



Data Article

A comprehensive dataset of landslide inventory in Pannonian Croatia: Archived and reported data



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ABSTRACT

This dataset provides a comprehensive inventory of landslides in Pannonian Croatia, serving as an essential resource for assessing landslide susceptibility, hazard, and risk. Given the lack of a national-level landslide inventory in Croatia, this dataset represents an initial effort to systematically collect and digitize landslide data. Landslide point data were extracted from archived geological maps created at various scales and from publicly reported landslide locations submitted through the online portal "Report a Landslide", managed by the Croatian Geological Survey. The data are compiled in ESRI shapefile format using ArcMap 10.2.1 software and standardized in the World Geodetic System 1984 (WGS84) coordinate system.

This landslide dataset supports spatial analyses such as landslide density mapping, susceptibility mapping, and hazard and risk assessment. It is suitable for reuse by geoscientists, urban planners, and civil protection authorities for future research and hazard mitigation. By consolidating historical and publicly reported data, this dataset aims to contribute to the development of a national landslide inventory and improve landslide risk management in Croatia.

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Specifications Table

Subject	Earth & Environmental Sciences
Specific subject area	Natural hazards (Landslide inventory)
Type of data	Raw
Data collection	The dataset was collected from archived geological maps: (i) the Engineering Geological Map at a scale of 1:500,000, (ii) sheets of the Basic Geological Map at a scale of 1:100,000, and (iii) sheets of the Draft Field Geological Map at a scale of 1:25,000. Landslides were extracted as ESRI shapefile point data using digitizing and editing tools in ArcMap 10.2.1 GIS software. Additionally, the dataset includes landslide points reported through a publicly available online portal "Report a landslide" during the period 2018–2023.
Data source location	The karst region of southern Croatia, characterized by carbonate rocks, was excluded from the dataset since mass movements in this area predominantly consist of rock falls rather than landslides. Institution: Croatian Geological Survey City/Town/Region: Pannonian Croatia Country: Croatia Latitude and longitude for collected data (Fig. 1): The dataset was collected for the area of Pannonian Croatia, between 44.85° and 46.55° northern latitude and 14.96° and 19.45° eastern longitude. The primary data sources are listed within the attribute table of the shapefile Landslides_maps_WGS.
Data accessibility	The link to the secondary data sources: https://hgi.maps.arcgis.com/apps/webappviewer/index.html?id=6a80501268e64e7ca403493b369c2c04 Repository name: Mendeley data Data identification number: 10.17632/9rss4pgvzc.1 Direct URL to data: https://data.mendeley.com/datasets/9rss4pgvzc/1
Related research article	[1] V. Gulam, D. Pollak, I. Bostjančić, T. Frangen, 2025. Defining the geological units susceptible to landslides in Pannonian Croatia using energy relief index. Bull. Eng. Geol. Environ. 84, 175. https://doi.org/10.1007/s10064-025-04186-2

1. Value of the Data

- The dataset supports the development of landslide susceptibility maps at a small scale, aiding in the identification of priority areas and guiding future detailed investigations. These maps can benefit geoscience researchers, local authorities, and policymakers in landslide risk prevention.
- It enables the creation of landslide density maps, helping to identify regions with frequent landslide occurrences. These maps provide valuable insights for geologists, geomorphologists, and disaster management institutions, while also raising public awareness of associated risks.
- This dataset serves as a key input for landslide hazard and risk assessments, supporting the development of predictive zonation maps.
- The dataset is valuable for various spatial analyses, supporting scientific research and professional applications in fields such as spatial planning, land use management, and civil protection. It can also be integrated with other environmental datasets for comprehensive risk assessments.

2. Background

Landslide inventory maps primarily record the location of landslides and, if known, other information such as the date of activation and the type of phenomenon [2]. According to a critical review of past and recent methods, techniques, and tools used to prepare landslide inventories, there are two main types distinguished [2]: (a) archive inventories, based on available literature which do not involve landslide mapping [3], and (b) geomorphological inventories, based on landslide mapping through the interpretation of aerial photographs, satellite images, or digital terrain models [4–6]. A comprehensive landslide inventory is fundamental for assessing landslide susceptibility, hazard, and risk [7,8].

However, in Croatia, there is a significant gap in the availability of any national landslide inventory database. This lack of data motivated the creation of this archive dataset, with primary objective to compile and digitize existing landslides in Pannonian Croatia into an ESRI shapefile format, making it accessible to researchers in geohazards and related fields.

The dataset focuses on enhancing the understanding of landslide distribution and density in the region. Consolidating historical landslide data and integrating publicly reported locations provides a basis for developing more accurate landslide susceptibility maps and conducting associated risk assessments in areas of concern. This dataset is intended as a starting point for establishing a comprehensive national landslide inventory, covering a large area with a unified methodology for mapping landslides within each input dataset.

Additionally, this dataset has already been utilized with geological and topographic factors to identify geological units most frequently in an unstable equilibrium state [1], providing critical data for various spatial analyses.

3. Data Description

This dataset presents landslide locations extracted from four different data sources (Fig. 1) and is grouped into two following point shapefiles:

- Landslides_maps_WGS shapefile, which includes landslides digitized from archived geological maps created at three different scales;
- Landslides_portal_WGS shapefile, which includes landslides reported through the publicly available “Report a landslide” portal.

The dataset covers an area of 29,785 km² in Pannonian Croatia, with all data stored in the WGS84 coordinate system. The corresponding attribute table fields for both shapefiles are explained in Table 1 and Table 2.

The shapefile Landslides_maps_WGS contains 887 landslides extracted from: i) the Engineering Geological Map of the former Socialist Federal Republic of Yugoslavia (SFRY) at a scale of 1:500,000 (20 %), ii) sheets of the Basic Geological Map of SFRY at a scale of 1:100,000 (created within the project of mapping the territory of the SFRY from 1982 to 2014) (17 %), and (iii)

Table 1

The attribute table of the shapefile Landslides_maps_WGS.

FID	Shape	WGS84 coordinates		Source	Sheet	Scale	Year	Authors	County
0–886	Point	X	Y	Engineering Geological Map of SFRY	n/a	1:500,000	production	name	name
				Basic Geological Map of SFRY	name (city)	1:100,000	production		
				Draft Field Geological Map	name (city- municipality)	1:25,000	mapping period		

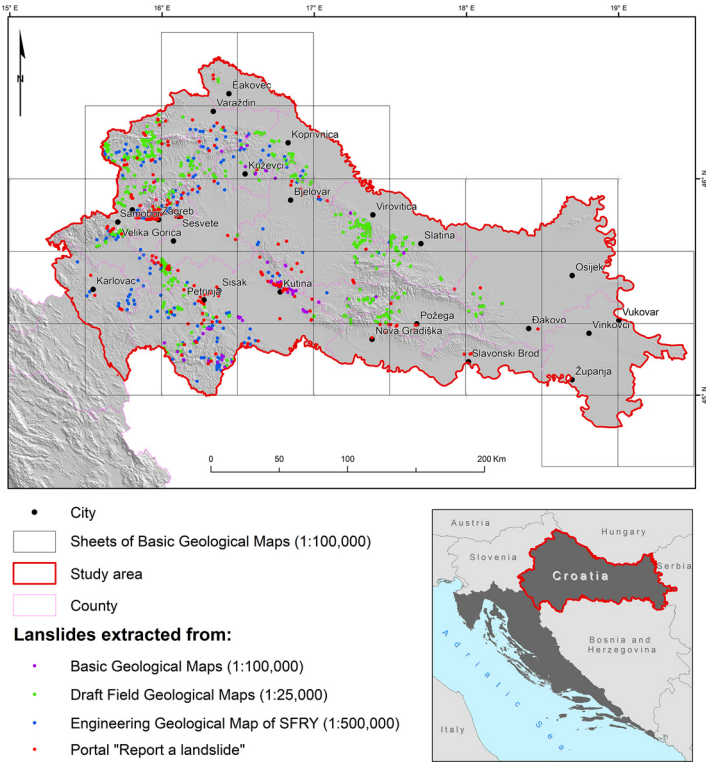


Fig. 1. Overview of the landslide point datasets.

Table 2

The attribute table of the shapefile Landslides_portal_WGS.

FID	Shape	WGS84 coordinates		Entered_by	County
0-237	Point	x	y	Croatian Geological Survey / Department for Spatial Planning of Sisak-Moslavina County Croatian Geological Survey Directorate of Civil Protection of the Ministry of the Interior Local community - City of Kutina Citizens	name

sheets of the Draft Field Geological Map at a scale of 1:25,000 (created within the project of mapping the territory of the SFRY from 1966 to 1985) (63 %). The landslide data was digitized in the period between 2018 and 2022. The attribute table structure of this shapefile is detailed in Table 1.

Additionally, landslide data were collected from the landslide database maintained by the Croatian Geological Survey, forming the shapefile Landslides_portal_WGS, which contains 238 landslides reported through the portal "Report a landslide" in the period between 2018 and 2023. A majority of the data were reported with the assistance of the Directorate of Civil Protection of the Ministry of the Interior (49 %), followed by the Croatian Geological Survey (20 %), the Department for Spatial Planning of Sisak-Moslavina County (11 %), the City of Kutina (8 %),

and citizens (12 %). All data have been validated by the administrator of the portal. The attribute table structure of this shapefile is provided in [Table 2](#).

4. Experimental Design, Materials and Methods

The first dataset, Landslides_maps_WGS shapefile, contains landslide point data extracted from three different geological map sources, originally created during the systematic geological mapping of Croatia as part of the former SFRY mapping projects at various scales.

The Engineering Geological Map of SFRY at a scale of 1:500,000 was developed between 1962 and 1965 at the Institute for Geological and Geophysical Research in Belgrade. It was primarily based on unpublished documents and literature data [9]. The map classifies the terrain into 41 lithological categories and three stability classes, depicting contemporary exogenous processes, such as landslides, rockfalls, rapid erosion, gully formation, and torrential flows. For this dataset, only landslide data were extracted. The methodology for creating the Engineering Geological Map is documented in the “Guide for the Preparation of Engineering Geological Maps of SFRY” [9].

The sheets of Basic Geological Map of SFRY at a scale of 1:100,000 were produced primarily for economic purposes, including determining the geological structures, regional mineral resources prospecting, establishing a foundation for specialized geological maps, and addressing geological investigation results. The maps classify the terrain according to lithological and stratigraphic properties. The methodology for creating Basic Geological Map can be found in the “Guide for the Preparation of Basic Geological Maps of SFRY” published by the Federal Geological Institute Belgrade in 1962 [10].

These sheets of Basic Geological Map were based on unpublished Draft Field Geological Map sheets, which were originally created using 1:25,000 scale topographic maps. Thus, each sheet of the Basic Geological Map at a scale of 1:100,000 consists of 16 Draft Field Geological Map sheets at a scale of 1:25,000. Since these draft maps lacked coordinate references, georeferencing was performed using topographic maps and key geographical indicators to align them correctly.

In addition to geological maps, the second dataset, Landslides_portal_WGS shapefile, incorporates landslide locations reported via the online platform “Report a Landslide”.

All landslides extracted from geological maps were digitized manually using the ArcGIS Editor toolset, with positional accuracy dependent on the original map resolution. Landslide reported through the online portal were directly downloaded from the ArcGIS Server and integrated into the dataset.

Finally, all landslide data, along with county information, were stored in the WGS84 coordinate system to ensure consistency. No additional classification or reinterpretation of landslides was performed beyond what was originally documented in the source maps descriptions.

Limitations

Several limitations affect the dataset and its applications. First, the methodology employed for landslide mapping within geological maps remains undisclosed, with only a general reference to authors documenting substantial landslides, lacking explicit details on measurement units. Another limitation is the positional accuracy and precision of the landslide data. Since the extraction was done from geological maps at different scales (1:25,000, 1:100,000, and 1:500,000), the positional accuracy of the points depends on the resolution and quality of the original maps, making the data suitable primarily for small-scale investigations and assessments. Higher resolution maps (1:25,000 scale) may offer more precise locations, but this also depends on the georeferencing process during the integration of these maps into the GIS environment. Another notable limitation is the absence of landslide activation dates, both for a mapped landslides and for a significant portion of reported landslides. Finally, the landslides are presented as point data, which limits its ability to fully represent the spatial extent and impact of landslides.

Ethics Statement

The authors have read and follow the [ethical requirements](#) for publication in Data in Brief and confirm that the current work does not involve human subjects, animal experiments, or any data collected from social media platforms.

Data Availability

[Landslide inventory for Pannonian Croatia \(Original data\)](#) (Mendeley Data)

CRedit Author Statement

Marina Filipović: Conceptualization, Methodology, Data curation, Writing – original draft, Visualization; **Iris Bostjančić:** Conceptualization, Methodology, Data curation, Supervision, Writing – review & editing; **Vlatko Gulam:** Conceptualization, Writing – review & editing; **Ivan Markotić:** Investigation, Formal analysis.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Supplementary Materials

Supplementary material associated with this article can be found, in the online version, at [doi:10.1016/j.dib.2025.111740](https://doi.org/10.1016/j.dib.2025.111740).

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