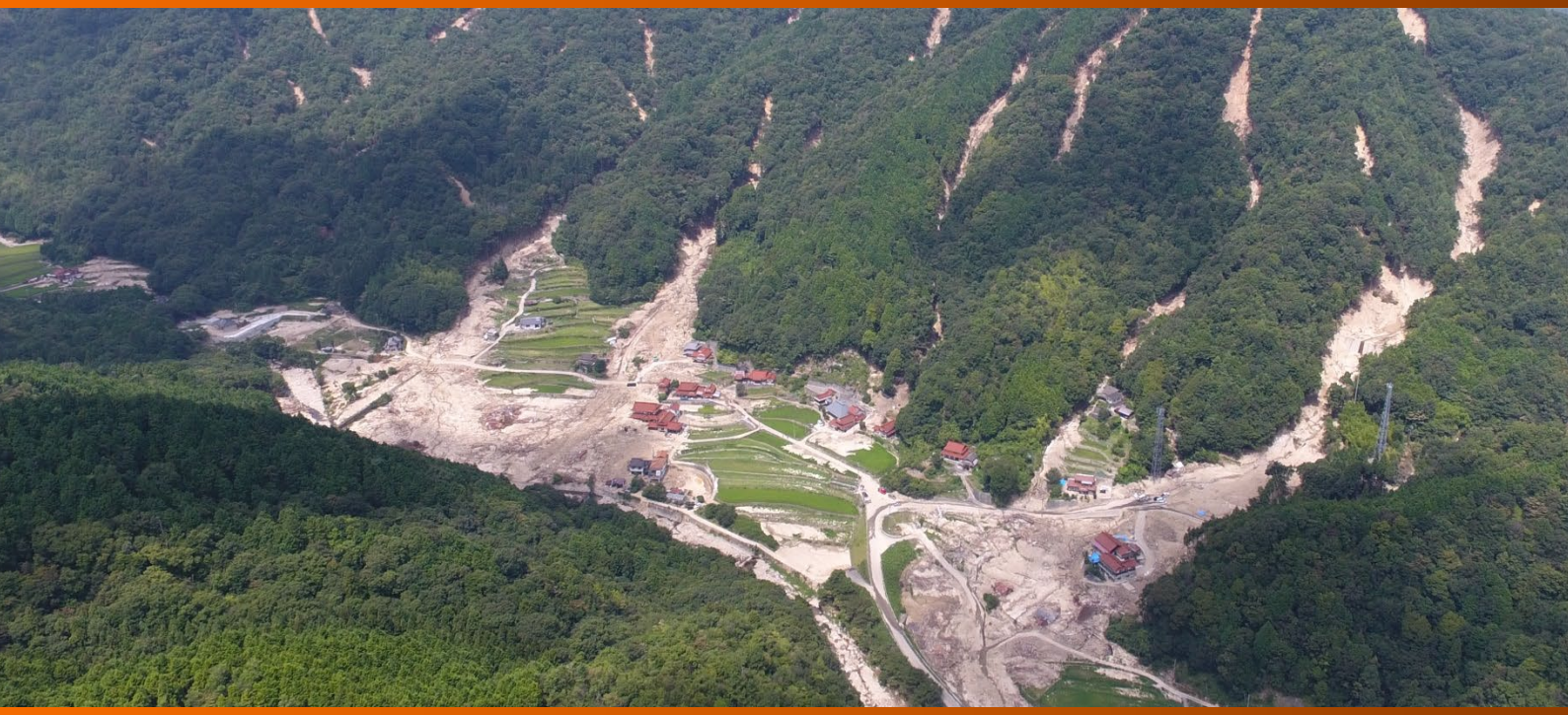
Progress in Landslide Research and Technology



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Volume 1 Issue 1, 2022

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Preface by the first Editor

Contents

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Abstract

This is an example text template for the full paper submission to the Progress in Landslide Research and Technology book series. The book series publishes original articles for practice. Contributed articles align with one of five categories: Original articles, Review articles, Case studies, IPL/WCoE/Network activities and Teaching tools with online extras (i.e., PPT, Video). The Abstract should be concise and self-contained, clearly stating main conclusions of the paper. The length should be of minimum 150 words, and within 300 words. The style to be used, according to the Template Style List, is the Normal Style with justification. At the end of the abstract text a list of keywords (minimum: 3 maximum: 7) should be added as shown in this template. The paper size should be set to A4 size (210 mm × 297 mm). The minimum paper length is 8 pages for original articles, review articles, IPL/WCOE/Kyoto Landslide Commitment, Teaching tools, and 4 pages for Technical notes and Case studies. 2-4 pages for World Landslide Reports. Please submit both MS-Word and pdf files.

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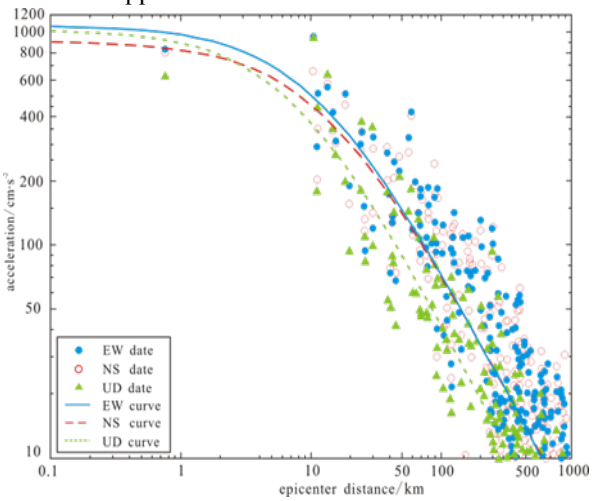

Fig. 1 Example of half page figure. Captions which are 2 or more rows long must be justified. Shorter caption must be column-centred. Please ensure to select the style "Figure Caption" and to place caption below figure. Figures should be cited in text using the short: "Fig.".

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Title and authors

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

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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.".

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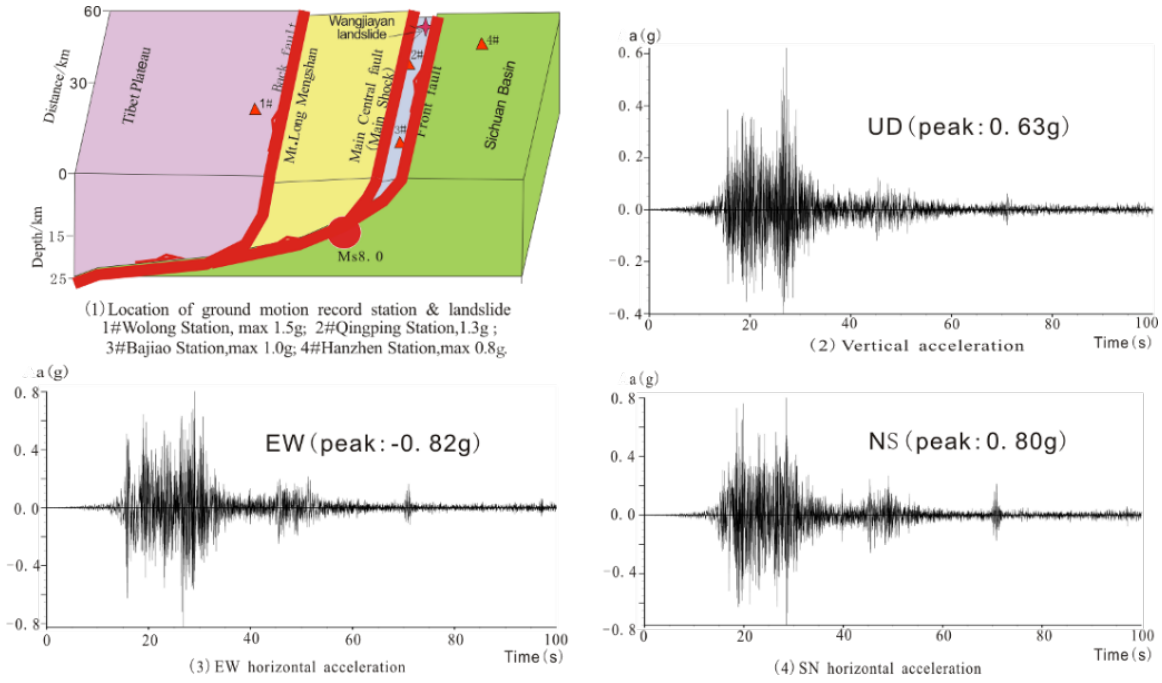

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In case this is not possible, add empty rows typing carriage-return characters until the visual appearance of the page is maintained, as in the following example.

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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.

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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.

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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.

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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

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- The International Union of Geological Sciences (IUGS) / John Ludden
- Faculty of Civil and Geodetic Engineering, University of Ljubljana, Slovenia / Matjaž Mikoš

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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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DOI 10.1007/978-94-007-2162-3_36

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).

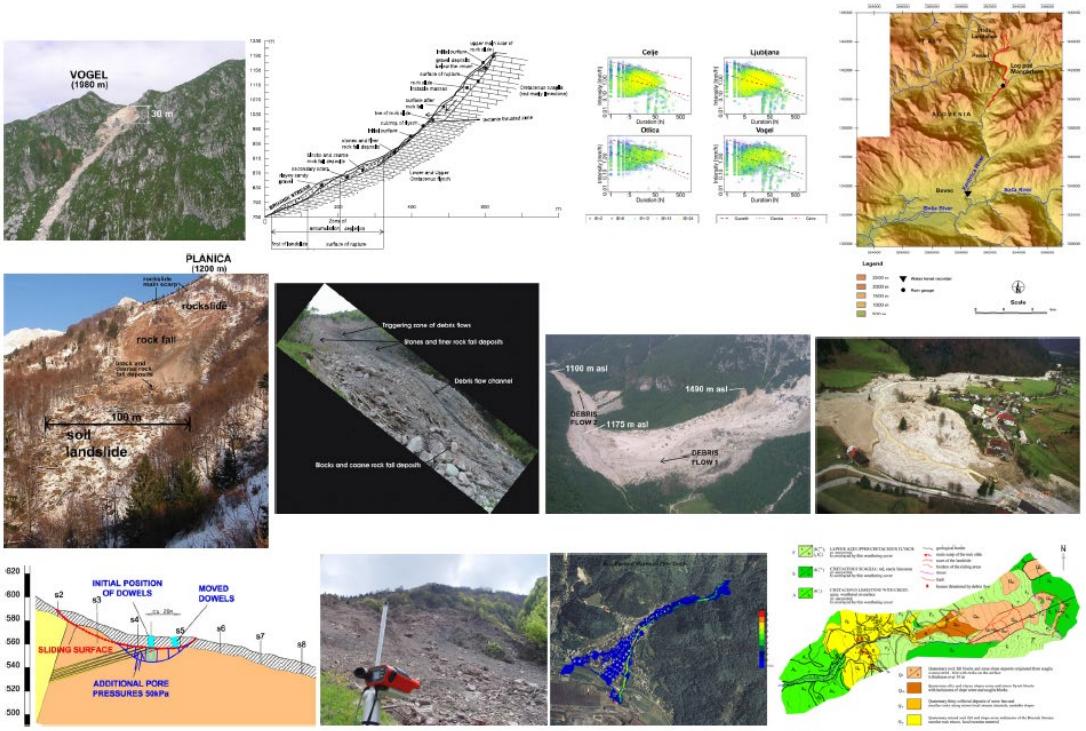

Fig. 1 A collage of landslides in Slovenia and their investigation performed by UL FGG

Fig. 2 At the WLF4 press conference in Ljubljana—from left to right: Qunli Han (UNESCO), Miloš Bavec (Geological Survey of Slovenia), Matjaž Mikoš (University of Ljubljana, ICL), Peter Bobrowsky (ICL) (from www.wlf4.org)

In Ljubljana between May 29 and June 2, 2017 (Fig. 2), followed by a three-day field study tour to see the variety of landslide forms in Slovenia and in its immediate NW surroundings. With over 600 participants from 49 countries and 5 international organizations, WLF4 was promoting the culture of living with natural hazards.

IPL projects

An important ICL activity is IPL projects (https://iplhq.org/category/iplhq/ipl-ongoing-projects/). The IPL Evaluation Committee examines the submitted proposals of ICL members by carefully reading the written proposals and by listening to their presentations at annual ICL conferences. The initially accepted proposals by the IPL Evaluation Committee are discussed and then approved at the annual Board of Representatives meeting of ICL members (Annual Assembly). Finally, the IPL projects are approved annually by the IPL Global Promotion Committee.

ULFGG has successfully submitted several proposals for IPL projects and has been so far actively involved in the following ones:

– IPL-151 Soil matrix suction in active landslides in flysch—the Slano Blato landslide case (2010–2012).

– IPL-225 Recognition of potentially hazardous torrential fans using geomorphometric methods and simulating fan formation (2017–2020).

– IPL-226 Studying landslide movements from source areas to the zone of deposition using a deterministic approach (2017–2020)—coordinated by the Geological Survey of Slovenia.

ICL thematic and regional networks

Following the ICL Strategic Plan 2012–2021, several thematic networks and regional networks have been established (for an overview, see http://icl.iplhq.org/category/icl/icl networks/).

Landslide Monitoring and Warning Thematic Network

In 2012, ULFGG proposed the ICL landslide monitoring and warning thematic network (abbr. LaMaWaTheN), and almost 10 ICL members joined the initiative. The general objective of the proposed network was to compare experiences in the field of landslide monitoring and installed early warning systems for active landslides in various regions of the world. A proposal for landslide monitoring techniques database was. The network was later coordinated by the Croatian Landslide Group from the Faculty of Civil Engineering, University of Rijeka, Croatia, and the Faculty of Mining, Geology and Petroleum,

University of Zagreb, Croatia. Lately, we contributed to the network activities by preparing practice guidelines on monitoring and warning technology for debris flows.

The idea of the network was partially taken over by the web database ICL World Report on Landslides (http://iplhq.org/ls-world-report-on-landslide/), created to be a platform to share landslide case studies among the global landslide community, with monitoring and warning systems being a part of the story.

ICL Adriatic-Balkan Network

Jointly with other ICL members from Croatia and Serbia, in 2013, ULFGG proposed to establish an ICL Adriatic-Balkan Regional Network (ICL ABN; https://www.klizista-hr.com/en/organization/about-us/icl-abn/). Various network activities were proposed, the most active being the organization of biennial regional symposia on landslide risk reduction in the Adriatic-Balkan Region (called ReSyLAB). ULFGG supported the 1st Symposium in Zagreb (Croatia) in 2013 (March 6–9), and the 2nd in Belgrade (Serbia) in 2015 (May 14–16), and jointly organized the 3rd in Ljubljana (Slovenia) in 2017 (October 11–13) together with the Geological Survey of Slovenia (also an ICL member).

In the last decade, ULFGG has signed bilateral research projects with the ICL members in the region: "Adriatic-Balkan Regional Network: Landslide Risk Mitigation for Society and Environment" (2012–13 with University of Belgrade, Serbia), "Study of landslides in flysch deposits: sliding mechanisms and geotechnical properties for landslide modelling and landslide mitigation SoLiFlyD" (2014–15 with University of Rijeka, Croatia), and "Laboratory investigations and numerical modelling of landslides in flysch deposits in Croatia and Slovenia" (2016–17 with the University of Rijeka, Croatia). This joint research has helped strengthen regional cooperation within the ICL ABN regional network.

Other ICL-related international activities

ULFGG served the ICL by taking different leading roles in the Consortium, i.e. ULFGG member served as Chair of IPL Evaluation Committee, twice as ICL Vice President, and was elected to Co-Chair of IPL Global Promotion Committee (https://iplhq.org/).

ULFGG has been strongly supporting the journal Landslides: Journal of the International Consortium on Landslides, published by Springer Nature (https://link.springer.com/journal/10346) since its launch in 2004. ULFGG works for the journal in the roles of reviewers and an associate editor, and regularly publishes its top research results in the journal, as well as disseminates information important for capacity building in landslide risk reduction in the journal.

ULFGG followed the development of the journal from its bibliometric perspective, and compared scientometric impacts of the journal with the other ICL publications (monographs, volumes from World Landslide Forums) in the field of landslide research.

ULFGG also contributed to the two-volume set of Landslide Dynamics: ISDR-ICL Landslide Interactive Teaching Tools (LITT), namely to Volume 1: Fundamentals, Mapping and Monitoring by practice guidelines on monitoring and warning technology for debris flows (https://www.springer.com/gp/book/9783319577739), and to Volume 2: Testing, Risk Management and Country Practices(https://www.springer.com/gp/book/9783319577760) by a state-of-the-art overview on landslide disaster risk reduction in Slovenia, a study on two-dimensional debris-flow modelling and topographic data, and by study on intensity-duration frequency curves for rainfall-induced shallow landslides and debris flows using copula functions.

UNESCO Chair on Water-related Disaster Risk Reduction

Experiences and knowledge accumulated in the past decades at the Chair on Hydrology and Hydraulic Engineering at ULFGG in the field of (applied) hydrology in experimental basins, landslide research, landslide risk reduction, and flood risk management, culminated in 2016 in the establishment of the UNESCO Chair on Water-related Disaster Risk Reduction (WRDRR Chair; www.unesco-floods.eu) at the University of Ljubljana. The UNESCO WRDRR Chair was positively evaluated in 2020 and prolonged for another 4 years (2020–2024). The Chair is associated to the university twinning and networking UNITWIN UNESCO – Kyoto University – ICL on "Landslide and Water-Related Disaster Risk Management".

ULFGG supports activities of the Slovenian National Committee for UNESCO Intergovernmental Hydrological Programme (www.ncihp.si) – focus of the activities is the development of the IHP-IX Programme (2022–2029).

Conclusions

ULFGG as one of World Centres of Excellence in Landslide Risk Reduction, hosts the UNESCO Chair on Water-related Disaster Risk Reduction. ULFGG strongly supports ISDR-ICL Sendai Partnerships 2015–2025 for global promotion of understanding and reducing landslide disaster risk, and its extension to 2030 and beyond: the Kyoto 2020 Commitment for Global Promotion of Understanding and Reducing Landslide Disaster Risk that that was signed in November 2020. ULFGG is proud to be its Official Promoter, and will specifically work for its Actions 2, 5, 6, 9 and 10.

This review contribution is intentionally written without giving references to described activities. For this purpose, listed websites and web search engines may be used.

The author wants to thank numerous colleagues from ULFGG and from the wide ICL community for a long-lasting excellent cooperation with a joint vision to reduce landslide disaster risk.

Marui & Co. Ltd.

Firstname Firstsurname, Secondname Secondsurname

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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 total 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.

In addition, Marui customizes the various testing apparatuses for supporting the product line of infrastructure such as the Fig. 1 shows. Moreover, Marui will continue to support solving the customers’ problems and developing products with added value by utilizing the AI and ecosystem.

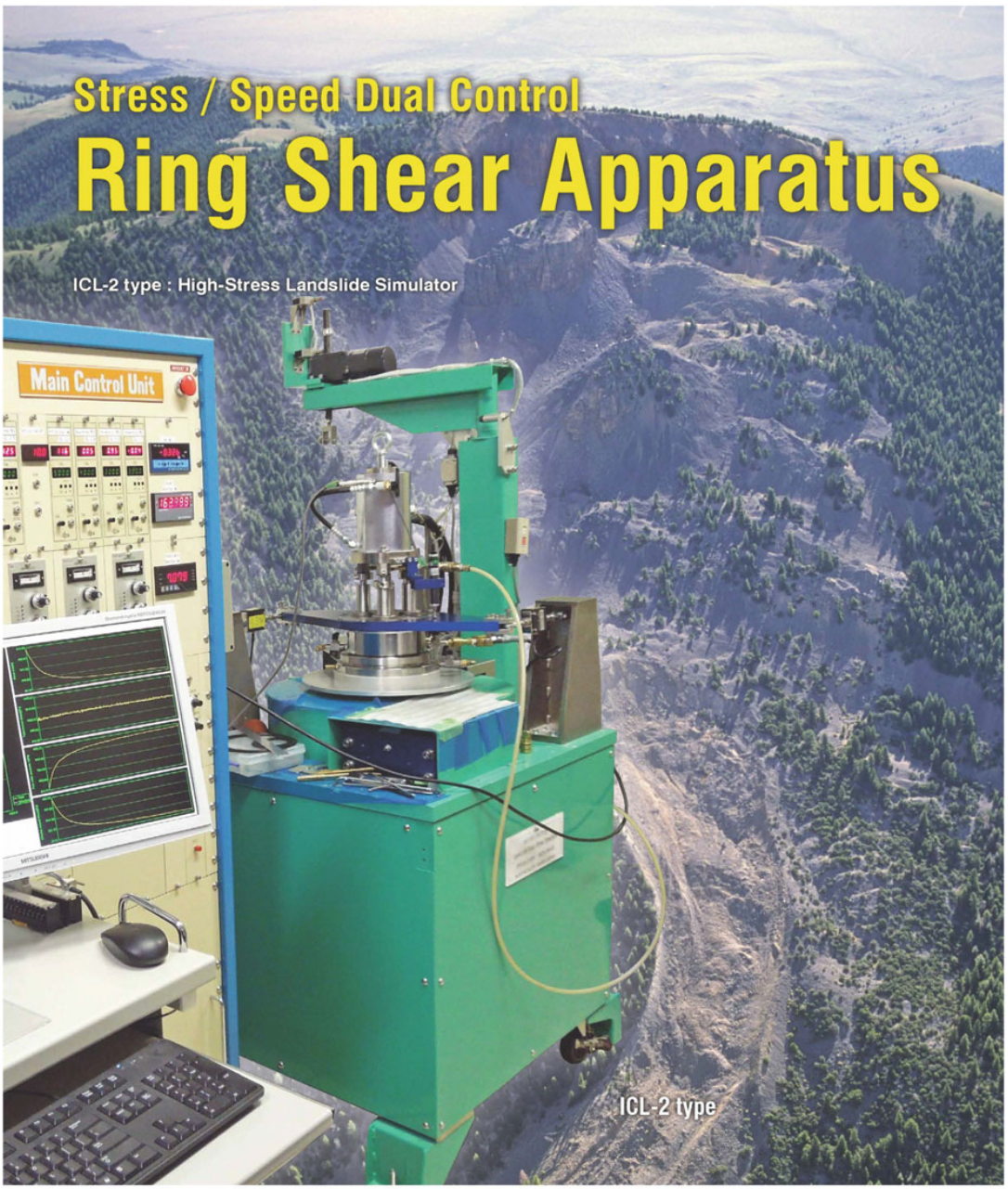

Fig. 2 High stress landslide simulator

Nippon Koei Co., Ltd., Geohazard Management Division

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Introduction

The Nippon Koei Group (NK) has been a leading international consultant in providing engineering consulting services over 5500 multi-disciplinary infrastructure and development projects in 160 countries all over the world (Fig. 1). The landslide prevention specialist team (at present called Geohazard Management Division, Fig. 2) 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. During disasters, we provide experienced professional engineers to quickly make 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.

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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 NIPPON KOEI

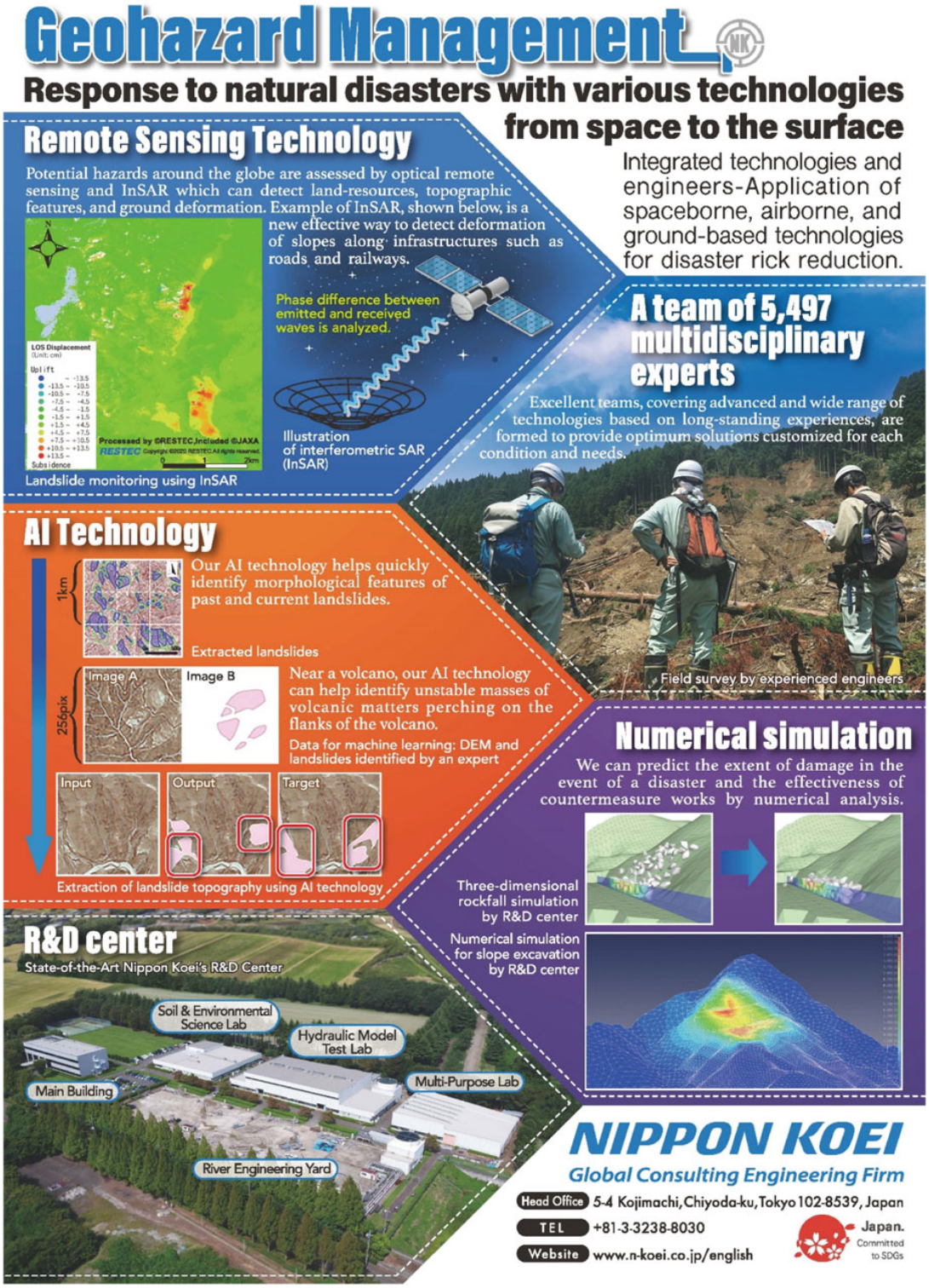

Fig. 2 Geohazard Management Division

Progress in Landslide Research and Technology

-Book Series of the International Consortium on Landslides-

Progress in Landslide Research and Technology is the Open Access book series of the International Consortium on Landslides (ICL). The series provides a common platform for the publication of recent progress in landslide research and technology for practical applications and the benefit for the society contributing to the Kyoto Landslide Commitment 2020, which is expected to continue up to 2030 and even beyond to globally promote the understanding and reduction of landslide disaster risk, as well as to address the 2030 Agenda Sustainable Development Goals. The contributions include the following seven categories:

1. Original articles (minimum 8 pages): Original articles reporting progress of landslide research and technology. Practical application of original scientific findings, technology, equipment, and modelling for landslide disaster risk reduction which were published in the Journal "*Landslides*" or any other publication.
2. Review articles (minimum 8 pages): Review of landslide research and technology in a thematic area of landslides. A review article integrating a series of research and technology of the author or its group.
3. IPL/WCoE/Kyoto Commitment activities (minimum 8 pages): Progress or achievements of the projects of the International Programme on Landslides (IPL) and the World Centres of Excellence on Landslide Risk Reduction (WCoEs), and Kyoto Landslide Commitment.
4. Teaching tools with online extras (minimum 8 pages): User-friendly teaching tools with extras (i.e., photos, illustration, videos, guidelines & manuals) online to fill the gap between the available level of science and technologies and the practical use in the society.
5. Technical note & Case studies (minimum 4 pages): Technical note and case studies on landslides and landslide disaster risk reduction practice.
6. World Landslide Reports (2-4 pages): Landslide reports from landslide-prone developing countries and urbanizing areas of the developed countries from around the world. No processing charge, but limited to approximately 10 reports per issue.
7. Introduction of KLC2020 Official Promoters (1-3 pages): KLC2020 Official Promoters are eligible for this category. The introduction of the official promoters is published throughout the year.

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