

**Supplementary Material for  
“Landslide Risk Management in Areas Affected by wildfire events or floods: A  
Comprehensive Framework Integrating GIS, Remote Sensing Techniques, and  
Regional Climate Models<sup>1</sup>” BGS paper #35629**

**The pdf Supplementary Material for the manuscript includes:**

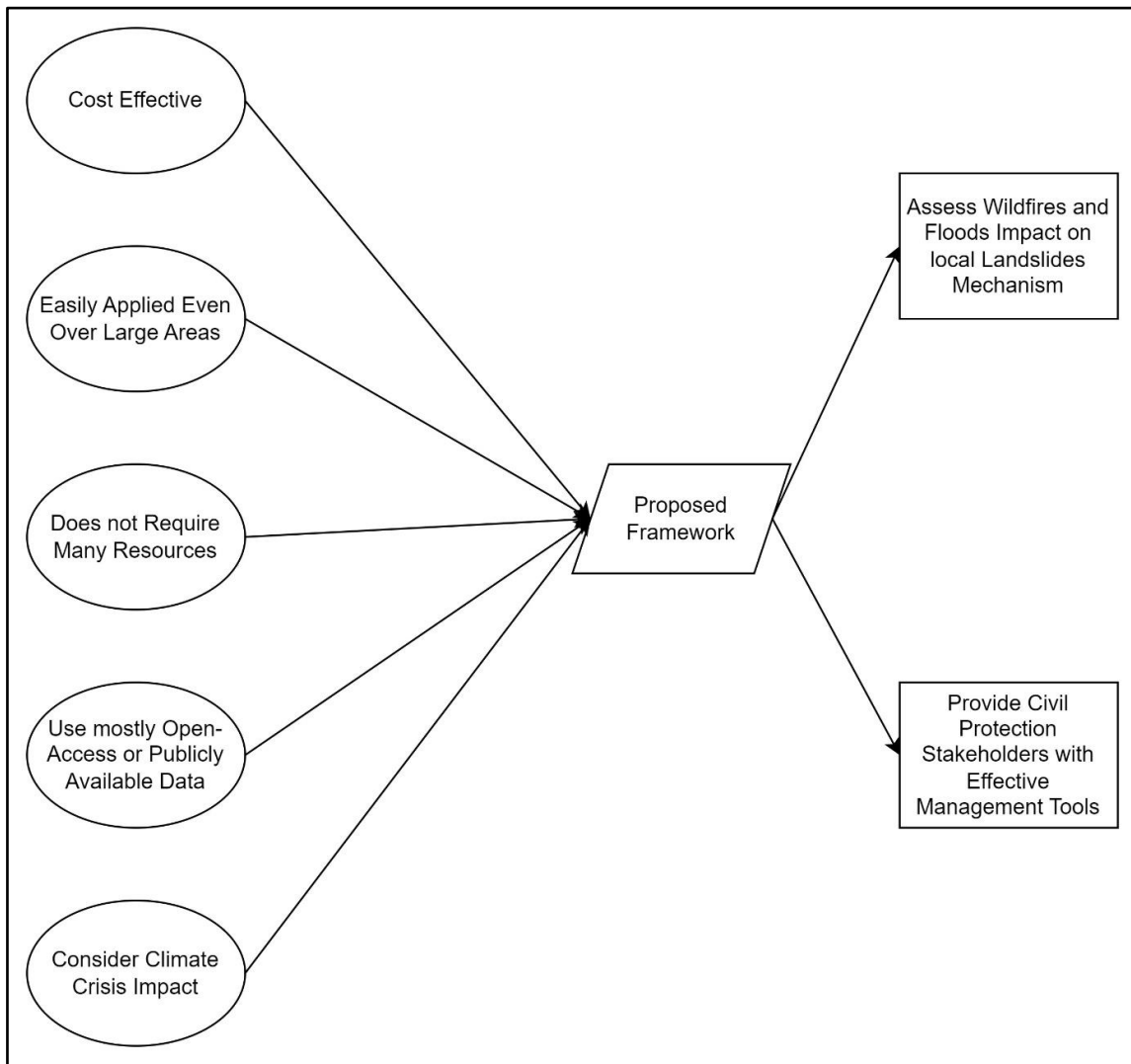
Figures S1- S3

Tables S1-S7

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**FIGURES**



**Fig. S1.** Framework Specifications and Outcomes

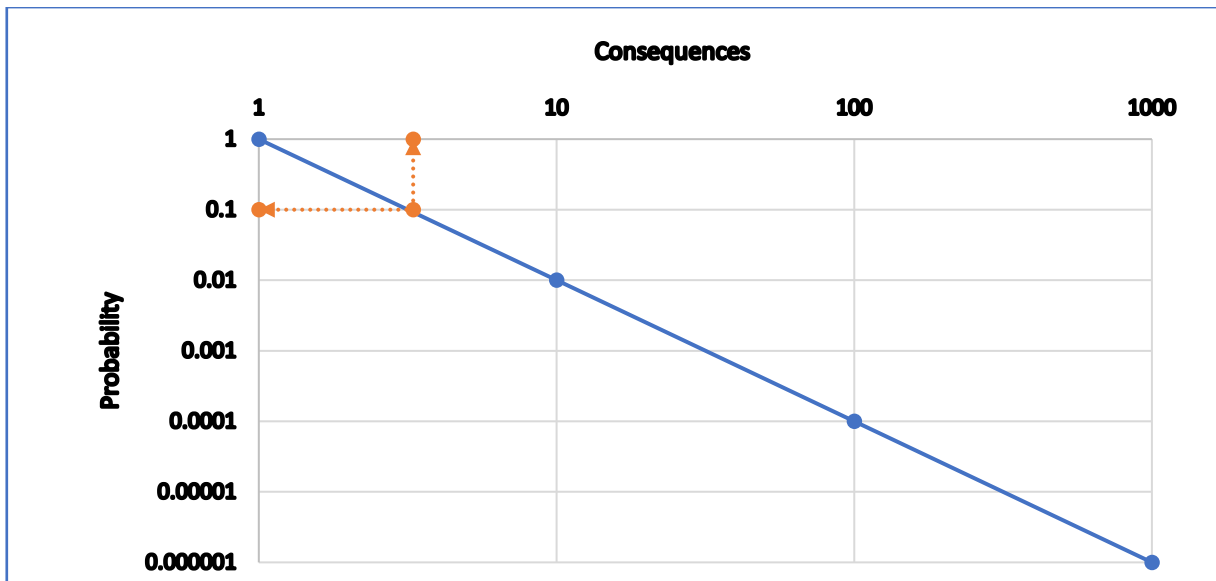


Fig. S2. Framework Specifications and Outcomes (based on graph of (Fausto Guzzetti, 2005))

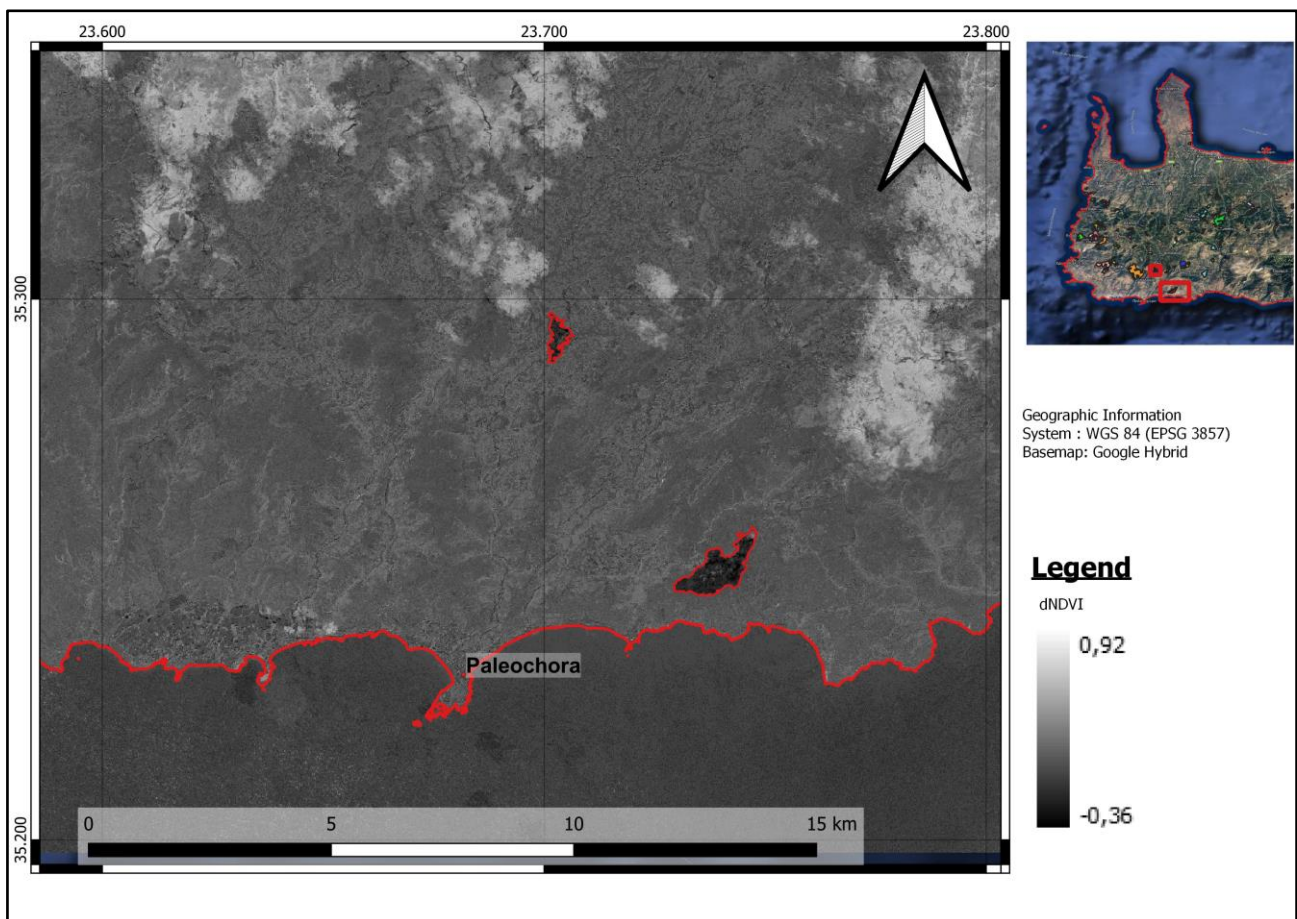


Fig. S3. dNDVI evaluated before and after the 2021 wildfires.

## TABLES

**Table S1.** Acquiring Open Access or Publicly Available Data within the Proposed Framework

	<b>Data</b>	<b>Indicative Examples of Sources</b>
1	Precipitation Timeseries from local meteorological stations' rain gauges	<a href="https://meteosearch.meteo.gr">https://meteosearch.meteo.gr</a> <a href="http://www.hydroscope.gr">http://www.hydroscope.gr</a> <a href="http://www.emy.gr/emy/el/services/paroxi-ipiresion-protogeni-dedomena">http://www.emy.gr/emy/el/services/paroxi-ipiresion-protogeni-dedomena</a>
2	Landslide Inventory	<a href="https://data.nasa.gov/Earth-Science/Global-Landslide-Catalog-Not-updated-/h9d8-neg4">https://data.nasa.gov/Earth-Science/Global-Landslide-Catalog-Not-updated-/h9d8-neg4</a> <a href="http://geoland.metal.ntua.gr/">http://geoland.metal.ntua.gr/</a> <a href="https://elixisgroup.com/GEER-Medicanelanos-FieldMap/">https://elixisgroup.com/GEER-Medicanelanos-FieldMap/</a> <a href="http://dias-proj.civil.duth.gr/mapstore/#/context/Dias_Landslides/40">http://dias-proj.civil.duth.gr/mapstore/#/context/Dias_Landslides/40</a>
3	Satellite Images	Sentinel (e.g., <a href="https://search.asf.alaska.edu/#/">https://search.asf.alaska.edu/#/</a> , <a href="https://sentinels.space.noa.gr/dhus/#/home">https://sentinels.space.noa.gr/dhus/#/home</a> ) Landsat (e.g., <a href="https://earthexplorer.usgs.gov/">https://earthexplorer.usgs.gov/</a> ) MODIS (e.g., <a href="https://ladsweb.modaps.eosdis.nasa.gov/search/">https://ladsweb.modaps.eosdis.nasa.gov/search/</a> ) Google Earth (e.g., <a href="https://earth.google.com/web">https://earth.google.com/web</a> ) <a href="https://apps.sentinel-hub.com/eo-browser">https://apps.sentinel-hub.com/eo-browser</a>
	Burned /Flooded Areas	Normalized Difference Vegetation Index (NDVI) Normalized Difference Water Index (NDWI) Differenced Normalized Burn Ratio (DNBR) Relativized Burn Ratio (RBR) Burned Vegetation Index (BVI) Potential Evapotranspiration (PET) <a href="https://effis.jrc.ec.europa.eu/apps/data.request.form/">https://effis.jrc.ec.europa.eu/apps/data.request.form/</a> <a href="https://www.efas.eu/efas_frontend/#/home">https://www.efas.eu/efas_frontend/#/home</a> <a href="http://ocean.space.noa.gr/diachronic_bsm">http://ocean.space.noa.gr/diachronic_bsm</a>
	Other Open Access/ Publicly Available Data	<a href="https://www.google.com/streetview/">https://www.google.com/streetview/</a> <a href="https://www.mapillary.com/app">https://www.mapillary.com/app</a> <a href="https://www.openstreetmap.org">https://www.openstreetmap.org</a> (such as streets and rivers) <a href="https://land.copernicus.eu/pan-european/corine-land-coverCorine Database">https://land.copernicus.eu/pan-european/corine-land-coverCorine Database</a> <a href="https://geoportal.ermis-f.eu/">https://geoportal.ermis-f.eu/</a> <a href="https://data.apdkritis.gov.gr/">https://data.apdkritis.gov.gr/</a> <a href="https://mapsportal.ypen.gr/">https://mapsportal.ypen.gr/</a>

**Table S2.** Methods used within the Proposed Framework

	<b><u>Techniques</u></b>	<b><u>Application</u></b>	<b><u>Relative Scientific Article analysing the methodology</u></b>
	<b>Geographical Information System (GIS)</b>	Evaluating hydrological and geological characteristics of the area of interest	(Nefros & Loupasakis, 2022)
		Causal Factor Analysis (e.g., Analytical Hierarchy Process)	(Nefros, et al., 2023a)
		Weight Linear Combination	(Nefros, et al., 2023a)
		Creation of Landside Susceptibility Maps	(Nefros, et al., 2023a)
		Evaluation of Precipitation Thresholds	(Nefros, et al., 2022)
		Evaluating Proximity to Faults	(Ganas et al., 2013)
		Landslide Hazard Assessment	(Guzzetti Fausto, 2005)
		Landslide Risk Assessment	(Guzzetti Fausto, 2005)
	<b><u>Remote Sensing</u></b>	Indexes (Burn Ratio Difference, NDVI, Evapotranspiration)	(De Simone et al., 2020, KOVÁCS, 2019)
		P-PSI	(Nefros, et al., 2023b)
	<b><u>Regional Climate Models</u></b>	Moch, cbrn, mpi (Max Plank Institute)	(Nefros, et al., 2023a)
		Evaluation of landslide precipitation thresholds trends to the future	(Nefros, et al., 2023a)

**Table S3.** Meteorological Stations that provide publicly available data through Meteo platform and hydroscope project

ID	Meteorological Station's Name	$\phi^\circ$	$\lambda^\circ$	Period Covered
1	Agioi Pantas	35.3988	24.1530	1/10/2015- 31/12/2020
2	Alikianos	35.4544	23.9108	1/9/2012- 31/12/2020
3	Asi Gonia	35.2739	24.2837	1/9/2017- 31/12/2020
4	Askifou	35.2926	24.1762	1/9/1973- 31/12/2020
5	Chania Technical University of Crete	35.53330	24.06920	1/1/2011-31/12/2020
6	Elos	35.3641	23.6385	1/12/2014- 31/12/2020
7	Emprosneros	35.3449	24.1870	1/10/1962- 30/9/2019
8	Falasarna	35.4924	23.5820	1/4/2010 – 31/2012 & 1/1/2016- 31/12/2020
9	Kalives	35.45935	24.14912	1/1/1976- 31/8/2010
10	Kandanos	35.3313	23.7470	1/1/1955- 31/12/2020
11	Kolimpari	35.5248	23.7988	1/11/2016- 31/12/2020
12	Palea Roumata	35.39975	23.77927	1/1/1976- 30/8/2010
13	Paleochora	35.2313	23.6812	1/10/2006 -31/12/2020
14	Platanias	35.5169	23.8842	1/7/2015 – 31/12/2020
15	Prasses	35.3760	23.8480	1/9/1997- 31/8/2010
16	Samaria	35.3092	23.9170	1/8/2008- 31/12/2020
17	Sebronas	35.3743	23.8214	1/6/2015- 31/12/2020
18	Stalos	35.5029	23.9347	1/11/2018 – 31/12/2020
19	Strovles	35.3621	23.6643	1/6/1954- 30/9/2019
20	Sfakia	35.2302	24.0179	1/3/2013 – 31/12/2020
21	Vrisses	35.3643	24.2296	1/1/2017- 31/12/2020

**Table S4.** Table for Assessing Causal Factors Relationships

Scales	Degree of preferences	Descriptions
1	Equally	Two activities contribute equally to the objective
3	Moderately	Experience and judgment slightly to moderately favour one activity over another
5	Strongly	Experience and judgment strongly or essentially favour one activity over another
7	Very strongly	An activity is strongly favoured over another and its dominance is showed in practice
9	Extremely	The evidence of favouring one activity over another is of the highest degree possible of an affirmation
2, 4 , 6, 8,	Intermediate values	Used to represent compromises between the preferences in weights 1, 3, 5, 7 and 9

**Table S5.** RI Index

n	1	2	3	4	5	6	7	8	9	10
RI	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.46	1.49

**Table S6.** Evaluating Vulnerability Criteria by using AHP

<i>Causal Factors</i>	<i>F1</i>	<i>F2</i>	<i>F3</i>	<i>F4</i>	<i>F5</i>
F1 (Population: disabled, elderly, kids)	1.00	2.00	8.00	4.00	5.00
F2 (Use: residential areas, churches, supermarkets, banks, warehouses etc.)	0.50	1.00	4.00	1.00	3.00
F3 (Buildings' age)	0.13	0.25	1.00	0.50	1.00
F4 (Construction importance: roads, bridges, industries, factory)	0.25	1.00	2.00	1.00	3.00
F5 (Distance from big cities- difficult of access)	0.20	0.33	1.00	0.33	1.00
<b>Total</b>	2.08	4.58	16.00	6.83	13.00

**Table S7.** Evaluating Criteria Weights by using AHP

<b>Causal Factors</b>	F1	F2	F3	F4	F5	Total	<b>Weight</b>	Consistency	Final Weight
F1	0.48	0.44	0.50	0.59	0.38	2.39	<b>0.478</b>	5.16	10
F2	0.24	0.22	0.25	0.15	0.23	1.09	<b>0.217</b>	5.07	4
F3	0.06	0.05	0.06	0.07	0.08	0.33	<b>0.065</b>	5.12	1
F4	0.12	0.22	0.13	0.15	0.23	0.84	<b>0.168</b>	5.06	3
F5	0.10	0.07	0.06	0.05	0.08	0.36	<b>0.071</b>	5.05	1
<b>Total</b>	1.00	1.00	1.00	1.00	1.00		CI	0.02	
							RI	1.12	
							<b>CR</b>	<b>0.020</b>	