The 6th World Landslide Forum (WLF6), Florence, 2023

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Abstract

The 6th World Landslide Forum "Landslides Science for sustainable development" (WLF6; https://wlf6.org) was held in Florence from November 14 to 17, 2023. The Forum was focused on Landslide Science for Sustainable Development, as a contribution to the Kyoto 2020 Commitment for global promotion of understanding and reducing landslide disaster risk (KLC2020). The Forum addressed key aspects related to landslide analysis, landslide monitoring and early warning, landslide modeling, landslide hazard and risk assessment, mitigation techniques, landslide triggering mechanism and climate change. The WLF6 was attended by more than 1200 participants from 61 countries. 853 abstracts were accepted, including 643 oral presentations and 210 e-posters. The 6th World Landslide Forum was awarded the Medal of the President of the Italian Republic, which is awarded for events of great scientific and cultural importance. Furthermore, the Forum was a sustainable event in line with the 2030 Agenda and the Sustainable Development Goals.

Keywords

Landslide · Risk Reduction · World Landslide Forum · KLC2020

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1 Introduction

The 6th World Landslide Forum "Landslides Science for sustainable development" (WLF6) (Fig. 1) was held from November 14 to 17, 2023 in Florence at the Palazzo dei Congressi. The WLF6 was focused on landslide science for sustainable development as a contribution to the Kyoto 2020 Commitment for global promotion of understanding and reducing landslide disaster risk (KLC2020) (Sassa 2021), to the Sendai Landslide Partnerships 2015–2025 (Sassa 2015), the Sendai Framework for Disaster Risk Reduction 2015–2030, the 2030 Agenda Sustainable Development Goals, the New Urban Agenda and the Paris Agreement (Casagli et al. 2022, 2023).

The Forum provided a platform for fruitful collaboration between landslide researchers and stakeholders to define common priority actions for landslide risk reduction at the global level. The Forum addressed key aspects related to landslide analysis, landslide monitoring and early warning, landslide modeling, landslide hazard and risk assessment, mitigation techniques, landslide triggering mechanism and climate change. The 6th World Landslide Forum was attended by a broad international audience interested in landslide disaster risk reduction: research and academic institutions; UN organizations; EU institutions and agencies; national governments and local authorities; non-governmental organizations with an interest in and activities related to disaster risk reduction; international and national civil protection and disaster relief organizations and agencies; and the private sector engaged in research, development and practical application of landslide risk reduction technologies and solutions. In particular, the WLF6 was attended by more than 1200 participants from 61 countries. 853 abstracts were accepted, including 643 oral presentations and 210 e-posters. During the Forum were organized 2 plenary sessions, 48 scientific parallel sessions, and 10 workshops and side events (Table 1).

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B. Abolmasov et al. (eds.), *Progress in Landslide Research and Technology, Volume 3 Issue 2, 2024*, Progress in Landslide Research and Technology, https://doi.org/10.1007/978-3-031-72736-8_17

Fig. 1 WLF6 logo

Table 1 WLF6 in figures

Participants	1202
Countries/Regions	61
Plenary sessions	2
Parallel sessions	48
Oral presentations	643
E-poster presentations	210
Workshops and side events	10
Exhibitors booths	27

The Forum was a sustainable event in line with the 2030 Agenda and the Sustainable Development Goals. The venue (Fig. 2), the Palazzo dei Congressi, is located in the city center of Florence, in a strategic position within walking distance of the city's main attractions. No printed material was provided to the participants. The detailed scientific program, the schedule and all general information were available on the congress app. The program and the proceedings of the

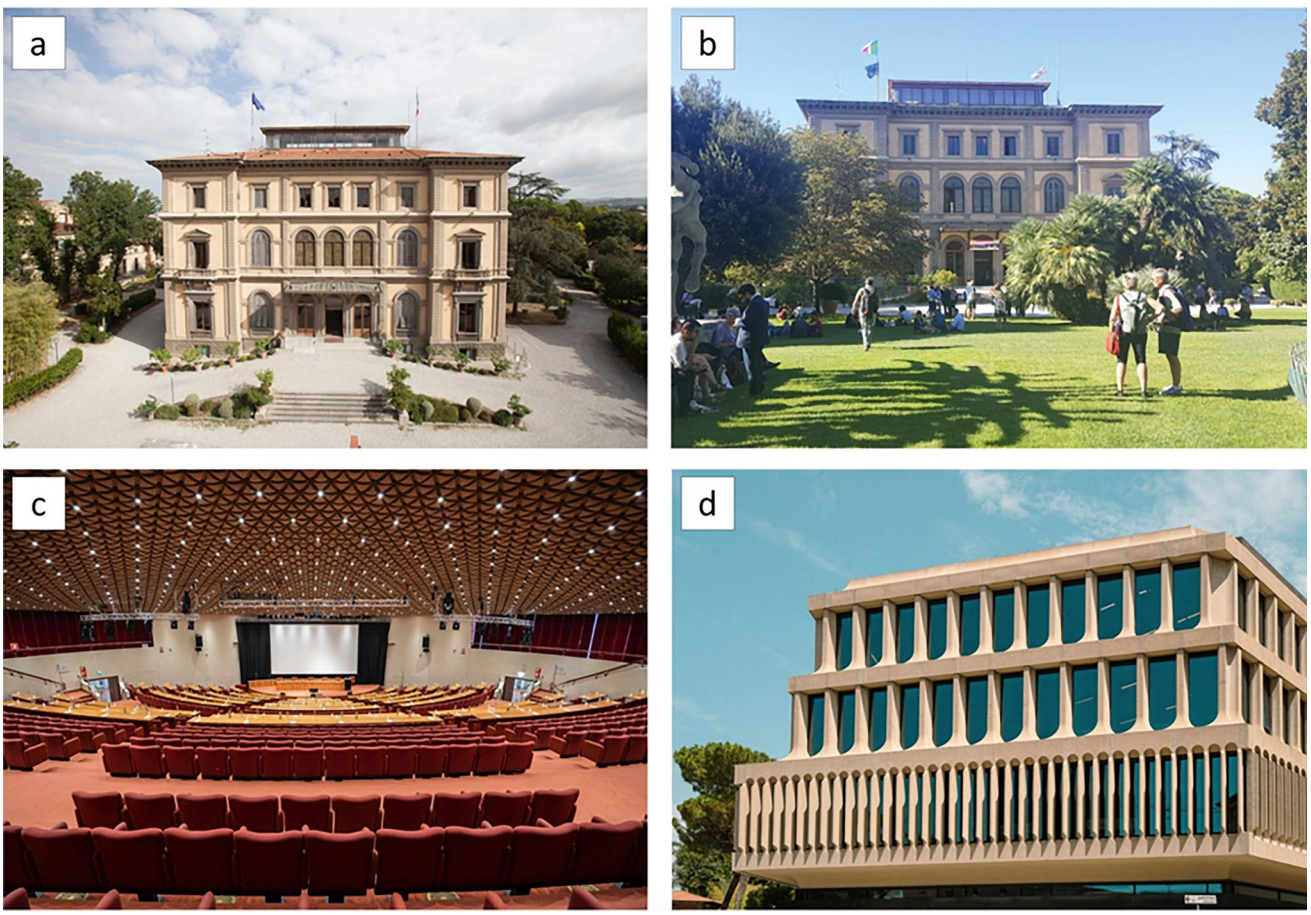

Fig. 2 Congress venue. (**a**) Palazzo dei Congressi, (**b**) Park in front of Palazzo dei Congressi, (**c**) Florence Auditorium for plenary sessions, (**d**) Palazzo degli Affari

Fig. 3 Medal of the President of the Italian Republic

Forum were distributed to the participants in electronic form and can be downloaded from the Forum's website (https://wlf6.org).

The 6th World Landslide Forum was awarded the Medal of the President of the Italian Republic, which is awarded for events of great scientific and cultural importance (Fig. 3).

2 Organizers, Organizing Committees, Patronage, Partners and Sponsors

Organizers

International Consortium on Landslides (ICL).

UNESCO Chair on Prevention and Sustainable Management of Geo-Hydrological Hazards, University of Florence, Italy.

Global Promotion Committee of International Programme on Landslides and KLC 2020 (GPC/IPL-KLC), 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).

Forum Chair

Nicola Casagli, Professor, University of Florence; President of ICL.

Forum Co-chairs

Kyoji Sassa, Professor Emeritus, Kyoto University; Secretary General of ICL).

Paolo Canuti, UNESCO Chair Holder, UNESCO Chair on Prevention and Sustainable Management of Geo-Hydrological Hazards, University of Florence.

Secretary general

Veronica Tofani, Associate Professor, University of Florence, Vice President of ICL.

Secretariat General

It was composed of 16 members from the University of Florence: Domenico Armignacco, Anna Elisa Bandecchi, Tommaso Carlà, Pierluigi Confuorto, Matteo Del Soldato, Elisa Gargini, Teresa Gracchi, Emanuele Intrieri, Silvia Massagni, Massimiliano Nocentini, Teresa Nolesini, Guglielmo Rossi, Melania Scacciati, Gabriele Scaduto, Carlo Tacconi Stefanelli, Luca Tanteri.

International scientific committee

It was composed of 24 members including ICL members and internationally recognized scientists in the field of landslide research and landslide risk reduction: Kyoji Sassa (Kyoto University, Japan; Secretary General of ICL), Matjaž Mikoš (University of Ljubljana, Slovenia), Shinji Sassa (Port and Airport Research Institute, Japan), Khang Dang (Research Promotion Officer, ICL), Veronica Tofani (University of Florence, Italy), Michel Jaboyedoff (University of Lausanne, Switzerland), Jan Klimes (Academy of Sciences, Czech Republic), Hans-Balder Havenith (Liege University, Belgium), Binod Tiwari (California State University, Fullerton, USA), Kazuo Konagai (University of Tokyo, Japan; Principal researcher of ICL Headquarters), Sabatino Cuomo (University of Salerno, Italy), Xuanmei Fan (Chengdu University, China), Paola Reichenbach (Research Institute for Geo-Hydrological Protection—National Research Council, Italy), Snježana-Mihalić Arbanas (University of Zagreb, Croatia), David Huntley (Geological Survey of Canada, Canada), Maneesha V. Ramesh (Amrita University, India), Vít Vilímek (Charles University in Prague, Czech Republic), Alexander Strom (Geodynamics Research Center LLC, Russia), Stefano Luigi Gariano (Research Institute for Geo-Hydrological Protection—National

Research Council, Italy), Dalia Kirschbaum (NASA Goddard Space Flight Center, USA), Zeljko Arbanas (University of Rijeka, Croatia), Fawu Wang (Tongji University, China), Faisal Fathani (University of Gadjah Mada, Indonesia), Beena Ajmera (Iowa State University, USA).

Local organizing committee Chair

Claudio Margottini, Italian Institute for Environmental Protection and Research, Italy.

Local organizing committee

It was composed of 42 members including the members of the ICL Italian network and staff from University of Florence: Federico Agliardi (University of Milano-Bicocca, Italy), Gioacchino Francesco Andriani (University of Bari, Italy), Matteo Berti (University of Bologna, Italy), Silvia Bianchini (University of Florence, Italy), Francesca Bozzano (Sapienza Università di Roma—Istituto Nazionale di Geofisica e Vulcanologia INGV, Italy), Marcello Buccolini (University of Chieti-Pescara, Italy), Domenico Calcaterra (Federico II University of Naples, Italy), Michele Calvello (University of Salerno, Italy), Giovanna Capparelli (University of Calabria, Italy), Filippo Catani (University of Padua, Italy), Corrado Cencetti (University of Perugia, Italy), Alessandro Chelli (University of Parma, Italy), Giovani Crosta (University of Milano-Bicocca, Italy), Alessandro Corsini (University of Modena and Reggio Emilia, Italy), Sabatino Cuomo (University of Salerno, Italy), Carlo Esposito (Sapienza Università di Roma, Italy), Riccardo Fanti (University of Florence, Italy), Anna Maria Ferrero (University of Turin, Italy), Paolo Frattini (University of Milano-Bicocca, Italy), Giandomenico Fubelli (University of Turin, Italy), Antonio Galgaro (University of Padova, Italy), Stefano Luigi Gariano (Research Institute for Geo-Hydrological Protection—National Research Council, Italy), Monica Ghirotti (University of Ferrara, Italy), Giovanni Gigli (University of Florence, Italy), Francesco Maria Guadagno (University of Sannio, Italy), Giuseppe Mandrone (University of Turin, Italy), Claudia Meisina (University of Pavia, Italy), Sandro Moretti (University of Florence, Italy), Mario Parise (University of Bari, Italy), Dario Peduto (University of Salerno, Italy), Antonella Peresan (National Institute of Oceanography and Applied Geophysics, Italy), Federico Raspini (University of Florence, Italy), Paola Revellino (University of Sannio, Italy), Gabriele Scarascia Mugnozza (Sapienza Università di Roma, Italy), Nicola Sciarra (University of Chieti-Pescara, Italy), Andrea Segalini (University of Parma, Italy), Samuele Segoni (University of Florence, Italy), Vincenzo Simeone (Politecnico di Bari, Italy), Daniele Spizzichino (Italian Institute for Environmental Protection and Research, Italy), Paola Reichenbach (Research Institute for Geo-Hydrological Protection—National Research Council, Italy), Damiano Vacha (University of Turin, Italy), Pasquale Versace (University of Calabria, Italy).

Medal and Patronage

The WLF6 has received the Medal of the President of the Italian Republic (Fig. 3) the patronage from five Italian Ministries (Fig. 4):

- Ministero delle Infrastrutture e dei Trasporti,
- Ministero dell'Interno,
- Ministero dell'Agricoltura della Sovranità Alimentare e delle Foreste,
- Ministero dell'Ambiente e della Sicurezza Energetica,
- Ministro per la Protezione Civile e le Politiche del Mare—Presidenza del Consiglio dei Ministri,

and the patronage from 37 public institutions (Fig. 4): Dipartimento della Protezione Civile—Presidenza del Consiglio Dei Ministri, Dipartimento Casa Italia—Presidenza Del Consiglio Dei Ministri, Dipartimento per la Trasformazione Digitale—Presidenza Del Consiglio Dei Ministri, Regione Toscana, Comune di Firenze, Città Metropolitana di Firenze, Anci Toscana, Università degli Studi di Firenze, Consiglio Nazionale dei Geologi (CNG), Consiglio Nazionale degli Ingegneri (CNI), Consiglio Nazionale degli Architetti Pianificatori Paesaggisti e Conservatori (CNAPPC), Consiglio Nazionale Geometri e Geometri Laureati, Consiglio dell'Ordine Nazionale dei Dottori Agronomi e dei Dottori Forestali (CONAF), Corpo Nazionale Soccorso Alpino e Speleologico (CNSAS), Consiglio Nazionale delle Ricerche (CNR), Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA), Istituto Nazionale di Geofisica e Vulcanologia (INGV), Istituto Nazionale di Fisica Nucleare (INFN), Agenzia Spaziale Italiana (ASI), Istituto Nazionale di Oceanografia e di Geofisica Sperimentale (OGS), Area Science Park, Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC), Consorzio Cineca, Rai Cultura, Fondazione Earth And Water Agenda (EWA), Autorità di Bacino Distrettuale del Fiume Po, Autorità di Bacino Distrettuale Appennino Settentrionale, Autorità di Bacino Distrettuale Appennino Centrale, Autorità di Bacino Distrettuale Appennino Meridionale, Associazione Nazionale Consorzi Gestione e Tutela del Territorio e Acque Irrigue (ANBI-Toscana), Confindustria Firenze, Camera di Commercio di Firenze.

Partners

The Forum has received the partnership from 19 national and international associations (Fig. 5): International Consortium on Geo-Disaster Reduction (ICGDR), Global Alliance of Disaster Research Institutes (GADRI), International Association of Geomorphologists (IAG/AIG), RETURN—Multi-Risk Science for Resilient Communities Under a Changing Climate, Landaware, Alert Geomaterials,

Fig. 4 WLF6 Patronage

International Association for Engineering Geology and the Environment—Gruppo Nazionale Italiano (IAEG-Italia), Associazione Italiana di Geologia Applicata e Ambientale (AIGAA), Associazione Italiana di Geografia Fisica e Geomorfologia (AIGEO), Gruppo Italiano della Associazione Internazionale degli Idrogeologi (IAH-Italy), Società Geologica Italiana (SGI), Associazione Geotecnica Italiana (AGI), Società Italiana di Geologia Ambientale (SIGEA), Associazione Italiana per lo Studio del Quaternario (AIQUA), Associazione Italiana di Ingegneria Agraria (AIIA), Società Idrologica Italiana (SII), Sezione Italiana European Association of Geoscientists and Engineers—

Fig. 5 WLF6 partners

Society Of Exploration Geophysicists (EAGE-SEG), Gruppo Italiano di Idraulica (GII), Legambiente.

Sponsors and Exhibitors

There were 21 WLF6 sponsors (Fig. 6): Hexagon (Platinum Sponsor); LiSALab—Ellegi s.r.l. (Gold Sponsor); ESA, MicroGeo s.r.l., Rete Ferroviaria Italiana s.p.a., TRE Altamira (Silver Sponsors); ANBI Toscana, CAE, CNR, EcorisQ, e-GEOS, Geobrugg, Hortus, IAEG, INGV, Maccaferri, NHAZCA, OGS, Planetek Italia, Spektra, Winet s.r.l. (Bronze Sponsors).

At the WLF6 Technical Exhibition there were 27 exhibitors: the 21 sponsors and CSG, Georisk Engineering, ISPRA, METER, Sistematica s.p.a., Studio Pandolfi (Fig. 6).

Fig. 6 WLF6 Sponsors and exhibitors

3 Programme

The Forum was scheduled for November 14–17, 2023 (Table 2).

November 13 was dedicated to the ICL/IPL meeting. The Opening Plenary Session took place on November 14 (Table 3).

Parallel Scientific Sessions were held from November 15 to 17, organized in the following scientific themes:

- Theme 1: Kyoto Landslide Commitment for sustainable development (Coordinators: Kyoji Sassa, Matjaž Mikoš, Shinji Sassa, Khang Dang).

Table 2 WLF6 programme at a glance

Day	Morning 8:30–13:00	Afternoon 14:30–18:00	Evening
Mon. 13th		ICL/IPL Meeting	
Tue. 14th	Opening Ceremony and High-Level Panel Discussion	Keynote Lectures and Awards Ceremony	Welcome Cocktail
Wed. 15th	Parallel Sessions	Parallel Sessions	
Thu. 16th	Parallel Sessions	Parallel Sessions	Banquet
Fri. 17th	Parallel Sessions	Parallel Sessions and Closing Ceremony	

- Theme 2: Remote sensing, monitoring, and early warning (Coordinators: Veronica Tofani, Michel Jaboyedoff, Jan Klimeš, Hans-Balder Havenith).
- Theme 3: Testing, modeling, and mitigation technique (Coordinators: Binod Tiwari, Kazuo Konagai, Sabatino Cuomo, Xuanmei Fan).
- Theme 4: Mapping, hazard, risk assessment and management (Coordinators: Paola Reichenbach, Snježana Mihalić Arbanas, David Huntley, Maneesha V. Ramesh).
- Theme 5: Climate change, extreme weather, earthquakes, and landslides (Coordinators: Vít Vilímek, Alexander Strom, Stefano Luigi Gariano, Dalia Kirschbaum).
- Theme 6: Progress in landslide science and applications (Coordinators: Zeljko Arbanas, Fawu Wang, Faisal Fathani, Beena Ajmera).

For each theme, several sessions were proposed. In total, 48 scientific sessions were organized, 643 oral presentations were delivered, and 210 e-posters were presented; the final list of the sessions with number of oral and e-poster presentations is reported in Table 4. The scientific sessions, to which only a few contributions were received, were cancelled and the contributions were moved to other sessions.

The WLF6 Proceedings can be freely downloaded from: https://wlf6.org/wp-content/uploads/2023/12/WLF6_ABSTRACT-BOOK_FINAL.pdf.

Ten workshops and side events were organized during the Forum, from November 13 to November 18 (Sect. 5).

The Closing Plenary Session took place on November 17 in the afternoon (Table 5).

During the KLC2020 General Conference 2023 and Panel Discussion (Fig. 7), the Florence Declaration on risk reduction has been adopted. The declaration is a further commitment to KLC2020, in order to share information and best practices, support research and development of new technologies, and build capacity at all levels to improve landslide preparedness and response.

The full text of the Florence Declaration is reproduced in Fig. 8 and it is also available at: https://wlf6.org/florence-declaration/.

In the afternoon session four Forum lectures were delivered from Olivier Dewitte, Xuanmei Fan, Jonathan Godt and Giovanni Battista Crosta (Fig. 9).

Table 3 WLF6 opening plenary session

9:00–10:30	**OPENING CEREMONY** Chairs: **Kyoji Sassa**—ICL Secretary General and **Veronica Tofani**—ICL Vice President and WLF6 Secretary General
9:00–9:10	**Opening address from the primary organizers** **Nicola Casagli**—ICL President and Chair of the 6th WLF **Paolo Canuti**—UNESCO Chairholder prevention and sustainable mitigation of geo-hydrological hazard
9:10–9:35	**Greetings from United Nations organizations** **Tshilidzi Marwala**—Under-Secretary-General of the United Nations / Rector of the United Nations University **Mami Mizutori**—UN Special Representative of the Secretary-General for Disaster Risk Reduction **Qu Dongyu**—Director-General of the Food and Agriculture Organization FAO **Elena Manaenkova**—Deputy Secretary-General of the World Meteorological Organization WMO **Lidia Brito**—Assistant Director-General for Natural Sciences of United Nations Educational, Scientific and Cultural Organization UNESCO
9:35–9:55	**Greetings from scientific organizations** **Motoko Kotani**—Vice-President for Science and Society of the International Science Council ISC **Mustafa B. Shehu**—President of the World Federation of Engineering Organizations WFEO **John Ludden**—President of the International Union of Geological Sciences IUGS **Chris Rizos**—President of the International Union of Geodesy and Geophysics IUGG
9:55–10:30	**Welcome messages from host organizations in Italy** **Marco Pierini**—Vice Rector of Florence University **Nello Musumeci**—Minister for Civil Protection **Anna Maria Bernini**—Minister of University and Research **Gilberto Pichetto Fratin**—Minister of Environment
10:30–11:00	**COFFEE BREAK**
11:00–13:00	**KLC2020 GENERAL CONFERENCE 2023 & HIGH-LEVEL PANEL DISCUSSION** Chairs: **John Ludden**—IUGS President
11:00–11:10	**Opening of the KLC2020 General Conference 2023** **John Ludden**—IUGS President and Chair of KLC2020 General Conference 2023
11:10–11:30	**Signing ceremony of new KLC2020 signatories** **Kyoji Sassa**—Secretary General of KLC2020 *Introduction of new KLC2020 partners:* **Zhimin Wu**—Director, Forestry Division at FAO **John Ludden**—President, International Union of Geological Sciences (IUGS) **Fawu Wang**—Professor, Tongji University, China **Jian Guo**—Professor, Tsinghua University, China **Huiming Tang**—Vice-President, China University of Geosciences, China **Rajendra Ratnoo**—Director, National Institute of Disaster Management (NIDM), India **Kaoru Takara**—President, National Research Institute for Earth Science and Disaster Resilience (NIED), Japan **Taichi Minamitani**—Director, Disaster Risk Reduction Team 1, Global Environment Department, Japan International Cooperation Agency (JICA), Japan **Shinji Sassa**—Head, Soil Dynamics Group, National Institute of Maritime, Port and Aviation Technology, Japan **Katsuo Sasahara**—Professor, Kochi University, Japan **Ryosuke Seko**—Director, Chuo Kaihatu Cooperation, Japan **Yoshiyuki Yagiura**—President, Kiso-Jiban Consultants Co., Ltd., Japan **Julijana Bojadjieva**—Macedonian Association for Geotechnics, North Macedonia **Jagath Gunatilake**—Director, Engineering Geology Research Group (EGRG), University of Peradeniya, Sri Lanka **Jonathan Chambers**—United Kingdom Research and Innovation as represented by the British Geological Survey, UK **Beena Ajmera**—Iowa State University, USA
11:30–12:45	**High-Level Panel discussion "KLC2020 Review and way forward"** Chairs: **Matjaž Mikoš and Qunli Han**—Global Promotion Committee of IPL and KLC2020 Panelists from KLC2020 partners: **Thomas Hofer**—Senior Forestry Officer at FAO **Yuki Matsuoka**—Head UNDRR office in Japan **Soichiro Yasukawa**—Chief of Disaster Risk Reduction Unit at UNESCO **Satoru Nishikawa**—International Institute of Disaster Science **Alexander Rudloff**—Secretary General of IUGG **Hiroshi Kitazato**—Treasurer of IUGS **Fabrizio Curcio**—Department of Civil Protection Italian Government **Stefano Laporta**—ISPRA, Geological Survey of Italy **Nicola Casagli**—ICL President and Chair of the 6th WLF *Explanation of the Florence Declaration*
12:45–12:50	**Adoption of the Florence Declaration on Landslide Risk Reduction** **John Ludden**—IUGS President and Chair of KLC2020 General Conference 2023

(continued)

Table 3 (continued)

12:50–13:00	**Joint photo of the panelists and the new KLC2020 signatories**
13:00–14:00	**LUNCH BREAK**
14:00–16:00	**WLF6 PLENARY LECTURES** **Chairs: Fausto Guzzetti—National Research Council and Vít Vilímek—ICL Vice-President**
14:00–14:30	**Olivier Dewitte—Royal Museum for Central Africa** **Landslides in tropical environments: insight from the East African Rift**
14:30–15:00	**Xuanmei Fan—Chengdu University of Technology** **Mechanisms and prediction of earthquake and climate change induced cascading hazards**
15:00–15:30	**Jonathan Godt—USGS** **New US National Strategy for Landslide Loss Reduction**
15:30–16:00	**Giovanni B. Crosta—Università degli Studi di Milano Bicocca** **Landslides impact on structures and infrastructures**
16:00–16:30	**COFFEE BREAK**
16:30–18:00	**RECOGNITION AND AWARDS CEREMONY** **Chairs: Peter Bobrowsky—Chair IPL Awards Committee and Irasema Alcántara Ayala—Chair IPL Evaluation Committee**
16:30–17:00	**World Centers of Excellence on Landslide Risk Reduction** • Institute of Cold Regions Science and Engineering, Northeast Forestry University, China • Croatian Landslide Group, Croatia • Charles University, Czech Republic • National Institute of Disaster Management (NIDM), India • Amrita Vishwa Vidyapeetham, Amritapuri campus, India • Universitas Gadjah Mada, Indonesia • University of Calabria (UNICAL), Italy • UNESCO Chair on Prevention and Sustainable Management of Geo-Hydrological Hazards, University of Florence, Italy • CERI—Centre for Research on Prediction, Prevention, and Mitigation of Geological Risks, Italy • Institute of Geography, National Autonomous University of Mexico (UNAM), Mexico • JSC "Hydroproject Institute", Russia • Laboratory of Engineering Geodynamics, Department of Engineering and Ecological Geology, Faculty of Geology, Moscow State University, Russia • University of Belgrade, Faculty of Mining and Geology, Belgrade, Serbia • University of Ljubljana -Faculty of Civil and Geodetic Engineering (UL FGG) and the UNESCO Chair on Water-related Disaster Risk Reduction (WR DRR), Ljubljana, Slovenia • Engineering Geology Research Group (EGRG), Department of Geology, University of Peradeniya, Sri Lanka • British Geological Survey, U.K.
17:00–17:30	**Varnes Medals** **Charles Ng**—Hong Kong University of Science and Technology—*2022 Medal* **Edward N. Bromhead**—formerly Kingston University UK—*2022 Medal* **Irasema Alcántara-Ayala**—National Autonomous University of Mexico—*2023 Medal*
17:30–17:40	**IPL-KLC Award for Success** **Maneesha V. Ramesh**—*2021-2023 Award*
17:40–17:50	**Hiroshi Fukuoka IPL Award** **Vít Vilímek** and **Jan Klimeš**—Charles University—*2021-2023 Award*
17:50–18:00	**Oldrich Hungr Awards** **Clarence Choi**—University of Hong Kong—*2022 Award* **Tommaso Carlà**—University of Florence—*2023 Award*
18:00–19:00	**WELCOME COCKTAIL**

Table 4 WLF6 scientific sessions, number of oral and e-poster presentations

Theme and session number—Title	Conveners	Presentations	
		Oral	E-poster
1.1—International programme on landslides and global and international activities for KLC2020	K. Sassa, M. Mikoš, I. Alcantara-Ayala, Q. Han, K. Konagai, C. Margottini, S. Mihalić Arbanas	23	3
1.3—Cascading multi-hazard risks: submarine landslides, tsunamis, and impacts on infrastructures	S. Sassa, D. Tappin, F. Løvholt	14	2
1.4—Landslides and society: cultural, educational, ethical and social aspects in sustainable landslide risk reduction	M. Mikoš, I. Alcántara-Ayala, B. Ajmera, P.T. Bobrowsky, G. Di Capua, C. Margottini, S. Peppoloni	15	9
1.7—Cultural heritage threatened by landslides: from earth observation and in situ investigation to sustainable mitigation measures	C. Margottini, W. Frodella, D. Spizzichino, J.I. Gallego Revilla, S. Morelli, R. Bonì, R.M. Mateos Ruiz	9	8

(continued)

Table 4 (continued)

Theme and session number—Title	Conveners	Presentations	
		Oral	E-poster
1.9—Landslides and other ground failures triggered by the february 6, 2023 M 7.7 and M 7.6 Turkey-Kahramanmaras earthquakes	C. Gokceoglu, J. Wasowski, T. Gorum, K. Onder Çetin, C. Margottini	5	0
2.1—Case studies and state of the art on landslide monitoring	P. Marr, T. Glade, C. Massey, D. Kirschbaum, R.W.M. Cheung	26	14
2.2—Integrated application of deformation monitoring techniques and process analyses of deep-seated landslides	C. Fey, C. Rechberger, C. Crippa, L. Vick	14	7
2.3—Proactive risk management based on innovative monitoring methods	D. Giordan, L.H. Blikra, G.B. Crosta, J.-P. Malet, N.J. Rosser	7	1
2.4—Multiplatform and multisensor applications for landslides characterization and monitoring	G. Rossi, S. Karantanellis, L. Loiotine, C. Tacconi Stefanelli, F. Mugnai, M. Mulas	14	5
2.5—Geophysical imaging, close-range sensing and geomodelling of landslide processes	H.-B. Havenith, V. Pazzi, S. Martino, A.-S. Mreyen, R. Schlögel	11	4
2.7—Investigation of mass movements in alpine environments with remote sensing methods	F. Agliardi, B. Dini, M. Jacquemart, A. Manconi, A. Mondini	12	8
2.8—Earth observation data for landslide prediction and risk assessment	M.T. Brunetti, G. Amarnath, S. Peruccacci, T. Stanley, L. Brocca	7	0
2.9—Past, present and future of satellite interferometry for landslides	M. Del Soldato, L. Solari, G. Bru, Q. Meng, R.M. Palau Berastegui	21	3
2.10—Soil moisture and rainfall measured through remote sensing for monitoring and predicting landslides	M. Bordoni, L. Ciabatta, E. Volpe, T. Stanley	7	2
2.11—Enhancements in landslide data analysis for improved understanding, forecasting and early warning systems	K. Sasahara, M. Hendry, E. Intrieri, R. Macciotta Pulisci, D. Elwood,	13	5
2.12—Landslide early warning systems: innovations and applications	S. Segoni, M. Stähli, N. Satyam, A. Patton, L. Piciullo, G. Devoli	21	10
3.1—Recent advancement in laboratory and in-situ testing methods for landslide and slope analyses	B. Tiwari, B. Ajmera	15	5
3.2—Natural field laboratories on landslides	S. Martino, D. Bakun-Mazor, C. Colombero, M. Ziegler	11	1
3.3—Recent advancement on slope stability and deformation analysis	B. Tiwari, B. Ajmera	14	1
3.4—Physical and numerical modelling of Landslide-Structure-Interaction (LSI)	S. Cuomo, M. Martinelli, V. Thakur, C. Choi	14	2
3.5—Rock falls and rock avalanches	G. Crosta, F. Bourrier, A. Giacomini, S. Pudasaini	18	7
3.6—Landslides prediction: advanced techniques and alternative data sources for uncertainty assessment and reduction	D.J. Peres, F. Marra, E. Leonarduzzi, C. Zhao, B. Mirus	12	2
3.7—Advancements in landslide and debris flow mitigation using geosynthetics and other solutions	K. Konagai, B. Tiwari, J. Jokela, D. Cazzuffi, S. Cuomo, Z. Arbanas	10	0
3.9—Geotechnical mitigation of landslide hazard through nature-based solutions (nbs)	M. Uzielli, V. Capobianco, F. Preti, L. Borselli	10	0
4.1—Regional and global landslide inventories: parameters and principles of compilation	A. Dufresne, X. Fan, A. Strom	12	5
4.2—Spatial landslide assessments and beyond: new challenges in mapping, modelling, validation and scenario building	T. Glade, H. Petschko, S. Steger, B. Carvalho Vieira, S. Pereira	28	14
4.3—Weak points in landslide susceptibility modelling	T. Bornaetxea, A. Braun, I. Marchesini	17	4
4.4—Shallow landslides: monitoring, modeling, predicting	M. Bordoni, R.J. Marin, S. Moreiras, J. Dou	10	5
4.5—Rockfall data: collection methods, analysis and use for hazard and risk assessments	M. Rossi, S. Melzner	15	9
4.6—Landslides in urban environments	R.M. Mateos Ruiz, R. Sarro, E. Poyiadji, M. Jemec-Auflič	16	5
4.8—Landslide impacts, vulnerability and quantitative risk assessments of people, communities, structures, and infrastructure	D. Peduto, O. Mavrouli, M. Winter, P. Salvati	29	10
4.9—Land use and slope management practices with landslide occurrence: past, recent and future challenges and adaptation strategies	C. Meisina, T. Glade, F. Catani, Y. Bamutaze	11	0

(continued)

Table 4 (continued)

Theme and session number—Title	Conveners	Presentations	
		Oral	E-poster
4.10—Landslide risk management: the challenges of transdisciplinary research in data-scarce environments	M. Micu, O. Dewitte, O. Ivanik, T. Shevchenko, J. Uwihirwe, V. Zumpano	7	0
4.11—Assessing geohazards of submarine landslides: where are we? and what are we missing?	S. Ceramicola, M. Urlaub, N. Scarselli, L. Chiocci, G. Ercilla	8	6
5.1—Landslides and climate change: processes, trends, challenges and perspectives	C. Camera, G. Rianna, M. Böhme, A. Reder, G.M. Stock	7	9
5.2—Landslides in the cold regions and extremes	C. Morin, M. Jacquemart, J. Blahůt, G. Magnarini, D. Dräbing, S. McColl	15	3
5.3—Towards a holistic understanding of landslide-induced disaster cascades in the Himalayas	S. Sen, U. Ozturk, R. Shukla, K. Cook, S. Srikrishna	7	2
5.4—Wildfire, erosion and landslide in the framework of global warming: civil protection and land management aimed at mitigation of effects on slopes induced by extreme events	G. Mandrone, D. Peduto	10	1
5.5—Advances in earthquake-induced landslide research	P. Frattini, H.-B. Havenith, G. Forte, O. Marc, S. Martino	23	3
5.6—Landslides, earth dam and levee failures during recent extreme precipitation events	D. Pradel, N.H. Jafari, M. Pando, K.S Hughes Merz, A. Morales	6	0
5.7—Timescales in evolving landscapes affecting landslide hazard and risk	Y. Zhang, D. Yue, M. Winter, T. Dijkstra, G. Chen	11	6
6.1—Advances in understanding and modelling the internal and surface deformation of landslides	L. Guerriero, L. Borgatti, D. Di Martire, M. Francioni, D. Stead	22	8
6.4—Machine learning applications in landslide science	F. Catani, X. Fan, B. Pradhan, C. Van Westen, A.P. Yunus	18	6
6.5—Hydrological monitoring, modelling, and analysis of rainfall-induced landslides	B. Mirus, L. Piciullo, E. Leonarduzzi, M. V. Ramesh, W.L. Liang, P. De Vita	9	4
6.6—Advances in understanding, quantifying and modeling the contribution of plants to slope stability	E.B. Masi, W. Wu, M. Bordoni, M. Moscariello, J.P. Galve	7	3
6.7—4D high-resolution topographic surveys to support the analysis of slope instability processes in high-steep slope agricultural and forested landscapes	S. Cucchiaro, E. Arnone, A. Beinat, P. Tarolli	6	0
6.8—Landslides in subaerial and subaqueous volcanic environments	F. Di Traglia, L. Borselli, I. Manzella, L.N. Schaefer, M. Urlaub	9	0
6.9—Landslide studies in Italy: state of the art and future perspectives	P. Revellino, D. Calcaterra, V. Tofani, A. Cevasco, M. Francioni	18	5

Table 5 WLF6 closing plenary session

16:00–17:00	**CLOSING CEREMONY** Chairs: **Snježana Mihalić Arbanas**—Chair ICL Network Committee and **Faisal Fathani**—ICL Vice-President
16:00–16:10	**Bestow of WLF6 PhD Award** for the best oral presentation held by a PhD student
16:10–16:30	**Speech by the WLF6 Forum Chair and Certificates to new ICL Members** **Nicola Casagli**—ICL President and Chair of the 6th WLF
16:30–16:50	**Speech by the new ICL President and Introduction of the new ICL officers** **Željko Arbanas**—ICL Incoming President
16:50–17:00	**Welcome Address to WLF7** **Jia-Jyun Dong and Chih-Chung Chung**—Chair and Organizer of the 7th World Landslide Forum

During the recognition and awards ceremony, the following institutions were recognized as World Centers of Excellence on Landslide Risk Reduction for their great efforts and important results in this field: Institute of Cold Regions Science and Engineering, Northeast Forestry University, China; Croatian Landslide Group, Croatia; Charles University, Czech Republic; National Institute of Disaster Management (NIDM), India; Amrita Vishwa Vidyapeetham, Amritapuri campus, India; Universitas Gadjah Mada, Indonesia; University of Calabria (UNICAL), Italy; UNESCO Chair on Prevention and Sustainable Management of Geo-Hydrological Hazards, University of Florence, Italy; CERI—Centre for Research on Prediction, Prevention, and Mitigation of Geological Risks, Italy; Institute of Geography, National Autonomous University of Mexico (UNAM), Mexico; JSC "Hydroproject Institute", Russia; Laboratory of Engineering Geodynamics, Department of Engineering and Ecological Geology, Faculty of Geology, Moscow State University, Russia; University of Belgrade, Faculty of Mining and Geology, Belgrade, Serbia; University of Ljubljana -Faculty of Civil and Geodetic Engineering (UL FGG) and the UNESCO Chair on Water-

Fig. 7 Joint photo of the panelists and the new KLC2020 signatories

related Disaster Risk Reduction (WR DRR), Ljubljana, Slovenia; Engineering Geology Research Group (EGRG), Department of Geology, University of Peradeniya, Sri Lanka; British Geological Survey, U.K. (Fig. 10).

During the awards ceremony, the Varnes Medal, the Hungr Award, the Fukuoka Award and the IPL-KLC Award for Success were presented.

The Varnes Medal 2022 was awarded to Prof. Edward N. Bromhead (Fig. 11a) and Prof. Charles Ng (Fig. 11b), the Varnes Medal 2023 to Prof. Irasema Alcántara-Ayala (Fig. 11c).

The Hiroshi Fukuoka IPL Award went to Prof. Vít Vilímek and Prof. Jan Klimeš (Fig. 12).

The Oldrich-Hungr Awards for 2022 and 2023 were presented to Clarence Choi (Fig. 13a) and Tommaso Carlà (Fig. 13b), respectively, while the 2023 IPL-KLC Award for Success was presented to Maneesha V. Ramesh (Fig. 13c).

6th WORLD LANDSLIDE FORUM
2023 FLORENCE ITALY

2023 Florence Declaration on Landslide Risk Reduction

Preamble

We, the representatives of the global landslide community, gathered in Florence, Italy, for the 6th World Landslide Forum (WLF6) from 14 to 17 November 2023, have focused on Landslide Science for Sustainable Development by providing a common platform to foster cooperation among landslide scientists, engineers, practitioners, policymakers, and other stakeholders to define shared priority actions for landslide risk reduction at the global level. Additionally, we have addressed key aspects of landslide risk reduction, including monitoring and early warning, modelling, hazard and risk assessment, mitigation techniques, triggering mechanisms, relationships with climate change, landslide risk dialogue, and capacity building for social resilience as a part of intra-sectoral multi-hazard governance.

Landslides significantly threaten communities and individuals, causing loss of life and damage to property, infrastructure, economy, and cultural, natural and environmental heritage in all types of terrains and conditions. People most affected by landslide disasters are disproportionately the poor, the marginalized, and the vulnerable, especially women and children. Like other hazards, the adverse impact of landslides undermines efforts to achieve Sustainable Development Goals (SDGs) by 2030.

As climate change is expected to increasingly affect the frequency, magnitude, and extent of heavy rainfall, forest fires, snow and ice melt, and permafrost degradation, the potential for landslides is increased at local and regional levels. Likewise, population growth and development in mountainous, steep, and coastal areas, including infrastructure construction and urban expansion due to population shifts and growth, dramatically increase exposure to landslide hazards. Moreover, the combined effects of triggering factors, including rainfall, snow and ice melt, earthquakes, volcanic eruptions, and human activity can lead to major impacts from catastrophic landslides such as debris flows, rockfalls, rockslides, lahars, and megaslides.

Therefore, understanding landslide disaster risk requires an integrated multi-hazard and multi-sectoral approach that focuses on social and institutional vulnerability to formulate effective risk management policies. In the same way, landslide disaster risk can be effectively reduced through, *inter alia*, land use and urban planning, building codes, risk assessment, early warning systems, legal and policy developments, integrated research, insurance, and, most importantly, risk education and awareness at all levels, building together an effective landslide disaster risk governance.

The effectiveness of landslide disaster risk reduction actions depends on scientific, technological, and social developments to understand the components of disaster risk, including causes and

Fig. 8 Florence Declaration

triggering mechanisms, multi-hazard, cascading effects, vulnerability, exposure, public awareness, and community resilience. This goes hand in hand with capacity building and the production of freely available educational publications and tools, supported by multi-sector, bottom-up, and top-down collaboration between governments at all levels, civil society, and scientific communities, to reduce landslide disaster risk.

In view of the former considerations, the WLF6 community COMMITS to support efforts that:

1) foster understanding and reduce the risk of landslide disasters worldwide;
2) share information and best practices, support research and development of new technologies, and build capacity at all levels to improve preparedness and response to a landslide disaster;
3) pursue and support the further implementation of the Kyoto 2020 Commitment for Global Promotion of Understanding and Reducing Landslide Disaster Risk (KLC2020) by continuing to reduce the risk and impact of landslides on the environment and society, and working with all stakeholders to make further progress in the coming years;
4) work together to raise awareness of the risks posed by landslides and promote the implementation of effective mitigation and adaptation measures, including early warning systems, safe land use planning, sustainable land management practices, risk education and awareness;
5) initiate and promote the process to organize the 7th World Landslide Forum (WLF7) in 2026 by mobilizing a medium and long-term global alliance to accelerate and incentivize landslide risk reduction actions as defined in KLC2020; and
6) submit the 2023 Florence Declaration on Landslide Risk Reduction to UNDRR for endorsement as a further commitment from the global landslide community to the Sendai Framework for Disaster Risk Reduction 2015-2030.

We CALL on:

a) new competent global, regional, national, and local institutions and entities to join and support the KLC2020 initiative as an engagement 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;
b) landslide scientists, researchers, engineers, practitioners, policy makers, and other stakeholders to contribute to the open access book series Progress in Landslide Research and Technology, the Landslide journal and other ICL publications;
c) all stakeholders to join us in this effort and recognize the critical role of understanding and reducing landslide disaster risk in creating a safer and more sustainable future for all; and
d) related governmental, non-governmental, and international programs and initiatives from the natural, engineering, human, social, and economic sciences, both public and private, to further promote science and technology and their applications for landslide disaster risk reduction by supporting and joining KLC2020.

Adopted in Florence, Italy, 14 November 2023

Fig. 8 (continued)

Fig. 9 Plenary lecturers Prof. Olivier Dewitte (**a**), Prof. Xuanmei Fan (**b**), Prof. Jonathan Godt (**c**) and Prof. Giovanni B. Crosta (**d**)

Fig. 10 Joint photo of the World Centers of Excellence on Landslide Risk Reduction

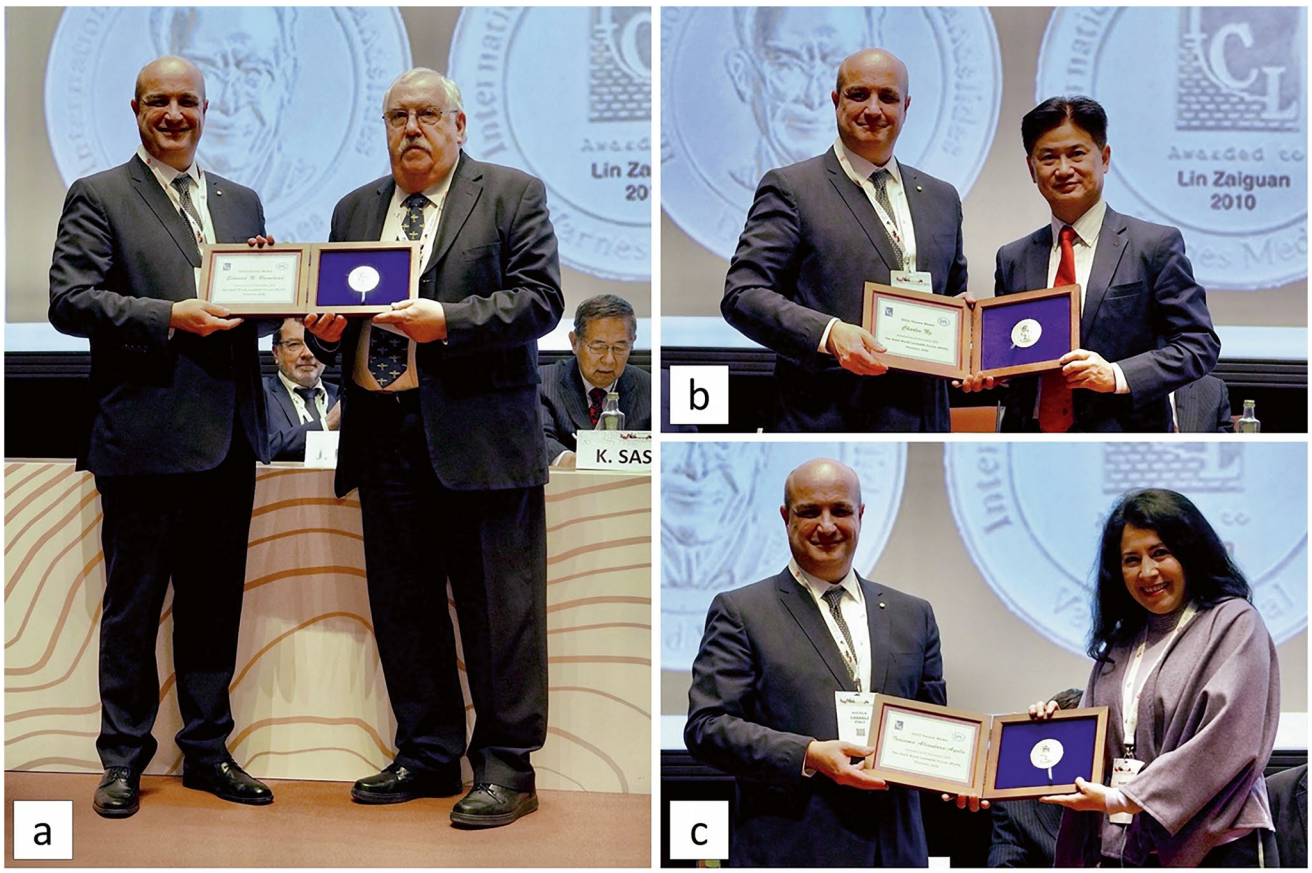

Fig. 11 Varnes Medal 2022 awarded to Prof. Bromhead (**a**) and Prof. Ng (**b**); Varnes Medal 2023 awarded to Prof. Alcántara-Ayala (**c**)

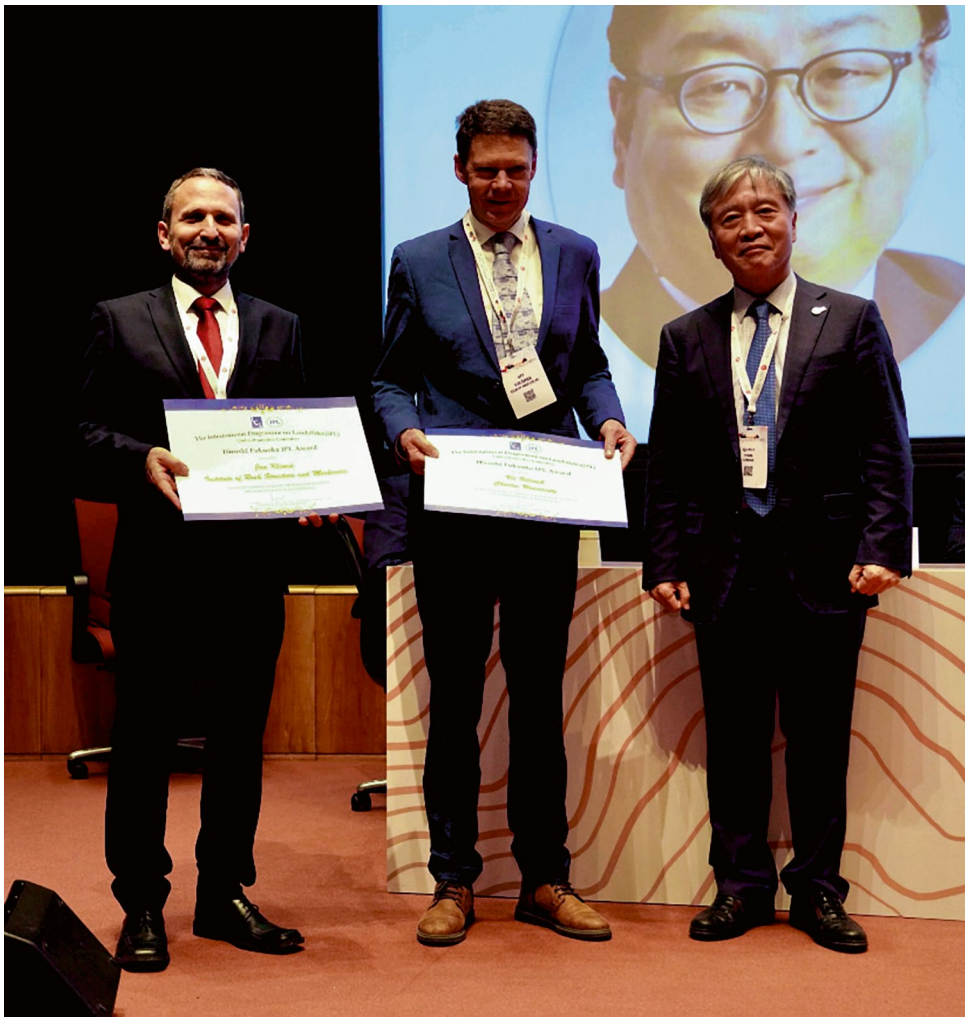

Fig. 12 Presentation of the Hiroshi Fukuoka IPL Award to Prof. Klimeš and Prof. Vilímek

Fig. 13 Presentation of the Oldrich-Hungr Awards to Clarence Choi (**a**) for 2022 and to Tommaso Carlà (**b**) for 2023; presentation of the 2023 IPL-KLC Award for Success to Maneesha V. Ramesh (**c**)

Table 6 WLF6 registered participants

Country/Region	Participants	Country/Region	Participants
Albania	1	Malaysia	1
Algeria	3	Marocco	1
Armenia	1	Mexico	2
Australia	3	Nepal	5
Austria	29	Netherlands	7
Belgium	9	New Zealand	8
Brazil	6	North Macedonia	1
Republic of Cameroon	1	Norway	32
Canada	18	Philippines	3
Chile	4	Poland	23
People's Republic of China	97	Portugal	7
Chinese Taipei	40	Puerto Rico	1
Colombia	6	Republic of Cyprus	2
Congo	4	Romania	4
Croatia	15	Russian Federation	1
Czech Republic	16	Rwanda	1
Denmark	1	Serbia	1
Ecuador	1	Slovakia	3
Egypt	1	Slovenia	5
El Salvador	1	South Korea	14
France	21	Spain	18
Georgia	4	Sri Lanka	11
Germany	39	Sweden	2
Greece	12	Switzerland	32
Hungary	1	Thailand	2
Iceland	3	Turkey	7
India	25	Uganda	1
Indonesia	1	United Kingdom	18
Iran	1	United States	37
Italy	524	Uzbekistan	1
Japan	63	Total Participants	1202

4 Participants

A total of 1202 participants from 61 countries from 5 continents attended the Forum (Tables 1 and 6).

The country/region with the highest number of participants is Italy, followed by People's Republic of China and Japan. 257 PhD students attended the Forum. During the closing plenary session, the Best PhD award presentation was bestowed to Yaser Peiro for the presentation entitled "The application of a PB slope stability model for the conservation of cultural heritage: the case study of the archaeological site of Pietrabbondante".

5 Workshops and Side Events

During the Forum, one exhibition and nine workshops and side events were organized.

Exhibition "The story of the Vajont landslide told through the photographs of Edoardo Semenza"

The "Vajont disaster" of October 9, 1963, a paradigm of a man-made catastrophe, was documented by the extraordinary photographs taken by Prof. Edoardo Semenza before and immediately after the event (Fig. 14).

Semenza was an engineering geologist and one of Italy's leading landslide researchers. He discovered the presence of an ancient landslide mass on the southern side of the Vajont valley, upstream of the reservoir under construction, years before the first mobilization. His discovery was immediately considered by the designers and project managers of the dam as a hypothesis to be verified by further research and investigation. Unfortunately, his work could not prevent the disaster.

The exhibition, organized on the occasion of the sixtieth anniversary of the Vajont disaster, aimed to raise awareness of the fundamental role that knowledge of geology plays in respecting and protecting the environment.

RETURN Project workshop

(November 15, 8:30–13:00)

The Forum hosted a workshop organized by Fondazione RETURN entitled "Multi-risk science for resilient communities under a changing climate—ground instabilities: from back learning to forward scenarios in a multihazard resilience perspective".

Fig. 14 Exhibition on the Vajont landslide

The RETURN project (multi-Risk sciEnce for resilienT commUnities undeR a changiNg climate project) aims to provide multihazard scenarios related to ground instabilities that can be used to plan countermeasures to increase the resilience of urban areas, infrastructures and communities towards greater sustainability.

The workshop was open to the participants of the RETURN project registered at WLF6 and was organized to communicate the ongoing results and to discuss among the researchers involved in the project how to apply the tools identified so far to the reconstruction of scenarios.

TRE ALTAMIRA side event

(November 15, lunch break 13:00–14:00)

TRE ALTAMIRA organized the side event entitled "Advancing geohazard monitoring: leveraging satellite radar data from wide area analysis to targeted local studies".

Spaceborne radar interferometry is becoming a key tool for wide-area mapping of ground deformation and for monitoring programs. The expanding array of satellite data sources has opened up unprecedented opportunities for interferometric applications, prompting a shift from a static view of the Earth's surface to a continuous stream of space-based ground motion measurements.

The workshop aimed to demonstrate the potential of satellite interferometric data as a powerful tool for monitoring and risk management. Through a series of compelling case studies, speakers demonstrated how these data can raise awareness among local and regional authorities of the critical need for proactive geohazard mitigation.

Ferrovie dello Stato Group side event

(November 15, lunch break 13:00–14:00)

The Forum hosted a side event organized by the Ferrovie dello Stato Group entitled "Sustainable and resilient rail and road infrastructures: landslide management and climate adaptation—when the infrastructural network generates connections".

The Ferrovie dello Stato Group promotes territorial studies, as well as the research, design and implementation of measures to manage the extensive interaction of landslide phenomena with transport infrastructures.

The "Resilience Transformation Roadmap" aims to improve the resilience of infrastructure by (i) defining climate adaptation guidelines with decision support tools; (ii) strengthening sensor networks and developing monitoring systems to cope with extreme events; (iii) forecasting models for the occurrence of extreme events.

LiSALab side event

(November 16, lunch break 13:00–14:00)

LiSALab organized the side event entitled "2003–2023—twenty years of GbInSAR natural hazard and landslide monitoring: worldwide examples and case studies".

The workshop aimed at reviewing the past 20 years, during which three experienced users described their experiences in monitoring natural hazards, particularly landslides, through the operational use of GbInSAR technology, including in emergency scenarios.

The first presentation focused on monitoring natural hazards such as volcanoes or during emergencies. The second presentation showed the application of this technology in environmentally challenging conditions, such as those found in Nordic environments, with low temperatures and high latitudes. The third presentation discussed the application of this tool in the Alpine region.

Studio Pandolfi workshop

(November 16, lunch break 13:00–14:00)

Studio Pandolfi promoted the workshop entitled "Innovative monitoring and modelling for rock slopes' stability: the Carrara marble quarries".

The Carrara marble quarries are known for their excellence in stone quarrying due to several factors: the concentration of quarries in a limited geographical area which have been cultivated for over two thousand years, the innovative technologies used, and the significant scientific research carried out over the years by numerous research institutions.

The workshop was the first in a series of technical-scientific events. It aimed at promoting the exchange and sharing of knowledge and best practices in ornamental stone quarrying.

LARAM School side event

(November 16, lunch break 13:00–14:00)

The Forum hosted the LARAM School side event entitled "LARAM Alumni Event—from 2006, to today, towards the future".

After attending the LARAM School, organized by the University of Salerno (Italy), many lecturers and students from different annual courses have met at various scientific events, including recurring conferences such as the World Landslide Forums, the International Symposiums on Landslides and the assemblies of the European Geosciences Union.

The workshop aimed to bring together LARAM alumni who are still active in the field, holding prestigious positions in academic institutes or other institutions after attending the LARAM course and therefore facing landslide problems and challenges daily.

Hexagon side event

(November 17, lunch break 13:00–14:00)

The Forum hosted a side event organized by Hexagon entitled "Total Monitoring: use cases, new tools and challenges in natural hazard monitoring".

Hexagon is a global leader in digital reality solutions, that combine sensors, software and autonomous technologies. The core of Hexagon Geosystems is represented by IDS GeoRadar, Geopraevent and Leica Geosystems, which offer technologically advanced solutions that combine monitoring technologies to provide real-time insight into movement. This is the result of the combined experience of several thousand monitoring projects in over one hundred countries.

During the event, participants were introduced to "Total Monitoring", a concept of using a combination of technologies to provide reliable information about movement in the monitored area and the most advanced technologies to improve early warning and situational awareness.

GeoSciences IR workshop

(November 17, 14:30–16:00)

The GeoSciences IR project organized a workshop on "New technologies for landslide monitoring and mapping".

GeoSciences IR is a project funded by the NextGenerationEU program, with the aim of creating a research infrastructure for the Italian Network of Regional Geological Surveys. The project involves 16 partners from academic and research institutions.

The GeoSciences IR event at WLF6 aimed to present innovative landslide monitoring techniques, methods for landslide mapping and inventory updating, landslide risk analysis and mitigation measures implemented in the project.

Fig. 15 A group of participants to the Florence walking tour

"Here be landslides: Florence from Romans up to now" side event

(November 13, 9:30–17:30; November 18, 9:30–13:00)

On November 13 and 18, some researchers from the University of Florence acted as local guides for a three-hours walking tour of Florence's most impressive monuments, anecdotes and places (Fig. 15).

Following the historical footsteps of Leonardo Da Vinci and the powerful Medici family, a non-technical and interactive tour showed the deep connection between the local geology and the history of Florence, from its foundation to the present days, highlighting some of the most remarkable monuments and palaces built since medieval time: their very stones can tell a fascinating story, often forgotten by Florentines, and show hidden scars from ancient and recent hazardous events such as floods and landslides.

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