6th WORLD LANDSLIDE FORUM

2023 FLORENCE ITALY

14-17 NOVEMBER 2023

LANDSLIDE SCIENCE FOR SUSTAINABLE DEVELOPMENT

**Proceedings of the 6th World Landslide Forum.
Florence Italy, 14-17 November 2023
Abstract book**

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INTRODUCTION

The 6th World Landslide Forum was held in Florence from November 14 and 17, 2023.

The World Landslide Forums are organized every three years to bring together scientists, engineers, practitioners, businesses, and policy makers, from around the world to share progress on landslide risk reduction on a global scale.

The 6th World Landslide Forum is jointly organized by the International Consortium on Landslides and the UNESCO Chair on Prevention and Sustainable Management of Geo-hydrological Hazards at the University of Florence, under the International Programme on Landslides (IPL) supported by five United Nations' organizations (UNESCO, WMO, FAO, UNDRR, UNU) and four international scientific organizations (ISC, WFEO, IUGS e IUGG).

The 6th World Landslide Forum was awarded the Medal of the President of the Italian Republic, which is given to events of great scientific and cultural importance.

More than 1100 participants from more than 60 countries attended the general plenary sessions, parallel scientific sessions, technical exhibitions, workshops and other side events during the four days of the Forum.

The Forum is entitled Landslide Science for Sustainable Development and contributes to the Sendai Framework for Disaster Risk Reduction, through the Kyoto Commitment for Landslide Risk Reduction which was signed by 90 institutions in 2020.

The aim of the Forum is to create a common platform to promote cooperation between all stakeholders involved in landslide risk reduction. This objective is particularly important considering that the Forum is taking place on the 60th anniversary of the Vajont landslide, the largest landslide disaster in Italy, which claimed more than 1900 lives.

The city of Florence was the cradle of the Renaissance of Arts and Science and is still today a cutting-edge city of science, culture, hospitality, and beauty. Florence has also been hit by severe natural disasters in the past, such as floods and landslides, which have caused enormous damage to its artistic and cultural heritage. We therefore consider Florence an ideal place to discuss the latest advances in research, technology, and policies for risk mitigation.

The General Conference on Landslide Risk Reduction, at the Opening Plenary Session on November 14, addressed the latest strategies of the landslide community to help achieve the global targets of the Sendai Framework for Disaster Risk Reduction. The High-Level Panel Discussion on the same day adopted the Florence Declaration on Landslide Risk Reduction, 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.

Scientific plenary lectures were given by renowned scientists from four continents: Prof. Giovanni Battista Crosta from the University of Milan Bicocca, Prof. Xuanmei Fan from Chengdu University of Technology in China, Dr. Jonathan Godt from the United States Geological Survey and Prof. Olivier Dewitte from the Royal Museum for Central Africa.

The scientific program includes six main themes:

1. Kyoto Landslide commitment for sustainable development

2. Remote sensing, monitoring and early warning

3. Testing, modeling and mitigation techniques

4. Mapping, hazard, risk assessment and management

5. Climate change, extreme weather conditions, earthquakes and landslides

6. Progress in landslide science and applications

In the following days there were 47 parallel scientific sessions, with 853 scientific contributions, including 643 oral presentation and 210 posters.

In the Closing Plenary Session on November 17 the baton was passed to the 7th World Landslide Forum which will take place in Taipei in 2026.

We would like to thank all those who have contributed to the organization of the Forum over the past three years: especially the scientific committee, organizing committee, supporting organizations, partners, bodies that granted the patronage, and sponsors, for their contribution and strong commitment to the success of the 6th World Landslide Forum.

Nicola Casagli

WLF6 Chairman and ICL President

Veronica Tofani

WLF6 Secretary General and ICL Vice-President

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UPSCALING AND DOWNSCALING LANDSLIDE SUSCEPTIBILITY MAPS

Miloš Marjanović[1], Cvjetko Sandić[2], Uroš Đurić[3], Biljana Abolmasov[1]
[1]University of Belgrade - Faculty of Mining and Geology, Beograd, Serbia, 2Geological Survey of the Republic of Srpska, 3Faculty of Civil Engineering of the University of Belgrade, Beograd, Serbia

Although without official standardization, landslide susceptibility models (LSM) have entered preliminary stages of design and planning practice worldwide. As design and planning itself undergoes from lower to higher level of detail, different scales of LSM apply. Nevertheless, the LSMs are mainly produced in regional scales, whereas national and local are rarely available.

Limitations of downscaling and upscaling LSMs are considered herein, by comparing LSMs coming from continental scale on one hand, and regional scale on the other, while the validation was performed using national scale model (Figure 1) at 30 m pixel resolution. Pan-European model (Wilde et al. 2018) is downscaled from 200 to 30 m pixel resolution using re-gridding method based on various interpolation techniques (linear, spline, Kriging) over the area of the City of Doboj in Republic of Srpska (Bosnia and Herzegovina). The LSM for the City of Doboj (Sandić et al. 2023) was upscaled from 5 to 30 m resolution using various resampling techniques (nearest neighbor, bilinear interpolation and cubic convolution). All maps were made using heuristic or combined heuristic approaches with standard landslide conditioning factors as raster inputs (geological, geomorphological, environmental, etc.).

The best performing downscaling option was spline interpolation, while cubic convolution gave the best match against the referent LSM for the upscaling. Other downscaling variants tend to pixelate the map at 30 m resolution, whereas upscaling was not that considerably affected by technique choice. For large scale urban planning and preliminary design it is important to avoid pixilation as much as possible and smoothen the susceptibility classes so they can be compared against various elements, such as road and railway network features (higher-order curves, bridges, tunnels) and urban fabric footprints (housing, industrial, infrastructure). Results indicate that downscaling can be misleading and should be avoided if there is time and resource to perform appropriate local or regional scale LSM.
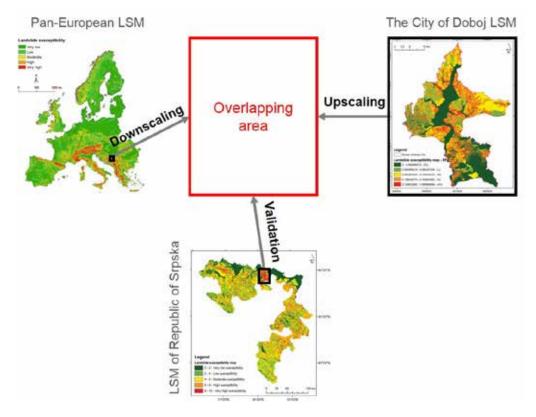

Fig. 1: Schematic of the Landslide Susceptibility Model comparison principle

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