensors by inserting a steel pole into the slope and affixing the sensor module.

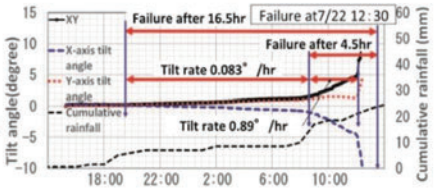






Utilization example

At other sites, there were gradual tilt rate increases within a relatively short time before slope failures occurred; the rate increase, in a way, was inversely proportional to the remaining time before failure.



Early warning can be issued based on the relationship between tilt rate and remaining time to failure.

International Support

Technical Services

- Early warning of slope failure
- Prevention of secondary disasters
- Assess pre-failure phenomena of slopes
- Dynamic monitoring of landslides in mountainous areas
- Application to Internet of Things and trends in Big data

Joint Research by Local Autonomies and Private Enterprise

Users

JICA, Local autonomies, Regional Bureaus of MLIT, General construction company etc.
International : Taiwan, China, India, Australia, Sri Lanka, Pakistan, Bhutan etc.

Achievement (-2019)

Over 900 sets in Japan
Over 300 sets abroad

Cooperation with Regional Bureau of MLIT to develop research results

Places of use

To fulfill a role of early warning for disaster prevention by using the results of research and develop for natural slope, road works, cutting slope works, and rock fall.

High-precision and stable early-warning system for slope failure.
→Realized early-warning system based on spatial and temporal analysis of entire slope behavior.

This R&D project is sponsored by Cabinet office of Japan
Principal Investigator : **Chuo Kaihatsu Corporation**
SIP Cross-ministerial Strategic Innovation Promotion Program

IDS GeoRadar

IBIS FM - Natural Hazard Monitoring Solution

GB-InSAR System with Advanced Atmospheric Correction

IDS GeoRadar is nowadays the leader company in the Radar monitoring solutions applied to landslide monitoring, thanks to the combination of the highest performance radar technology with the most advanced data processing algorithm for the removal of atmospheric artifacts integral part of Guardian Software.

The unique IBIS-FM radar system accurately monitors multiple scales of displacements in real time, from early detection of slow movements to fast accelerations associated with slope collapse. The great operative range, up to 4500 m, allows to safely deploying the system in comfortably accessible areas, without exposing people and equipment to hazardous zones.

Fully automatic

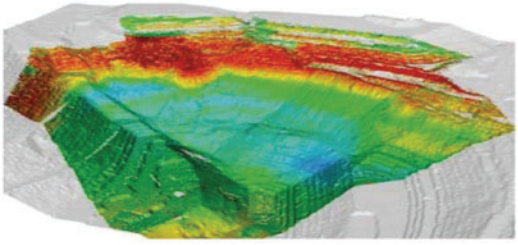
The atmospheric correction procedure does not require any input from the user (does not need any stable area selection); it is a completely automatic software processing, not requiring advanced know-how to the user. The atmospheric compensation algorithm is based on hundreds of thousands of pixels automatically selected by the software and updated at each radar scan. It permits to achieve the best performances even in case of extreme or unstable atmospheric conditions.

Advanced 3D atmospheric effects modelling

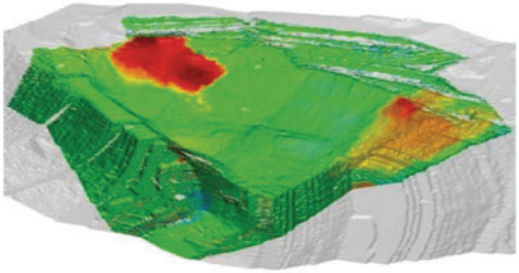
IDS GeoRadar algorithm for atmospheric correction offers unique capability able to model and remove complex atmospheric effects in extensive areas overcoming the limits of the standard linear model algorithms, providing very clean displacement maps in the most extreme atmospheric conditions environment.

Slow and fast movement detection

IDS GeoRadar algorithm is able to distinguish very slow movement together with the faster ones providing the capability to measure in real time movements across four orders of magnitudes: from very fast movements (up to 150 mm/hour) to extremely low displacements (few mm/month).



Displacement map obtained with standard processing and standard atmospheric correction



Displacement map obtained with IDS GeoRadar Guardian atmospheric correction and processing

IDS GeoRadar Srl
Part of Hexagon
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Tel: +39 050 89 34 100
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www.idsgeoradar.com

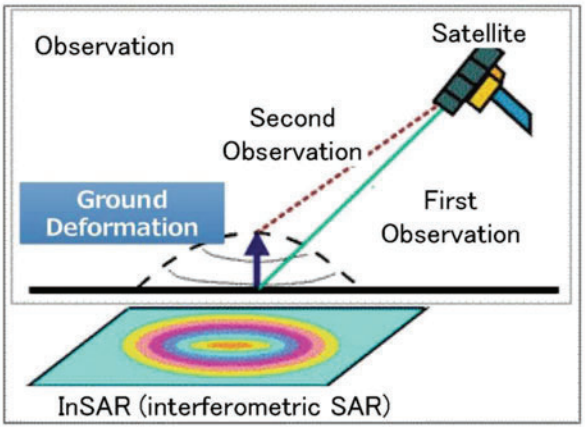
Kisojiban

Kiso-Jiban Consultants Co., Ltd.

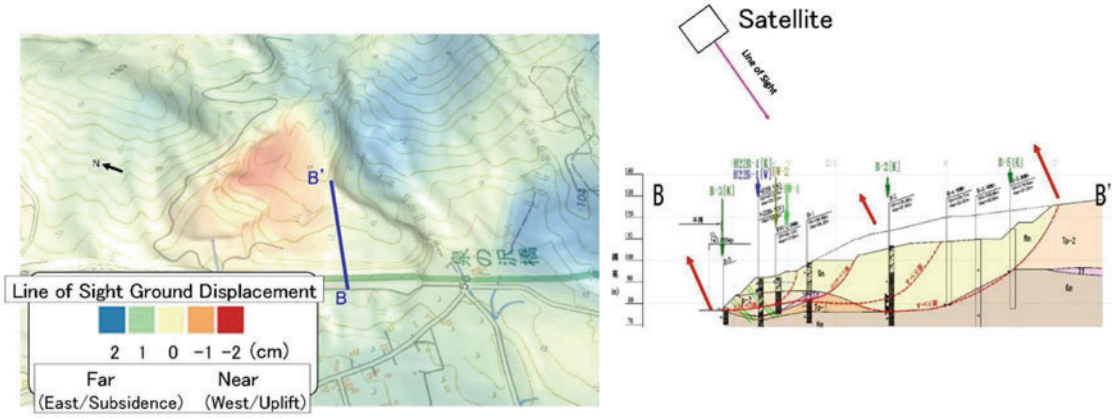
Monitoring Service for Landslide by Kiso-SAR System

What's SAR ?

SAR (Synthetic Aperture Radar) is a technique that utilizes interference of radio waves for precise determination of distance. InSAR (interferometric SAR), the phase of the received backscattered signal from two images of the same scene are used to measure path length differences with an accuracy of a few millimeters.



Ground Deformation Estimation in Landslides



Ground Deformation of Landslide Observed by Kiso-SAR System

Kisojiban

Kiso-Jiban Consultants Co., Ltd.
Kinshicho Prime Tower 12 Floor,1-5-7
Kameido,Koto-ku,Tokyo 136-8577,Japan
Tel.:+81-3-6861-8800

Small & simple water drainage drilling system* for landslide disaster prevention

Simple & Small

- Simple structure.
- At a narrow space (0.3m×1.5m for guide rail, 0.8m×2.0m for drilling machine base).
- Lightweight equipment (Max. weight of drilling machine: 25kg).
- Easy installation of one operational well requires only 2 persons.

Quick & Short-term construction

- All pieces of equipment are man-portable.
- Preparation time for starting drilling is only 30 min.
- 50% reduction in construction time compared with conventional construction method.

Low cost & High effectivity

- Additional works (ex. scaffold or construction road) are not required.
- 50% reduction in construction cost compared with conventional construction method.
- About 30m long water drainage hole can be drilled in clayey and/or soft rock layers.

Safety & Environmentally friendly

- Small sound and low vibration.
- Construction yard is not required.

*Japanese utility model registration No.3186011

奥山ボーリング株式会社
Okuyama Boring Co.,Ltd.
https://okuyama.co.jp/en/
10-39 Shinmei-cho, Yokote-City, AKITA Pref. 013-0046, JAPAN

Sustainable Asset Anchor Maintenance System

Earth Doctor

■ What's "SAAM System"?

SAAM stands for "Sustainable Asset Anchor Maintenance".

SAAM Jack, only half the weight of a conventional jack, enables lift-off tests in various onsite conditions.

SAAM, thus, allows for easy maintenance of ground anchors.

SAAM Jack

SAAM System

■ SAAM-A (PAT No. 5971596)

Lift-off tests on anchors with a short extra length can be performed with a newly developed jig.

■ SAAM-L (PAT No. 5440772)

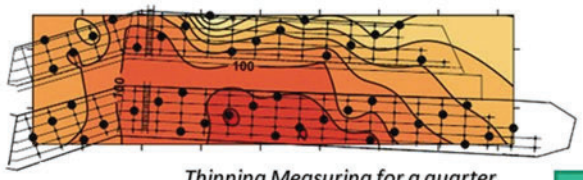
SAAM load cell can be attached to any anchors without loosening them.

Installation of Inner Coupler

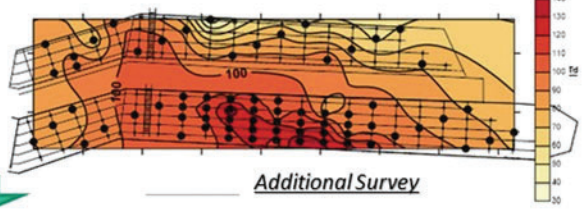
Removal of Wedge

Load Meter

■ Planar Distribution of Anchor's Tensioning Force



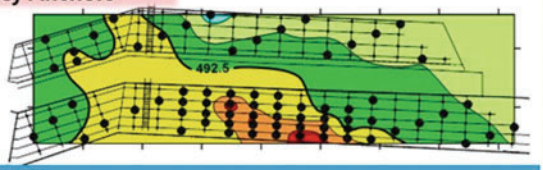
Thinning Measuring for a quarter



Additional Survey

Evaluation based on Soundness of Anchors

	Evaluation	Status	Coping example
0.9 Tys	E+	Risk of Breakage	Emergency measures
1.1 Ta	D+	Risk of Damage	Implementation of countermeasure work
Allowable anchor force (Ta)	C+	Exceeds the allowable value	
Design anchor forces (Td)	B+	Good	Follow up
Tensile force when fixed (Pt)	A+		
	A−		
0.8 Pt	B−		Follow up
0.5 Pt	C−	Fixed-type deterioration	Implementation of countermeasure work
0.1 Pt	D−	Dysfunction	



SAAM 合同会社アンカーアセットマネジメント研究会
Society of Anchor Asset Management

川崎地質株式会社
Kawasaki Geological Engineering Co., Ltd.
Marketing & Sales Department
URL : www.kge.co.jp TEL : +81-3-5445-2077

International Consortium on Landslides

International Consortium on Landslides

An international non-government and non-profit scientific organization promoting landslide research and capacity building for the benefit of society and the environment

ICL Full Members:

Geotechnical Engineering Office, Hong Kong Special Administrative Region, China
UNESCO Chair for the Prevention and the Sustainable Management of Geo-hydrological Hazards—University of Florence, Italy
Korea Institute of Geoscience and Mineral Resources (KIGAM)
University of Ljubljana, Faculty of Civil and Geodetic Engineering (ULFGG), Slovenia

Albania Geological Survey/The Geotechnical Society of Bosnia and Herzegovina/Center for Scientific Support in Disasters—Federal University of Parana, Brazil/ Geological Survey of Canada/University of Alberta, Canada/Northeast Forestry University, Institute of Cold Regions Science and Engineering, China/China University of Geosciences/Chinese Academy of Sciences, Institute of Mountain Hazards and Environment/Tongji University, College of Surveying and Geo-Informatics, China/The Hong Kong University of Science and Technology, China/Shanghai Jiao Tong University, China/The University of Hong Kong, China/Universidad Nacional de Colombia/Croatian Landslide Group (Faculty of Civil Engineering, University of Rijeka and Faculty of Mining, Geology and Petroleum Engineering, University of Zagreb)/City of Zagreb, Emergency Management Office, Croatia/Charles University, Faculty of Science, Czech Republic/Institute of Rock Structure and Mechanics, Department of Engineering Geology, Czech Republic/Brown Coal Research Institute, Czech Republic/Cairo University, Egypt/Technische Universitat Darmstadt, Institute and Laboratory of Geotechnics, Germany/National Environmental Agency, Department of Geology, Georgia/Universidad Nacional Autonoma de Honduras (UNAH), Honduras/Amrita Vishwa Vidyapeetham, Amrita University/Vellore Institute of Technology, India/National Institute of Disaster Management, India/Agency for Meteorology, Climatology, and Geophysics of the Republic of Indonesia (BMKG Indonesia)/University of Gadjah Mada, Center for Disaster Mitigation and Technological Innovation (GAMA-InaTEK), Indonesia/Parahyangan Catholic University, Indonesia/Building & Housing Research Center, Iran/Italian Institute for Environmental Protection and Research (ISPRA)—Dept. Geological Survey, Italy/University of Calabria, DIMES, CAMILAB, Italy/Istituto de Ricerca per la Protezione Idrogeologica (IRPI), CNR, Italy/DIA–Universita degli Studi di Parma, Italy/University of Torino, Dept of Earth Science , Italy/Centro di Ricerca CERI—Sapienza Università di Roma, Italy/Kyoto University, Disaster Prevention Research Institute, Japan/Japan Landslide Society/Korean Society of Forest Engineering/National Institute of Forest Science, Korea/Korea Infrastructure Safety & Technology Corporation/Korea Institute of Civil Engineering and Building Technology/Slope Engineering Branch, Public Works Department of Malaysia/Institute of Geography, National Autonomous University of Mexico (UNAM)/International Centre for Integrated Mountain Development (ICIMOD), Nepal/University of Nigeria, Department of Geology, Nigeria/Moscow State University, Department of Engineering and Ecological Geology, Russia/JSC "Hydroproject Institute", Russia/University of Belgrade, Faculty of Mining and Geology, Serbia/Comenius University, Faculty of Natural Sciences, Department of Engineering Geology, Slovakia/Geological Survey of Slovenia/University of Ljubljana, Faculty of Natural Sciences and Engineering (ULNTF), Slovenia/Central Engineering Consultancy Bureau (CECB), Sri Lanka/National Building Research Organization, Sri Lanka/Landslide group in National Central University from Graduate Institute of Applied Geology, Department of Civil Engineering, Center for Environmental Studies, Chinese Taipei/National Taiwan University, Department of Civil Engineering, Chinese Taipei/Asian Disaster Preparedness Center, Thailand/Ministry of Agriculture and Cooperative, Land Development Department, Thailand/Institute of Telecommunication and Global Information Space, Ukraine/California State University, Fullerton & Tribhuvan University, Institute of Engineering, USA & Nepal/Institute of Transport Science and Technology, Vietnam/Vietnam Institute of Geosciences and Mineral Resources (VIGMR).

ICL Associates

State Key Laboratory of Geohazard Prevention and Geoenvironment Protection (Chengdu University of Technology), China/Czech Geological Survey, Czech Republic/Department of Earth and Environmental Sciences, University Aldo Moro, Bari, Italy/Department of Sciences and Technologies, University of Sannio, Italy/Department of Earth and Environmental Sciences—University of Pavia, Italy/Geotechnical Engineering Group (GEG), University of Salerno, Italy/Niigata University, Research Institute for Natural Hazards and Disaster Recovery, Japan/Ehime University Center for Disaster Management Informatics Research, Japan/Tian-Shan Geological Society, Kyrgyzstan/Institute of Environmental Geoscience RAS (IEG RAS), Russia/Russian State Geological Prospecting University n.a. Sergo Ordzhonikidze (MGRI-RSGPU)/TEMPOS, environmental civil engineering Ltd., Slovenia/Institute of Earth Sciences—Faculty of Geoscience and Environment, University of Lausanne, Switzerland/Middle East Technical University (METU), Turkey/North Dakota State University, USA

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2	AOKI	Toshiya	Hokkaido University	Japan
3	ARAI	Mizuho	Asia Air Survey Co., Ltd.	Japan
4	ARAIBA	Kiminori	National Research Institute of Fire and Disaster	Japan
5	ARIYARATHNA	Imaya	Ehime University	Japan
6	ASANO	Shiho	Forestry and Forest Products Research Institute	Japan
7	BAATOR	Has	Asia Air Survey Co., Ltd.	Japan
8	BHANDARY	Netra Prakash	Ehime University	Japan
9	DO	Ngoc Ha	University of Yamanashi	Japan
10	DOAN	Huy Loi	Kyoto University	Japan
11	DOSHIDA	Shoji	National Research Institute of Fire and Disaster	Japan
12	ENOKIDA	Mitsuya	Japan Conservation Engineers & Co., Ltd.	Japan
13	FUJIMOTO	Ryo	NIPPON KOEI CO., LTD.	Japan
14	FUJITA	Kumiko	International Consortium on Landslides	Japan
15	FUJIWARA	Takao	FTS., LTD	Japan
16	FUKUDA	Mutsutoshi	JAPAN CONSERVATION ENGINEERS & CO.,LTD.	Japan
17	FUKUHARA	Makoto	Chuo Kaihatsu Corporation	Japan
18	FURUYA	Takehiko	Nissaku Co., Ltd.	Japan
19	FURYUYA	Rikako	Kyoto University	Japan
20	GOMEZ	Christopher	Kobe University	Japan
21	GOTO	Satoshi	Yamanashi University	Japan
22	HACHIRO	Hiroyuki	Kiso-Jiban Consultants Co.,Ltd.	Japan
23	HAN	Yusong	Kyoto University	Japan
24	HATTORI	Katsunori	Godai Corporation	Japan
25	HAYAKAWA	Tomoya	Nippon Koei Co., Ltd.	Japan
26	HAYASHI	Kazunori	Okuyama Boring Co., Ltd.	Japan
27	HIGAKI	Daisuke	Nippon Koei Co.Ltd.	Japan
28	HIROTA	Kiyoharu	KOKUSAI KOGYO CO., LTD/(ICL)	Japan
29	HOSHINO	Hisashi	Sabo Department, MLIT	Japan
30	IKARI	Yuji	MARUI & CO LTD	Japan
31	IKUSHIMA	Jun-ichi	NIPPON KOEI CO., LTD.	Japan
32	ISHIGAKI	Michio	OYO Corporation	Japan
33	ISHIKAWA	Tatsuya	Hokkaido University	Japan
34	ISHIKAWA	Makoto	MARUI & CO LTD	Japan

35	ISMAIL	Sadaf	Kyoto University	Japan
36	ITO	Yoshinori	Kowa Co.,Ltd.	Japan
37	ITO	Motohiro	Nippon Koei Co., LTD.	Japan
38	IWASA	Naoto	Fujii consulting & associates Co,.Ltd.	Japan
39	JAYAKODY	Sanchitha	Kyoto University	Japan
40	KASAI	Mio	Hokkaido University	Japan
41	KASAMA	Kiyonobu	Kyushu University Japan	Japan
42	KATSUME	Yasunori	OYO CORPORATION	Japan
43	KAWAMURA	Shima	Muroran Institute of Technology	Japan
44	KIMURA	Yoshitsugu	Toa Grout Kogyo Co., Ltd	Japan
45	KIMURA	Hiroyuki	FTS., LTD	Japan
46	KITAZATO	Hiroshi	International Union of Geological Sciences	Japan
47	KITAZUME	Takashi	Tokyo Electric Power Services Co., Ltd.	Japan
48	KIYONO	Junji	Kyoto University	Japan
49	KOBAYASHI	Ryohei	Nissaku Co., Ltd.	Japan
50	KOJIMA	Hiroaki	OSASI Technos, Inc.	Japan
51	KOMATSUBARA	Taku	Geological Survey of Japan, AIST	Japan
52	KONAGAI	Kazuo	International Consortium on Landslides	Japan
53	KOSEKI	Junichi	University of Tokyo	Japan
54	KOYANAGI	Kenta	Public Works Research Institute(PWRI)	Japan
55	KRENGEL	Dominik	Yokohama National University	Japan
56	KUBO	Norifumi	Nissaku Co., Ltd.	Japan
57	KURAOKA	Senro	Nippon Koei Co., Ltd.	Japan
58	LAKRUWAN	Mihira	Tohoku University	Japan
59	LAKRUWAN	S.O.A.D. Mihira	Tohoku University	Japan
60	LE	Vu Hai	Kyoto University	Japan
61	LE	Thai Thuy Nhi	Kyoto University	Japan
62	MAI	Cong Hung	Kyoto University	Japan
63	MAKINO	Eizo	Toyama Prefecture	Japan
64	MARUI	Taketoshi	MARUI & CO LTD	Japan
65	MIYAGI	Toyohiko	Advantechnology Co., Ltd	Japan
66	MIYAGI	Fumiko		Japan
67	MIYAGI	Akihiro	SABO&Landslide Technical Center	Japan
68	MIYAMOTO	Junji	Toyo Construction	Japan
69	MIZUNO	Toshimi	OYO Corporation	Japan
70	MORI	Taiki	Chuo Kaihatsu Corporation	Japan
71	MURAKAMI	Akira	Executive Vice-President of Kyoto University	Japan

72	NAGAI	Osamu		Japan
73	NAGANO	Masakazu	Sabo Department, MLIT	Japan
74	NAGANO	Takato	Kyoto University	Japan
75	NAKAI	Hiroto	Kiso-Jiban Consultants Co.,Ltd.	Japan
76	NAKAMURA	Kiyomi	Japan Conservation Engineers & Co. ltd.	Japan
77	NAKAMURA	Mitsutomo	KOKUSAI KOGYO CO., LTD	Japan
78	NAKAMURA	Naoto	El-Koei, Co.Ltd	Japan
79	NAKAMURA	Susumu	College of Engineering, Nihon University	Japan
80	NAKASE	Hitoshi	TEPSCO	Japan
81	NAKASHIMA	Michiyo	NIPPON KOEI	Japan
82	NGUYEN	Phuong Lan	Kyoto University	Japan
83	NISHIKAWA	Satoru	Nagoya University	Japan
84	NISHIMURA	Naoki	Asia Air Survey Co,. Ltd.	Japan
85	NISHIMURA	Nobuhito	Geobrugg AG	Japan
86	NISHIMURA	Tomohiro	KOKUSAI KOGYO CO., LTD	Japan
87	NISHINO	Yuka	OSASI Technos Inc.	Japan
88	NOMURA	Yasuhiro	Toyama Prefecture	Japan
89	OKAMOTO	Atsushi	Asia Air Survey Co. Ltd.	Japan
90	ONISHI	Ryo	Tokyo Institute of Technology	Japan
91	OOZONE	Keisuke	OYO Corporation	Japan
92	OTANI	Yoshinori	Hirose Hokyodo & Co.,ltd.	Japan
93	PHAM	Thi Bich Ngoc	Kyoto University	Japan
94	PHAM	Minh Quyen	Nissaku Co., Ltd.	Japan
95	PIPATPONGSA	Thirapong	Kyoto University	Japan
96	RAJ BHAT	Deepak	Okuyama Boring Co., Ltd.	Japan
97	SAGARA	Wataru	SABO&Landslide Technical Center	Japan
98	SAITO	Kenta	Kyoto University	Japan
99	SAKAGAMI	Noriko	Kiso-Jiban Consultants Co.,Ltd.	Japan
100	SASAHARA	Katsuo	Kochi University	Japan
101	SASSA	Kyoji	International Consortium on Landslides	Japan
102	SASSA	Reiko		Japan
103	SASSA	Shinji	Port and Airport Research Institute	Japan
104	SATO	Go	Teikyo Heisei University	Japan
105	SEKIGUCHI	Masashi	Central Nippon Highway Engineering Nagoya Company Limited	Japan
106	SEKIYA	Shiro	Godai Corporation	Japan
107	SHIDA	Mayuko	Rural Infrastructure Department, Rural Development Bureau, MAFF	Japan
108	SHINOHARA	Nobumichi	Kyoto University	Japan

109	SHIRAKI	Kojiro	Forestry Conservation Division, Forestry Agency, MAFF	Japan
110	SUZUKI	Motoyuki	Yamaguchi University	Japan
111	TAKAHARA	Teruyoshi	Shikoku Mountainous Region Sabo Office, MLIT	Japan
112	TAKARA	Kaoru	Kyoto University, ICL	Japan
113	TAKARA	Yumiko		Japan
114	TAKAYAMA	Toko	Asia Air Survey Co., Ltd.	Japan
115	TAKESHITA	Wataru	Public Works Research Institute(PWRI)	Japan
116	TAKIMOTO	Keisuke	Godai Corporation	Japan
117	TANAKA	Yoshikazu	Kyoto University	Japan
118	TANG	Zhiyuan	Kyoto University	Japan
119	TAO	Shangning	Chuo Kaihatsu Corporation	Japan
120	TAUCHI	Hiroaki	Nippon Koei, Co., Ltd.	Japan
121	TOGO	Kazuhito	Kiso-Jiban Consultants Co.,Ltd.	Japan
122	TOUHEI	Masaru	Fuji Sabo Office, MLIT	Japan
123	TOWHATA	Ikuo	Kanto Gakuin University	Japan
124	TOZAWA	Masanori	Kokusai Kougyo co., ltd.	Japan
125	TSUCHIDA	Ryo	Kyoto University	Japan
126	TSUKAMOTO	Satoru	KOKUSAI KOGYO CO., LTD	Japan
127	UEDA	Mie	International Consortium on Landslides	Japan
128	UEDA	Kosei	Asia Air Survey Co., Ltd.	Japan
129	UENO	Yuuichi	Nittoc Construction Co., Ltd.	Japan
130	UZUOKA	Ryosuke	Kyoto University	Japan
131	WANG	Lin	Chuo Kaihatsu Corporation	Japan
132	XU	Jiawei	Kyoto University	Japan
133	YABE	Mitsuru	OYO Corporation	Japan
134	YAGI	Hiroshi	Yamagata University	Japan
135	YAMADA	Masataka	Kyoto University	Japan
136	YAMADA	Takemine	The Japanese Professional Engineers Society for Geotechnical Evaluation	Japan
137	YAMADA	Shogo	Kyoto University	Japan
138	YAMADA	Masataka	NIPPON KOEI CO., LTD.	Japan
139	YAMASHITA	Yuichi	Technico Ltd.	Japan
140	YANO	Maki	OSASI Technos Inc.	Japan
141	YASUFUKU	Noriyuki	Kyushu University	Japan
142	YOKOYAMA	Osamu	JAPAN CONSERVATION ENGINEERS & CO.,LTD.	Japan
143	YOSHIDA	Hirotaka	OYO Corporation	Japan
144	YOSHIGATA	Yuki	Kyoto University	Japan
145	YOTSUTUSKA	Katsuhisa	FTS., LTD	Japan

The Fifth World Landslide Forum

2020 Kyoto Japan

Implementing and Monitoring the Sendai Landslide Partnerships 2015-2025

Voluntary contribution to the Sendai Framework 2015-2030 and the Sustainable Development Goals

第 5 回斜面防災世界フォーラム

仙台地すべりパートナーシップの推進と評価
-仙台防災枠組み 2015-2030 と持続可能な開発目標への自発的貢献-

日時：2021 年11 月2 日～6 日
場所：国立京都国際会館
主催：第5回斜面防災世界フォーラム組織委員会
共催：(特非)国際斜面災害研究機構、国際斜面災害研究計画・地球規模推進委員会、京都大学、
(公社)日本地すべり学会、(公社)地盤工学会、日本自然災害学会、(一社)斜面防災対策技術協会
後援：内閣府政策統括官(防災担当)、外務省、文部科学省、国土交通省、農林水産省、
日本学術会議、(独法)国際協力機構、(公社)土木学会、(公社)農業農村工学会、(公社)砂防学会、
(一社)日本応用地質学会
助成：京都大学、(公社) 東京地学協会、国際地質科学連合(IUGS)、(一財) 防災研究協会

組織委員会：

名誉議長

Audrey Azoulay、 UNESCO 事務局長*
水鳥真美、国連事務総長特別代表(防災担当)
Petteri Taalas、世界気象機関 (WMO)事務局長
Maria Helena Semedo, 国連食糧農業機関(FAO)副事務局長
David Malone、 国連大学(UNU)学長
村上 章、京都大学 理事・副学長
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Jose M.P.Viera、 世界工学団体連盟(WFEO)会長
John Ludden、 国際地質学連合(IUGS)会長
Kathy Whaler、 国際測地学・地球物理学連合(IUGG)会長
Qunli Han、 災害リスク統合研究(IRDR)理事長
Walter Ammann、 スイス・Global Risk Forum(GRF) 会長兼 CEO
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Darko But、 スロベニア政府市民防衛災害救助局・局長
中尾晃史、内閣府政策統括官(防災担当)付参事官(普及啓発・連携担当)
綱川浩章、国土交通省水管理・国土保全局砂防計画調整官
Chungsik Yoo、 国際ジオシンセティックス学会(IGS)会長
Rafig Azzam、 国際応用地質学会(IAEG)会長

* to be confirmed.

国内組織委員会役員：

委員長： 佐々恭二

副委員長：寶 馨、檜垣大助、東畑郁生

幹事長： 渦岡良介、小長井一男、カンダン

国内組織委員会委員：浅野志穂、阿部 真郎、新井場公徳、生島 潤一、石井靖雄、内村太郎、榎田 充哉、汪 発武、大曽根啓介、笹原 克夫、佐々 真志、佐藤 剛、柴崎 宣之、杉浦信男、大丸 裕武、瀧本圭介、塚原 健一、綱木亮介、富田陽子、西川 智、ハスバートル、林 一成、廣田 清治、圓井 健敏、八木 浩司、矢野 真妃、山岸宏光

目的：斜面防災世界フォーラムは、 世界各国での斜面災害軽減に関する取り組みについての情報交換やネットワーク形成、研究促進を目指してThe International Consortium on Landslides（ICL:国際斜面災害研究機構）が、支援機関である国連教育科学文化機関（UNESCO)、国連防災機関（UNDRR）などと共に2008年から3年毎に各国で開催している国際会議です。

第5回斜面防災世界フォーラムは、2020年11月2-6日に開催予定でしたが、新型コロナウイルスの世界的流行のために、 1 年延期し、2021年11月2-6日に国立京都国際会館において開催いたします。

国際斜面災害研究機構他が、国連防災世界会議（2015 年3 月14-18 日に仙台で開催）への自発的貢献として提案した「地すべり災害リスクの理解と軽減を地球規模で推進するための仙台パートナーシップ 2015-2025」が、2015 年3 月16 日に採択され、現在、国連機関、国際機関、国内機関など 22 機関がこのパートナーシップに参加しています。

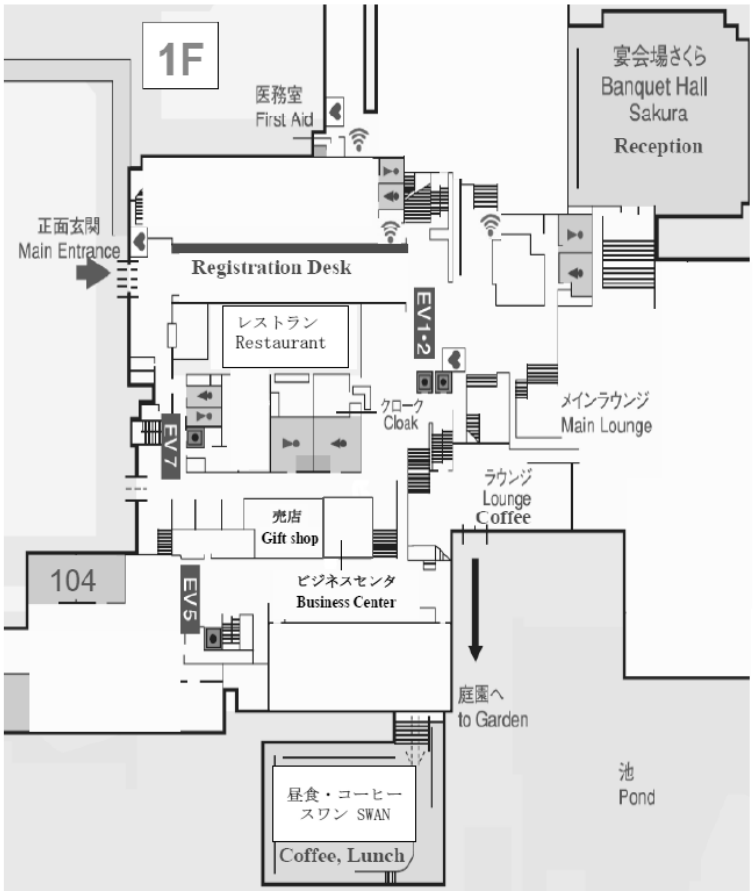
また、仙台パートナーシップ 2015-2025 後も続く、新たな国際協力の枠組として、「地すべり災害リスクの理解と軽減を地球規模で推進するための京都地すべりコミットメント 2020（Kyoto Landslide Commitment 2020: KLC2020）」が、世界各国からの90機関の署名を得て2020 年 11 月 5 日に発効しました。WLF5 では、2021 年 11 月 3 日に、仙台地すべりパートナーシップの中間評価と KLC2020 発足 1 年目のレビューを行うとともに、さらなる発展のためのハイレベルパネル討論を行います。そして地すべり災害軽減の中核として、発展途上国の人々や、山間地に住む地域住民が、無料でダウンロードして読める年2回発行のシリーズ本「地すべり研究と技術の進歩」の創刊宣言を採択し、来年から出版いたします。

フォーラムのプログラム

日	時	活動内 容
2021 年 11 月 2 日	9:00-18:00	フォーラム登録
	14:00-16:00	第 21 回 BOR/ICL 及び第 17 回 GPC/IPL ミーティング (Room 104)
2021 年 11 月 3 日 (Room A)	9:00 – 10:00	開会の辞: ICL、 ICL 賛助会員及び主催組織
	10:00-11:50	ハイレベルパネル討論 " KLC2020 の現状と今後について" 発展途上国の人々や山間地に住む地域住民が、無料でダウンロードして読める年2回発行のシリーズ本「地すべり研究と技術の進歩」の創刊宣言の採択
	11:50-12:00	Break
	12:00-12:20	Room Aの演台上にて参加者集合写真の撮影
	12:20-13:30	昼食
	13:30-15:30	フォーラム講演 Fausto Guzzetti (イタリア): On the prediction of landslides and their consequence (地すべりと災害の予測について) Charles NG (香港): Interaction mechanisms between debris flow and multiple barriers（土石流と構造物による対策の相互メカニズム）
	15:45-17:00	業績紹介と授賞式 World Centres of Excellence on Landslide Risk Reduction (WCOEs) 2020-2023 Bestow the Varnes Medal、 IPL Awards for 2017-2021
	8:00-17:00	ブース準備に引き続いて、ブース展示とパネル展示 (Room B1)
	18:30-20:30	歓迎レセプション

2021 年 11 月 4 日	10:30-12:30	KLC2020 マルチハザード円卓会議
	9:00-17:00	分科会
	8:00-17:00	ブース及びパネル展示(Room B1)
2021 年 11 月 5 日	9:00-17:00	世界津波の日 特別行事 地すべりが原因となる津波に関する特別講演及びパネル討論
	9:00-17:00	分科会
	8:00-17:00	ブース及びパネル展示 (Room B1)
2021 年 11 月 6 日	9:00-12:00	分科会
	12:00-13:30	昼食
	13:30-15:30	フォーラム講演 Michel Jaboyedoff (スイス): Improving the rockfall failure hazard assessment.(岩盤崩壊評価) Brian Collins (アメリカ): Progress and lessons learned from responses to catastrophic landslides(大規模地すべりへの対応の進捗と教訓) 表彰記念講演 福岡浩IPL賞（発展途上国への貢献）： Claudio Margottini (イタリア、地質調査所) Oldrich Hungr賞（35才までの若手地すべり研究者）： Beena Ajimera (米国アイオア大学助教授)
	15:30-17:00	閉会式 ➢ ICL President による閉会の辞 (2021.1.1 - 2023.12.31) ➢ ICL President による新 ICL メンバーの紹介 ➢ ICL President による新 ICL メンバーへの Certificates の授与 (2017-2021) ➢ WLF5組織委員長による WLF5財政支援機関とスポンサーへの謝辞 ➢ 第 6 回 WLF の紹介 (WLF6 主催)

京都国際会館1階（Recepton Desk, Lunch, Reception, Loungeの配置図



事前にLunchをお申込みされた方には、宴場スワンにて弁当をご用意しております。
スワンあるいはラウンジにてお召し上がりください。

・コーヒーは宴場スワンにて常設（AM9:00-PM3:00）しております．ご自由にお飲みいただけますが、スワンあるいはラウンジのみでお願いいたします。

・京都国際会館内への飲食物の持ち込みは一切禁止となっております。ご了承ください.

Sponsor Booths and Posters in Room B1

Poster

(1) Marui &Co., Ltd.
(2) Toyama Prefecture
(3) NIPPON KOEI Co., Ltd.
(4) Kiso-Jiban Consultants Co.,Ltd.
(5) GEOBRUGG
(6) Okuyama Boring Co,. Ltd.
(7) Asia Air Survey Co., Ltd.
(8) GODAI Corporation
(9) OSASI Technos Inc.
(10) OYO Corporation
(11) Nissaku Co., Ltd.
(12) Kokusai-Kogyo Co., Ltd.
(13) JAPAN CONSERVATION ENGINEERS & CO.,LTD.
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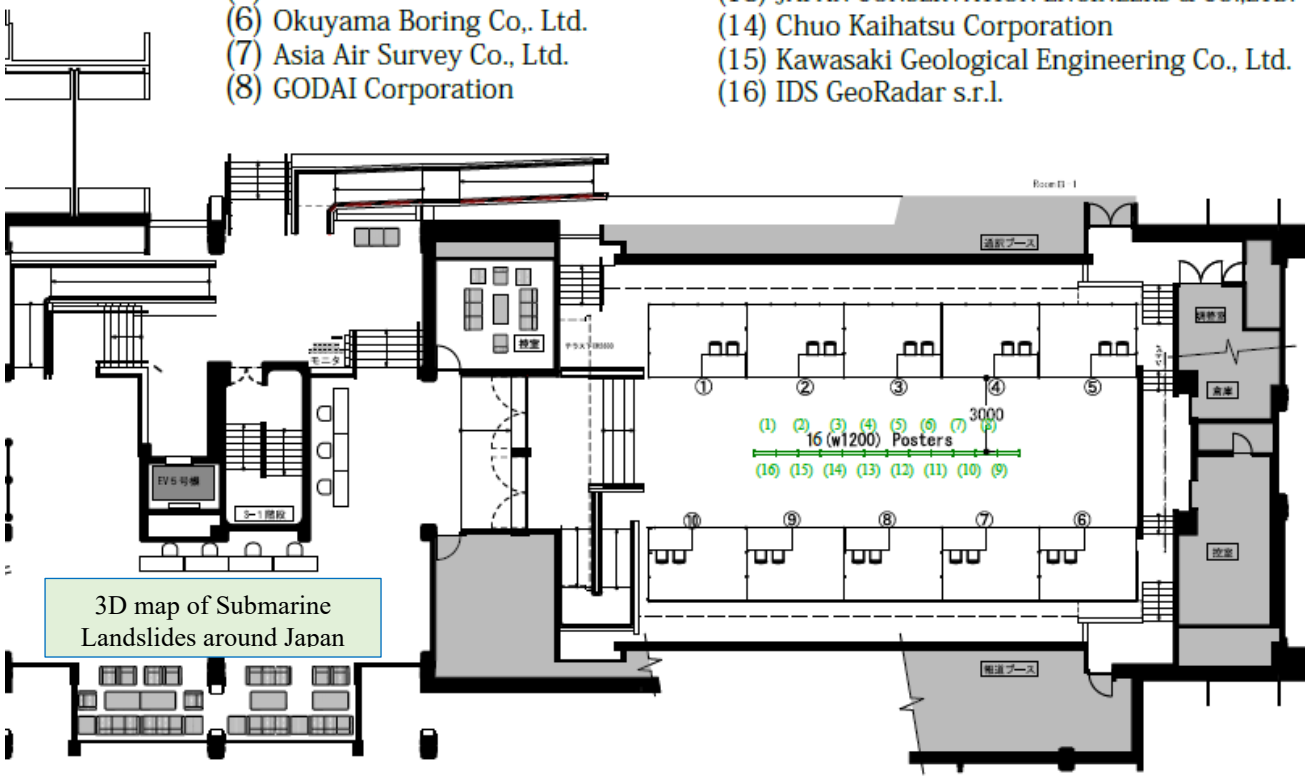

Booth

① Marui &Co., Ltd.
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⑤ GODAI Corporation
⑥ OSASI Technos Inc.
⑦ OYO Corporation
⑧ Kokusai-Kogyo Co., Ltd.
⑨ Chuo Kaihatsu Corporation
⑩ IDS GeoRadar s.r.l.

<3D map of Submarine Landslides around Japan is shown on the floor in the lounge>

全体セッション

2021年11月3日 (水) ROOM A

1. 開会式： ICL, ICL 支援機関及び主催機関
11月3日9:00-10:00

議長: 佐々恭二 (WLF5フォーラム議長) 及び
Qunli Han (国際斜面災害研究計画・地球規模推進委員会・議長（GPC-IPL）/災害リスク統合研究（IRDR）理事長

主催者代表による開会の辞
- Nicola Casagli (国際斜面災害研究機構・会長)

国際連合機関からの開会の辞
- David Malone (国連事務次長/国連大学長)
- Mami Mizutori (国連事務総長特別代表（防災担当) 兼国連防災機関長）
- Petteri Taalas（世界気象機関事務局長）
- Maria Helena Semedo (国連食糧農業機関副事務局長)
- Shamila Nair-Bedouelle (ユネスコ自然科学担当事務局長補佐)

学術機関からの開会の辞
- José M.P. Vieira (世界工学団体連盟（WFEO）次期会長)
- Kathryn Whaler (国際測地学・地球物理学連合（IUGG）会長)
- John Ludden (国際地質学連合(IUGS) 会長)

ホスト機関からの歓迎メッセージ
- 綱川浩章（国土交通省水管理・国土保全局砂防計画調整官）
- 村上 章 (京都大学 理事・副学長)

2. ハイレベルパネル討論 “KLC2020の現状と今後について”
11月3日10:00-11:50

フォーラム組織委員長による開会の辞
- Peter Bobrowsky (カナダ地質調査所、国際斜面災害研究機構・前会長) 及び 寶　馨 (京都大学思修館・教授) による開会の辞
- 議長
  Matjaž Mikoš (国際斜面災害研究計画・地球規模推進委員会・議長 / 第４回斜面防災世界フォーラム・組織委員長, Ljubljana, 2017)
  小長井一男 （国際斜面災害研究機構・学術代表、東京大学名誉教授)
- 基調講演
  佐々恭二 (KLC2020事務局長): KLC2020 及びオープンアクセスブックシリーズについて

KLC2020調印組織のパネリスト9名によるスピーチ

ICL支援機関:
- Paola Albrito (国連防災機関・政府間プロセス/機関間協力とパートナーシップ担当長)

- 安川総一郎 (ユネスコ防災プログラム担当スペシャリスト)
- José M.P. Vieira (世界工学団体連盟・次期会長)
- 北里洋 (国際地質学連合・会計、東京海洋大学・教授)
- John LaBrecque (国際測地学・地球物理学連合 GeoRisk Commission委員長, 米国テキサス大学・宇宙兼研究センター教授)

ICL正会員:

- Binod Tiwari (国際斜面災害研究機構・アメリカ担当副会長、カルフォルニア州立大学教授)
- Paola Reichenbach (イタリア学術会議IRPI研究所・ 研究デイレクター)
- Maneesha Ramesh (インド・アムリタ大学・持続できる開発と国際プログラム学部長)

ICL賛助会員:

- 田内宏明（日本工営㈱総合防災部長）

パネル討論のまとめ（Concluding Remarks）

- Sálvano Briceño (初代国際斜面災害研究計画・地球規模推進委員会・議長（2007-2014）、元国連防災戦略事務局長（2001-2011）)

すべての参加者による KLC2020 のための ICL オープンアクセスブックシリーズ創刊宣言の採択

11:50-12:00 JST　休憩
12:00-12:20 JST　全参加者による舞台上での集合写真撮影 (Room A)
12:00-12:30 JST　昼食 (SWAN)

3. フォーラム講演/フォーラムスピーチ
11月3日13:30-15:30

議長: Željko Arbanas (Vice President for Europe, University of Rijeka, Croatia) and Veronica Tofani (Vice President for WLF6, University of Florence, Italy)

フォーラム講演

- Fausto Guzzetti (General Director of Office III, Department of Civil Protection, Italian Presidency of the Council of Ministers, Italy): On the prediction of landslides and their consequence
- Charles NG (Chair Professor and Dean of Graduate School, Hong Kong University of Science and Technology, China): Interaction mechanisms between debris flow and multiple barriers

フォーラムスピーチ

Dwikorita Karnawati (Head of Agency for Meteorology, Climatology, and Geophysics of the Republic of Indonesia): Promotion of intergovernmental network of ICL-KLC2020

4. 業績紹介と授賞式
11月3日15:45-17:00

World Centres of Excellence on Landslide Risk Reduction (WCoEs) 2020-2023

Bestow the Varnes Medals (2017-2021), IPL Awards for Success (2017-2020)

5. 歓迎レセプション 18:30-20:30 JST (Room Sakura)

2021年11月6日 (土) ROOM 510

6. フォーラム講演及び受賞講演
11月6日13:30-15:00

議長: Vít Vilímek (Vice President for Mission (KLC2020), Charles University, Prague, Czech Republic) and Fawu Wang (Professor, Tongji University, China)

フォーラム講演
- Michel Jaboyedoff (Professor, University of Lausanne, Switzerland): Improving the rockfall failure hazard assessment.
- Brian Collins (Research civil engineer, U.S. Geological Survey, USA): Progress and lessons learned from responses to catastrophic landslides

受賞講演
- Claudio Margottini (ISPRA - Dpt. Geological Survey of Italy) 福岡浩IPL賞・受賞講演
- Beena Ajmera (Assistant Professor, North Dakota State University, USA) Oldrich Hungr Award lecture

7. 閉会式
11月6日15:30-17:00

Masters of Ceremonies: Alexander Strom (Chief expert, Geodynamic Research Center LLC., Russia) and Ryosuke Uzuoka (Vice Director, DPRI, Kyoto University, Japan)

- ICL President による閉会の辞 Nicola Casagli (2021.1.1 - 2023.12.31)
- ICL President による新ICLメンバーの紹介
- ICL Presidentによる新ICL membersへのCertificatesの授与(2017-2021)
- WLF5組織委員長によるWLF5 財政支援機関とスポンサーへの謝辞
  第6回斜面防災世界フォーラムの紹介 (WLF6 Forum Chair, Nicola Casagli)

フォーラムでのパラレルセッション

- テーマ1: 仙台パートナーシップ2015-2025と京都2020コミットメント
  First Coordinator: Kyoji Sassa (ICL Headquarters) Contact: ICL secretariat <secretariat@iclhq.org>
- テーマ2: ハザードおよび脆弱性マッピングとゾーネーション
  First Coordinator: Fausto Guzzetti (Department of Civil Protection, Italy) Contact: Paola Reichenbach <paola.reichenbach@irpi.cnr.it>
- テーマ3: 計測と早期警戒
  First Coordinator: Nicola Casagli (University of Firenze, Italy) Contact: Veronica Tofani <veronica.tofani@unifi.it>
- テーマ4: 試験、モデリングとリスク評価
  First Coordinator: Binod Tiwari (California State University, Fullerton, USA) Contact: Binod Tiwari <btiwari@fullerton.edu>
- テーマ5: 大災害を引き起こす地すべりと最先端の地すべり科学
  First Coordinator: Vít Vilímek (Charles University in Prague, Czech Republic) Contact: Vít Vilímek <vit.vilimek@natur.cuni.cz>
- テーマ6: 地すべり科学とその応用に関する個別課題、日本地すべり学会による電子プロシーデイングセッション
  First Coordinator: Željko Arbanas (University of Rijeka, Croatia)
  Contact: Zeljko Arbanas <zeljko.arbanas@gradri.uniri.hr>
- 世界津波の日特別事業
  Coordinator: Shinji Sassa (Port and Airport Research Institute)
  Contact: Shinji Sassa <sassa@p.mpat.go.jp>