High Mountain Asia Landslide Catalog, Version 2

USER GUIDE

How to Cite These Data

As a condition of using these data, you must include a citation:

Kirschbaum, D. B. 2023. *High Mountain Asia Landslide Catalog, Version 2*. [Indicate subset used]. Boulder, Colorado USA. NASA National Snow and Ice Data Center Distributed Active Archive Center. https://doi.org/10.5067/E8U4F9M2NCCN. [Date Accessed].

FOR QUESTIONS ABOUT THESE DATA, CONTACT NSIDC@NSIDC.ORG

FOR CURRENT INFORMATION, VISIT https://nsidc.org/data/HMA_LS_Cat

National Snow and Ice Data Center

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1 DATA DESCRIPTION

The High Mountain Asia Landslide Catalog, Version 2, is an inventory of some 2800 landslides that occurred in the High Mountain Asia (HMA) study area between 5 January 2007 and 31 December 2018 (plus one event from 28 January 1990). The catalog includes dates and locations of landslides, plus additional characteristics such as event triggers, country, length and area of the slide, and the number of injuries and fatalities.

The events in this catalog represent an HMA-specific subset of the Cooperative Open Online Landslide Repository (COOLR)[1], a project that was created to build a more robust, publicly available inventory of landslides by supplementing data in the NASA Global Landslide Catalog (GLC) with citizen science reports.

1.1 Parameters

Table 1 lists the parameters reported for each landslide[2] event:

Table 1. Parameter Descriptions

Parameter	Description
src_name	Information source
src_link	Link to information source
ev_id	Event ID
ev_date	Event date (YYYY/MM/DD)
ev_time	Event time (HH:MM)
ev_title	Event title
ev_desc	Event description
loc_desc	Location description
loc_accu	Location accuracy (km)
ls_cat	Landslide category
ls_trig	Landslide trigger
ls_size	Landslide size
ls_setting	Landslide setting
fatalities	Number of fatalities
injuries	Number of injuries

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[1] Work has been discontinued on the COOLR and GLC projects. As such, Version 2 of the HMA Landslide Catalog represents the final version. To obtain the complete, global COOLR database, including any ad-hoc/post-hoc updates, should they occur, visit Landslides @ NASA.

[2] "Landslide" is used as a general term to represent all event types. See the "ls_cat" parameter to differentiate between landslide types.

Parameter	Description
storm_name	Associated storm name
photo_link	Link to representative photo
comments	Comments
ev_imp_src	Inventory source (GLC)[3]
ev_imp_id	Event ID in original inventory
latitude	Latitude
longitude	Longitude
ctry_name	Country name
ctry_code	2-letter country code
div_name	Political division name
gaz_point	Nearest point in gazetteer
gaz_dist	Distance to nearest point in gazetteer
sub_date	Submission date (YYYY/MM/DD)
edit_date	Editing date (YYYY/MM/DD)

For more information about the parameters listed in Table 1, see Juang et al., 2019 and Kirschbaum et al., 2015.

Users may also wish to consult The Landslide Reporter's Guide. This guide from Landslides @ NASA describes the steps for submitting a landslide report to COOLR and can provide additional context for how this data set's parameters are defined.

1.2 File Information

1.2.1   Format

ESRI Shapefile

> ⓘ An ESRI Shapefile is a geospatial, vector data storage format consisting of multiple, related files.

1.2.2   Naming Convention

Two Shapefiles are available:

    HMA_LS_Cat_point_v02.0
    HMA_LS_Cat_poly_v02.0

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[3] All landslides in the HMA Landslide Catalog were sourced from the NASA GLC

The "HMA_LS_Cat_point_v02.0" Shapefile contains a record for each landslide in the catalog, represented as a point location. "HMA_LS_Cat_poly_v02.0" consists of a single polygon corresponding to the roughly 3 km-long Ultar Glacier rock and ice avalanche[4].

Both Shapefiles include the eight file types listed in Table 2:

Table 2. Shapefile File Extensions and Descriptions

Extension	File Type
.cpg	Codepage specifying the character set
.dbf	dBASE table of attributes for each record
.prj	Coordinate system information
.sbn	Part 1 of spatial index
.sbx	Part 2 of spatial index
.shp	Main file with shape and vertices for each record
.shx	Index file
.xml	Metadata file

1.3 Spatial Information

1.3.1 Coverage

This data set spans the HMA study area:

Northernmost latitude: 45° N
Southernmost latitude 20° N
Easternmost longitude: 111° E
Westernmost longitude: 61° E

1.3.2 Resolution

Varies

1.3.3 Geolocation

The following table contains information for geolocating this data set:

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[4] 9 April 2018, near Karimabad, Pakistan

Table 3. Geolocation Details

Geographic coordinate system	WGS 84
EPSG code	4326
PROJ4 string	+proj=longlat +datum=WGS84 +no_defs
Reference	https://epsg.io/4326

1.4 Temporal Information

1.4.1 Coverage

28 January 1990

5 January 2007 – 31 December 2018

1.4.2 Resolution

Varies

2 DATA ACQUISITION AND PROCESSING

2.1 Background

Landslides cause billions of dollars in infrastructural damage and thousands of deaths every year worldwide. Because data on past landslide events can guide future disaster prevention, NASA created the biggest, open global landslide inventory with input from citizen scientists.

2.2 Data Acquisition and Processing

The COOLR project is an open platform where scientists and citizen scientists around the world can share information about landslides, to improve landslide modeling and emergency response. Data collection methods in COOLR include crowd-sourced submissions, events identified in satellite imagery, and ground-based reports (see Figure 1).

Scientists and citizen scientists can submit landslide data to the Landslide Reporter web application. Landslide inventories can be submitted directly to the NASA Global Landslide Catalog. COOLR data are available to view and download via the NASA Landslide Viewer, which contains georeferenced landslide inventories from all over the world (see Juang et al., 2019).

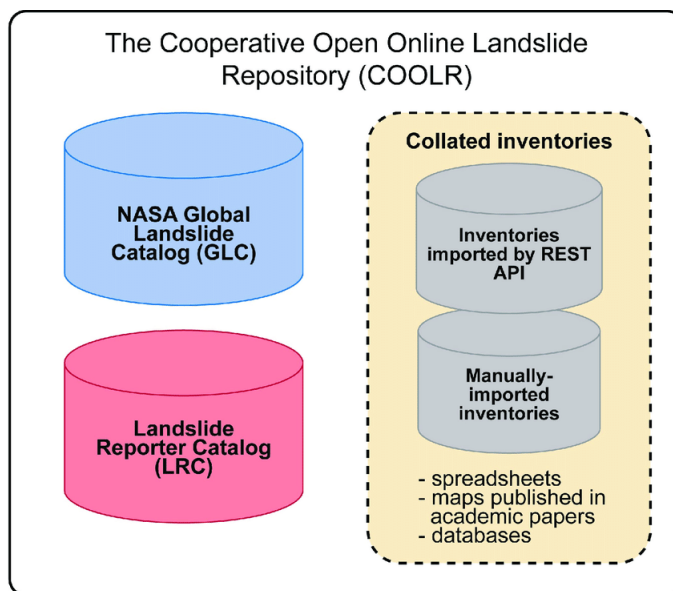Figure 1. COOLR Components Schematic (Juang et al., 2019)

2.3 Quality, Errors, and Limitations

Location accuracy (km) is stored in the Shapefiles in the "loc_accu" parameter. Uncertainty in the magnitude of impacts is not addressed.

3   SOFTWARE AND TOOLS

Shapefiles files can be opened using software that recognizes the shapefile format, such as QGIS and ESRI ArcMap.

The Landslide Hazard Assessment for Situational Awareness (LHASA)[5] software package was developed at NASA Goddard Space Flight Center for the HMA Project, to identify in real time the potential for rainfall-triggered landslides. Though not designed for non-specialist users, it may be useful to other scientists and can provide details about the algorithms behind certain HMA data products.

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[5] Created by Thomas Stanley and Dalia Kirschbaum

4 VERSION HISTORY

Table 4. Version History Summary

Version	Description of Changes
V2 (June 2023)	• Spatial coverage trimmed to the HMA study area • Includes corrections and new landslides added to COOLR source catalog after publication of V1 (March 2019)
V1 (March 2019)	Initial publication

5 RELATED DATA SETS

High Mountain Asia | Data

Landslides @ NASA (COOLR)

6 RELATED WEBSITES

High Mountain Asia | Overview

NASA's High Mountain Asia Team

7 CONTACTS AND ACKNOWLEDGMENTS

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8 REFERENCES

Juang, C. S., Stanley, T. A., and Kirschbaum, D. B. 2019. Using citizen science to expand the global map of landslides: Introducing the Cooperative Open Online Landslide Repository (COOLR). *PLOS ONE*, 14(7), e0218657. https://doi.org/10.1371/journal.pone.0218657

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9   DOCUMENT INFORMATION

9.1 Publication Date

June 2023

9.2 Date Last Updated

June 2023