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Progress Report of ICL Network

1. **Title of Network**
   Italian ICL Network
2. **Name of Coordinator (Affiliation and email)**
   Mario Parise
   Department of Earth and Environmental Sciences - University of Bari Aldo Moro (DiSTeGeo-UNIBA) mario.parise@uniba.it

3. **List of member organizations**

ICL Full Members

- **UNESCO Chair on Prevention and Sustainable Management of Geo-hydrological hazards, University of Florence (UNESCO Chair – UNIFI)** Board member: *Nicola Casagli*, Alternative board member: *Veronica Tofani*.
- **Research Institute for geo-hydrological protection - Italian National Research Council (CNR-IRPI)** Board member: *Maria Teresa Brunetti*, Alternative board member: *Michele Santangelo*
- **Italian Institute of Enviromental Protection and Research (ISPRA)**
  Board member: *Daniele Spizzichino*, Alternative board member: *Carla Iadanza*
- **Laboratory of Environmental Cartography and Hydraulic and Geological Modeling - University of Calabria (CAMIlab-UNICAL)** Board member: *Giovanna Capparelli*
- **Research Center on Prediction, Prevention and Mitigation of Geological Risks - University of Roma la Sapienza (CERI-UNIROMA1)**
  Board member: *Francesca Bozzano*, Alternative board member: *Carlo Esposito*
- **Department of Earth and Geo-Environmental Sciences - University of Bari Aldo Moro (DiSTeGeo-UNIBA)**
  Board member: *Mario Parise*, Alternative board member: *Piernicola Lollino*
- **National Institute of Oceanography and Applied Geophysics (OGS)**
  Board member: *Antonella Peresan*, Alternative board member: *David Zuliani*

ICL Associates

- **Department of Engineering and Architecture - University of Parma (DIA-UNIPR)**
  Representative: *Andrea Segalini*

- **Department of Science and Technologies - University of Sannio (DST-UNISANNIO)** Representative: *Paola Revellino*
- **Geotechnical Engineering Group - University of Salerno (GEG-UNISA)** Representative: *Michele Calvello*
- **Department of Earth and Environmental Sciences – University of Pavia** Representative: *Claudia Meisina*
- **Federico II University of Naples – Department of Earth, Environmental and Resource Sciences** Representative: *Domenico Calcaterra*
- **University of Urbino "Carlo Bo", Department of Pure and Applied Sciences (DiSPeA)** Representative: *Stefano Morelli*

4. Progress report of activities

The Italian ICL Network is made of 7 ICL Full Members and 6 ICL Associates, with Universities and Research Bodies distributed all over the Italian territory.

The coordinator of the Italian network changed in July 2024, and Mario Parise was appointed, succeeding to Claudio Margottini.

In the recent past, it has co-organized the 6th World Landslide Forum "Landslides Science for sustainable development" (WLF6), 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). Taking advantage of the experience gained on that occasion, and given the wide attendance by a broad international audience interested in landslide disaster risk reduction, and the very good outcomes from the congress, members of the ICL Italian Network are actively being involved in the organization of the 7th World Landslide Forum, to be held in India from 23 to 27 November 2026.

Representatives of the Italian ICL network are included in the list of ICL Officers in the term 2024-2026. The complete list is as follows:

- Vice President as Immediate Past President: *Nicola Casagli* (University of Florence)
- Vice President for Mission: *Giovanna Capparelli* (University of Calabria)
- Chair of the Award Committee: *Nicola Casagli* (University of Florence)
- Chair of the Committee for World Report on Landslides: *Veronica Tofani* (University of Florence)

Three WCoE, led by members of the Italian ICL network, are active in the period 2023-2026. Namely, they are:

- *Risk assessment and modelling for mitigation strategies and for early warning systems.* Laboratory of Environmental Cartography and Hydraulic and Geological Modeling - University of Calabria (CAMIlab-UNICAL). Leader: *Giovanna Capparelli*.

- *Advanced technologies for LandSlides (ATLaS)*. UNESCO Chair on Prevention and Sustainable Management of Geo-hydrological hazards, University of Florence (UNESCO Chair – UNIFI). Leader: *Nicola Casagli*.
- *From learning on case studies to forecasting scenarios of ground instabilities*. Research Center on Prediction, Prevention and Mitigation of Geological Risks - University of Roma la Sapienza (CERI-UNIROMA1). Leader: *Gabriele Scarascia Mugnozza*.

In November 2024, at the ICL-KLC Conference, held in Kyoto (Japan), 8 presentations were made by members of the Italian ICL Network, as listed here:

New IPL Project Proposals

Isabella Serena Liso: Rock failures in coastal carbonate cliffs: susceptibility, hazard assessment and monitoring

Veronica Tofani: Multi-scale Landslide Risk Assessment (MultiLandRisk)

Mario Parise: Integrated Toolsets for the Assessment of Landslide Impact scenarios (ITALI)

IPL –KLC Symposium

Giovanna Capparelli: The improvement on landslide impact assessment.

Gabriele Scarascia Mugnozza: The Italian project RETURN: an outline of the VS2 spoke on Ground Instabilities.

Nicola Casagli: Automated technologies for landslides (ATLaS).

Daniele Spizzichino: Landslide risk assessment in AIUla archeological sites – Kingdom of Saudi Arabia.

Stefano Morelli:Analysis of landslides induced by an exceptional rainfall event in Central Italy on September 15, 2022.

Several national and international projects dealing with landslide studies and monitoring are developed by members of the Italian ICL network, both in Italy and abroad. Further, courses and summer school have been organized, including the one-week LARAM Course that was held in Hong Kong (https://www.laram.unisa.it/school/2025hk/2025hk) in June 2025, the LARAM School 2025 in Salerno in September 2025 (https://www.laram.unisa.it/school/2025/2025), and the 1-day LARAM Workshop 2025 held on 17th September.

Members of the Italian ICL network are coordinating several ongoing IPL projects or have coordinated recently terminated IPL projects. Further, other IPL projects have been proposed in 2025 and will be presented in December 2025 at Paris.

Here below the list of ongoing projects:

- IPL-221 PS continuous streaming for landslide monitoring and mapping. *Leader: Federico Raspini*
- IPL-248 Innovation in slow-moving landslide risk assessment of roads and urban sites by combining multi-sensor multi-source monitoring data. *Leader: Dario Peduto*

- IPL-258 Slope stability in vineyards with different management practices (Acronym: WINESLIDES). *Leader: Filippo Catani*
- IPL-259 Landslide Risk assessment in AlUla Archaeological sites – Kingdom of Saudi Arabia. *Leader: Claudio Margottini*
- IPL-277 Rock failures in coastal carbonate cliffs: susceptibility, hazard assessment and monitoring. *Leader: Isabella Serena Liso*
- IPL-278 Multi-scale Landslide Risk assessment (MultiLandRisk). *Leader: Veronica Tofani*
- IPL-279 Integrated Toolsets for the Assessment of Landslide Impact scenarios (ITALI). *Leaders: Carlo Esposito, Mario Parise, Veronica Tofani*

List of terminated projects:

- IPL-196 Development and applications of a multi-sensors drone for geohazards monitoring and mapping. *Leader: Veronica Tofani*
- IPL-235 EO4GEO – Towards an innovative strategy for skills development and capacity building in the space geo-information sector supporting Copernicus User Uptake. *Leaders: Luca Guerrieri, Daniele Spizzichino*
- IPL-237 The role of time-dependent rock mass deformations and landscape evolution rates as predisposing factors for massive rock slope failures. *Leader: Carlo Esposito*
- IPL-245 Laboratory physical modeling of rainfall, slope deformation and landslides triggering. *Leader: Giovanna Capparelli*
- IPL-236 A multiparametric field laboratory for the investigation on the relationship between material behavior and morphodynamic of landslides. *Leader: Andrea Segalini*
- IPL-260 Landslide Risk assessment in the High City of Antananarivo. *Leader: William Frodella*

In the time span 2024-2025, annual meetings of the Italian ICL Network have been organized online in July 2024, and in person on March 5, 2025, at Trieste.

A new online meeting of the Italian ICL network is planned for November 19, 2025.

5. Plan of future activities

The Italian ICL Network on Landslides aims at improving the national networking activities through a national collaborative work within the landslide research community by means of new multi-lateral scientific projects, shared capacity building strategies and transfer of knowledge for the dissemination of science related to landslides. The Network is presently contributing to the implementation of the Kyoto Landslide Commitment (KLC2020) at a national level, and most of its partners are actively working during these years at national projects related to the National Plan of Recovery and Resilience (PNRR), covering issues related to slope instability and landslides.
For the next years, the planned activities of the Italian ICL network will be:

- enhancing the level of national cooperation within the landslide scientific community by improving scientific networking and an effective transfer of knowledge (through support of student mobility and academic staff exchange, and by means of international master's Degree, Joint PhD Programs and the LARAM International Summer School);
- creating a dedicated Italian ICL Network Web page for dissemination purposes;
- managing jointly equipped experimental sites and laboratory devices;
- organizing internal annual meetings of the Italian Network;
- developing effective procedures to support risk reduction and emergency management policies in the framework of regional/national interconnected systems between the scientific community and stakeholders, end-users, administration personnel and land use planners;
- contributing to the international policies on disaster risk reduction by developing e-learning modules addressed at empowering technical stakeholders and end-users, with the final goal to reduce the geo-hydrological disaster risk;
- promoting and realizing multi-lateral partnerships for the development of projects focusing on innovative early warning technologies, forecasting, prevention and mitigation of geo-hydrological hazards in a climate change context in the Mediterranean area (also through IPL projects in synergy with ICL partners from other countries);
- promoting the increase in knowledge on cultural heritage sites affected by geo-hydrological hazards, and protecting them in the framework of mitigation and conservation strategies;
- contributing to the ICL activities through the active involvement in the organization of the next 7th World Landslide Forum;
- publishing the main network scientific results through dedicated paper categories (ICL/IPL activities, News/Kyoto Commitment) on the journal Landslides and on the ICL Open access book series Progress in Landslide Research and Technology.

6. Publication (ICL Journal Landslides, ICL Book Series, etc.)

2024

Landslides journal

Alvioli et al. (2024), *A scenario-based approach for immediate post-earthquake rockfall impact assessment.* Landslides, 21, 1-16. DOI: 10.1007/s10346-023-02127-2.

Carlà T. et al. (2024) Real-time detection and management of rockfall hazards by ground-based Doppler radar. Landslides, 21, 155-163

Casagli N. et al. (2024) *The Sixth World Landslide Forum (WLF6), Florence, 2023.* Landslides, 21, 1161-1172

Cignetti et al. (2024). *Impacts on mountain settlements of a large slow rock-slope deformation: a multi-temporal and multi-source investigation*. Landslides, 21, 327-337.

Crescenzo et al. (2024), *Evaluating the performance of propagation models of flow-like landslides at regional scale*. Landslides 21, 229–243. https://link.springer.com/article/10.1007/s10346-023-02162-z

Cuomo et al. (2024), *Possible remediation of impact-loading debris avalanches via fine long rooted grass: an experimental and material point method (MPM) analysis.* Landslides 21, 679–696. https://link.springer.com/article/10.1007/s10346-023-02178-5

Delchiaro et al. (2024), *The role of long-term preparatory factors in mass rock creep deforming slopes: insights from the Zagros Mts. belt (Iran)*. Landslides 21, 1735–1755.https://doi.org/10.1007/s10346-024-02252-6

Fiorucci et al. (2024), *A web-GIS for the analysis of scientific literature on earthquake-triggered landslides*. Progress in Landslide Research and Technology, Volume 3 Issue 2.

Guerriero et al. (2024), *Reduced complexity debris flow/flood hazard assessment at the southwestern slope of Mt. Omo, L'Aquila municipality, central Italy*. Landslides, 21(1), 183-195.

Guzzetti et al. (2024), *Independent demonstration of a deep-learning system for rainfall-induced landslide forecasting*. Landslides, 21, 2171–2178. DOI 10.1007/s10346-024-02294-w

Guzzetti et al. (2024). *Landslide predictions through combined rainfall threshold models*. Landslides, DOI 10.1007/s10346-024-02340-7

Nardini O. et al (2024) *Integration of satellite SAR and optical acquisitions for the characterization of the Lake Sarez landslides in Tajikistan.* Landslides*, 21, 1385-1401*

Nocentini N. et al (2024) *Optimization of rainfall thresholds for landslide early warning through false alarm reduction and a multi-source validation*. Landslides, 21, 557-571

Nocentini N. et al (2024) *Regional-scale spatiotemporal landslide probability assessment through machine learning and potential applications for operational warning systems: a case study in Kvam (Norway)*. Landslides, 21, 1-19

Peresan et al. (2024), *An approach to rockfall hazard scenarios based on earthquake ground motion.* In: B. Abolmasov et al. Eds. *Progress in Landslide Research and Technology*, Volume 3 Issue 2. ICL Book Series, Springer.

Sannino et al. (2024), *Implementation of a slope stability method in the CRITERIA-1D agro-hydrological modeling scheme.* Landslides https://doi.org/10.1007/s10346-024-02313-w

Wu et al. (2024), *A global-scale applicable framework of landslide dam formation susceptibility*. Landslides 21, 2399 – 2416. https://doi.org/10.1007/s10346-024-02306-9

Zeng et al. (2024), *Double-index rainfall warning and probabilistic physically based model for fast-moving landslide hazard analysis in subtropical-typhoon area.* Landslides 21, 753–773. https://link.springer.com/article/10.1007/s10346-023-02187-4

Chapter in Proceedings 6th ReSyLAB (supported by ICL)

Gariano, S.L. (2024) Prediction of Rainfall-Induced Landslides in a Changing Climate: Issues and Perspectives for Regional-Scale Approaches. Proceedings of the 6th Regional Symposium on Landslides in the Adriatic-Balkan Region, ReSyLAB2024, Belgrade, Serbia 15–18th May 2024, Regional Symposium on Landslides in the Adriatic-Balkan Region, Vol. 6 (2024), Article 3 (p. 19–26), https://doi.org/10.18485/resylab.2024.6.ch3

2025

Landslides journal

Casagli, N., Tofani, V. (2025) Landslide science for sustainable development. Landslides, Volume 22, pages 615–617. https://doi.org/10.1007/s10346-025-02459-1

Caleca, F., Tofani, V., Raspini, F., Segoni S., Casagli N. (2025). Quantitative landslide risk assessment for Italy. Landslides, online first. https://doi.org/10.1007/s10346-025-02590-z

Esposito, G., Gariano, S. (2025) Overview of the first fatal post-fire debris flow event recorded in Italy. Landslides 22, 2131–2139. https://doi.org/10.1007/s10346-025-02516-9

Gariano, S.L., Rianna, G. (2025) How will the projected climate change influence rainfall-induced landslides in Europe? A review of

modelling approaches. Landslides 22, 3011–3027. https://doi.org/10.1007/s10346-025-02550-7

Guerriero L., Tufano R., Capozzi V., Budillon G., Di Muro C., Esposito L., Forte G., Vitale E., Calcaterra D. (2025) - *A postwildfire debris flood in Gragnano, southern Italy, on September 11, 2024*. Landslides, doi.org/10.1007/s10346-025-02509-8

Guerriero L., Van Wyk de Vries M., Hourston H., Novellino A., Calcaterra D., Di Martire D., Sciarra N., Francioni M. (2025) - *Earthquakes and rainfall accelerating deep-seated landslides toward failure: significance of combined use of InSAR and feature tracking in landslide analysis*. Landslides, 22 (10), 3169-3183, doi.org/10.1007/s10346-025-02568-x

Guzzetti, F., Melillo, M., Mondini, A.C. (2025) Landslide predictions through combined rainfall threshold models. Landslides 22, 137–147 (2025). https://doi.org/10.1007/s10346-024-02340-7

Melzner S., Peduto D., Hübl J., Fiorucci F., Phillips C. (2025) Wildfire-induced geohydrological risk in the Alps. Landslides (2025). https://link.springer.com/article/10.1007/s10346-025-02581-0

Segoni, S., Nocentini, N., Barbadori, F., Medici C., Gatto A., Rosi A., Casagli N. (2025) A novel prototype national-scale landslide nowcasting system for Italy combining rainfall thresholds and risk indicators. Landslides 22, 1341–1366. https://doi.org/10.1007/s10346-024-02452-0

Zhang S., Pecoraro G., Jiang Q., Calvello M. (2025) A probabilistic procedure to define multidimensional rainfall thresholds for territorial landslide warning models. Landslides 22, 1773–1787 (2025). https://link.springer.com/article/10.1007/s10346-025-02461-7

ICL Open Access books

Carlà, T., Beni, T., Lombardi, L., Nocentini, M., Gigli, G. (2025). Monitoring and Characterization of Surface Movements in Rock Slopes. In: Abolmasov, B., et al. Progress in Landslide Research and Technology, Volume 4 Issue 1, 2025. Progress in Landslide Research and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-89836-5_9

Gariano, S.L., Brunetti, M.T., Melillo, M., Napolitano, E., Gioia, E., Lazzeri, M., Speranza, G., Peruccacci, S. (2025). Role of Land Cover and its Changes in Triggering Rainfall-Induced Shallow Landslides in Central Italy. In: Abolmasov, B., et al. Progress in Landslide Research and Technology, Volume 4 Issue 1, 2025. Progress in Landslide Research and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-89836-5_4

Morelli, S., Pappafico, G.F., Guidi, E. (2025). The Landslide Occurrence Under Extreme Rainfall Events: The Central Italy Case on September 15, 2022. In: Abolmasov, B., et al. Progress in Landslide Research and Technology, Volume 4 Issue 1, 2025. Progress in Landslide Research and Technology. Springer, Cham.

Peresan, A., Alvioli, M., Zuccolo, E., Vaccari, F., Badreldin, H. (2025). An Approach to Rockfall Hazard Scenarios Based on Earthquake Ground Motion. In: Abolmasov, B., et al. Progress in Landslide Research and Technology, Volume 3 Issue 2, 2024. Progress in Landslide Research and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-72736-8_8

Tofani, V., Sassa, K., Canuti, P., Bandecchi, A.E., Gargini, E., Casagli, N. (2025). The 6th World Landslide Forum (WLF6), Florence, 2023. In: Abolmasov, B., et al. Progress in Landslide Research and Technology, Volume 3 Issue 2, 2024. Progress in Landslide Research and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-72736-8_17

Bougouin A., Dioguardi F., Capparelli G., Trausi D., Clausi G., Nicotra E. and Sulpizio R. (2025) A Multi-Purpose Large-Scale Laboratory Flume for Gravity-Driven Flows. Editor 1 et al. (eds), Progress in Landslide Research and Technology, Volume 5 Issue 1, 2025, Book Series of the International Consortium on Landslides, DOI 10.1007/978-94-007-2162-3_36.

Berti M., Bozzano F., Calcaterra D., Ceramicola S., Ciccarese G., Colacicco C., Di Martire D., Esposito C., Fanti R., Forte G., Liso I.S., Martino S., Parise M., Tacconi Stefanelli C. & Tofani V. (2025) Ground Instability processes in the Italian territory: outcomes for Advances Susceptibility Methods from a national review of Learning Examples. Volume 4 Issue 2, 2025. Progress in Landslide Research

and Technology. Springer, Cham, in press.

Liso I.S., Lollino P. & Parise M. (2025) Rock failures in coastal carbonate cliffs: susceptibility, hazard assessment and monitoring. Volume 4 Issue 2, 2025. Progress in Landslide Research and Technology. Springer, Cham, in press.