Analysis and mapping of natural hazards using common photography

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Short history:

2010 At WSL start of the monoplotting project with the aim of developing a user friendly software to do 3D cartography with oblique photographs.

2011 WSL Monoplotting Tool version 1.x

2017 WSL Monoplotting Tool version 2.x

wsl.ch/monoplotting

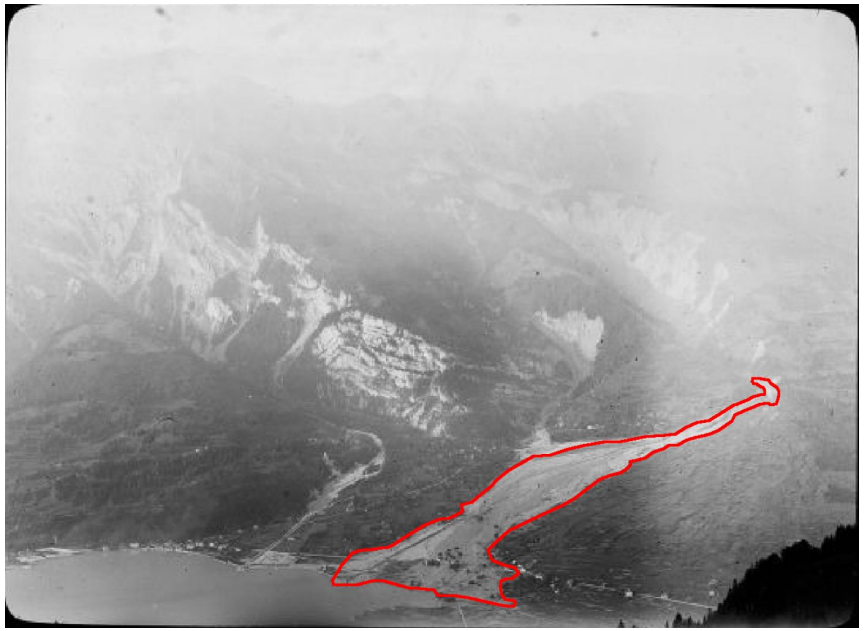
2023 image2world versione 3.x

i2w.ch

Landslide in Brienz/Schwanden (Canton Bern, Switzerland, 1896)

Situation:

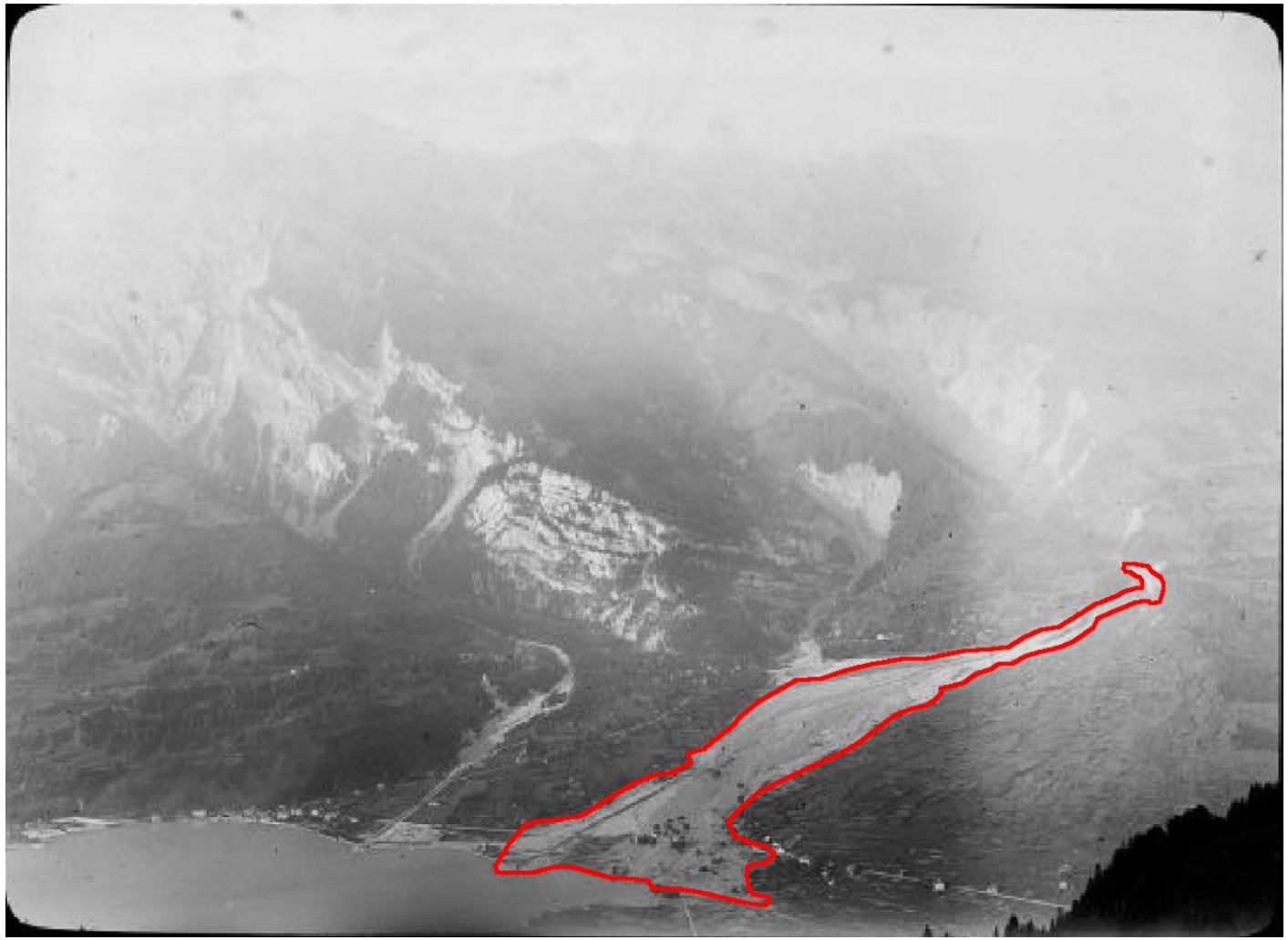
- May 26: 300,000 m^3 landslide created natural dam
- May 31: dam breach with first major debris flow
- June 12: second debris flow



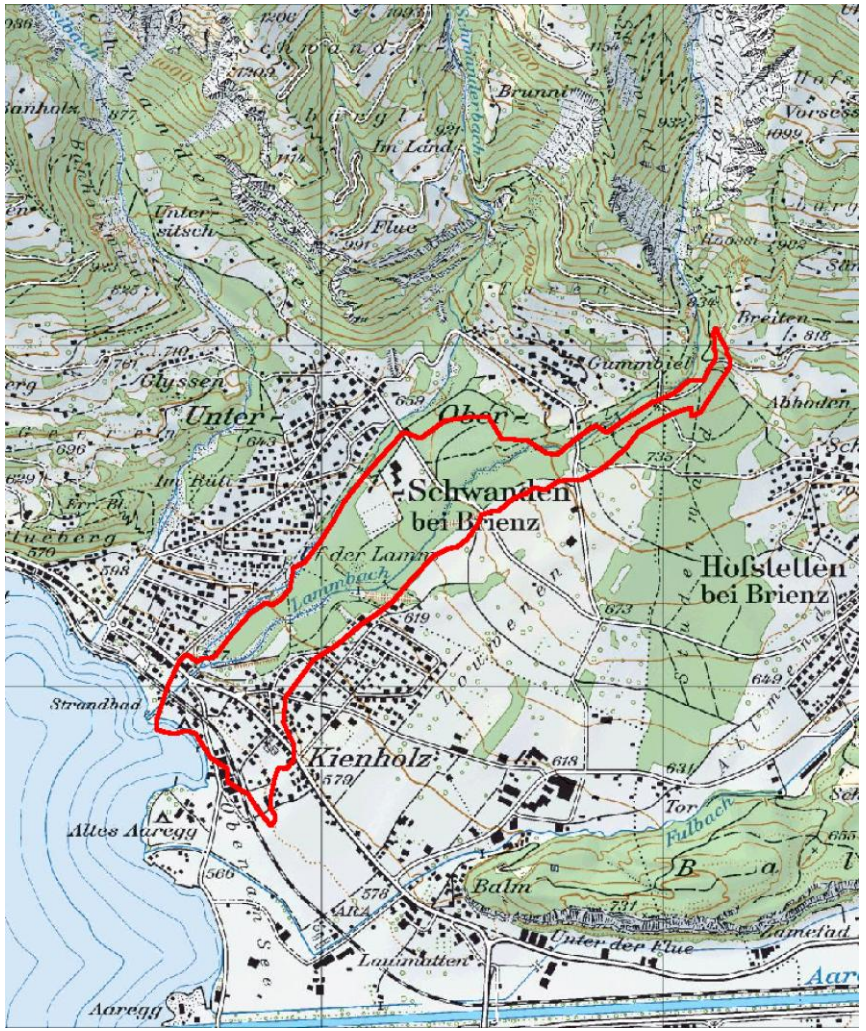
Cartography of the area affected by debris flows:

- Rough estimate based on existing event descriptions
- Precise cartography by georeferencing an ETH Library image

Landslide in Brienz/Schwanden (Canton Bern, Switzerland, 1896)

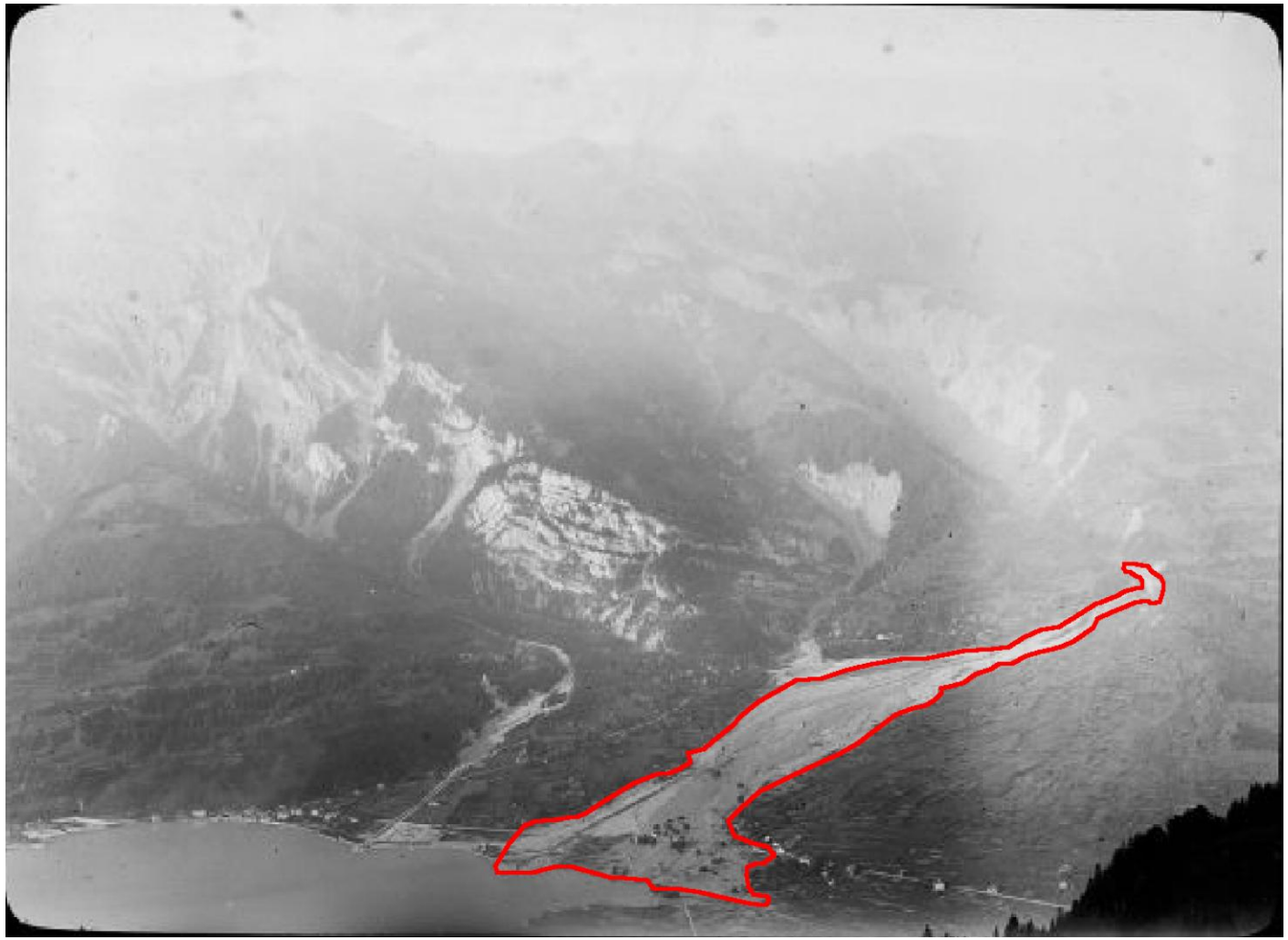


Debris flow on the 1896 photograph (ETH Library).

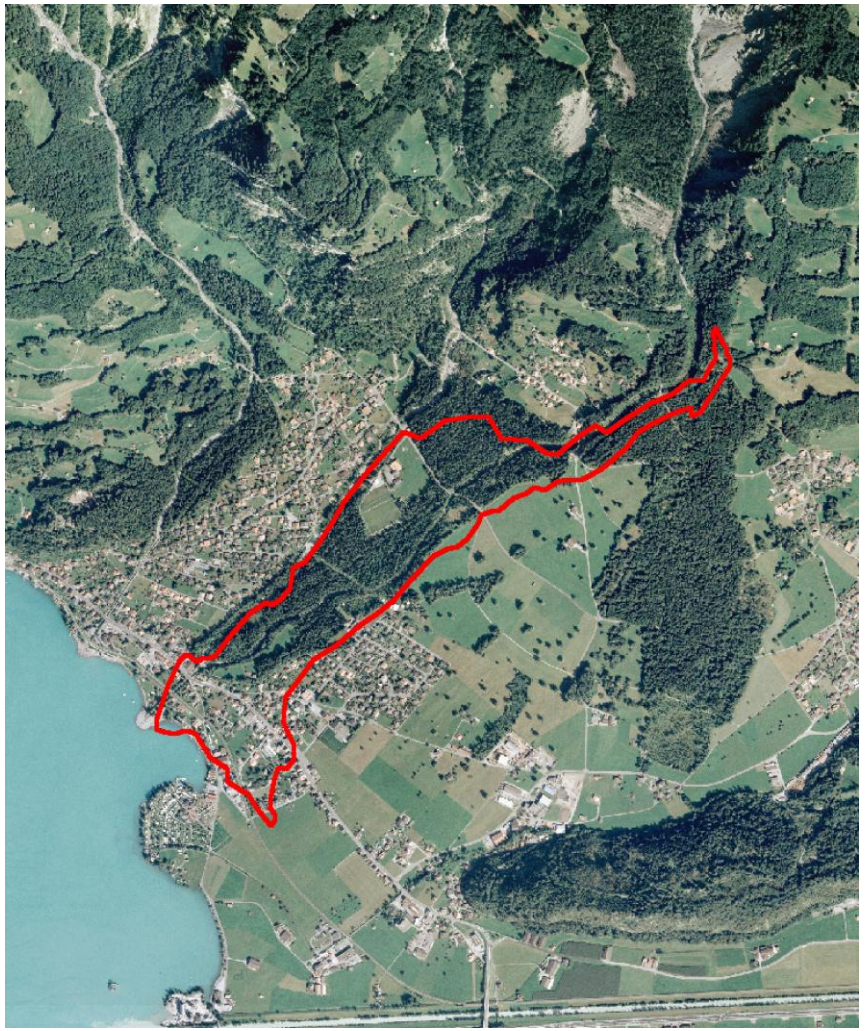


Cartography of the area affected by the flow (*swisstopo*).

Landslide in Brienz/Schwanden (Canton Bern, Switzerland, 1896)



Debris flow on the 1896 photograph (ETH Library).



Cartography of the area affected by the flow on the 2012 orthophoto (*swisstopo*).

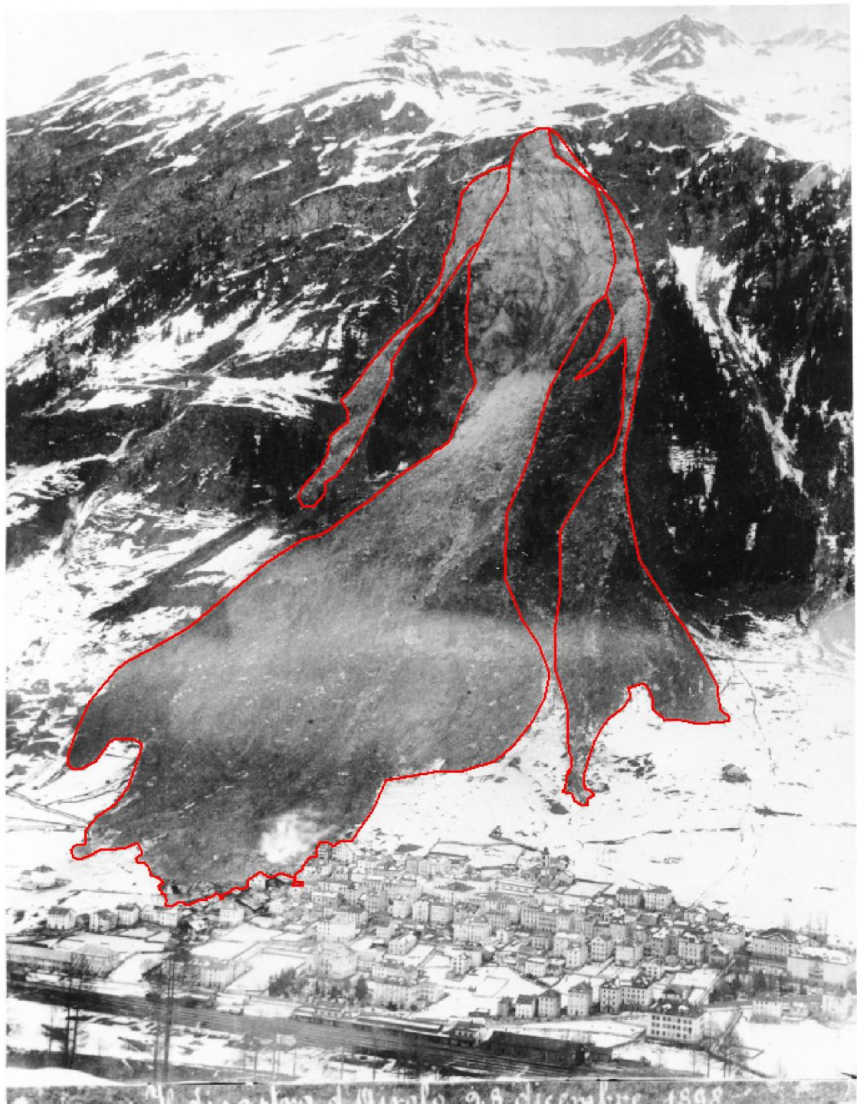
Rockslide of Sasso Rosso in Airolo - Valle Leventina (Canton Ticino, Switzerland, 1898)

Situation:

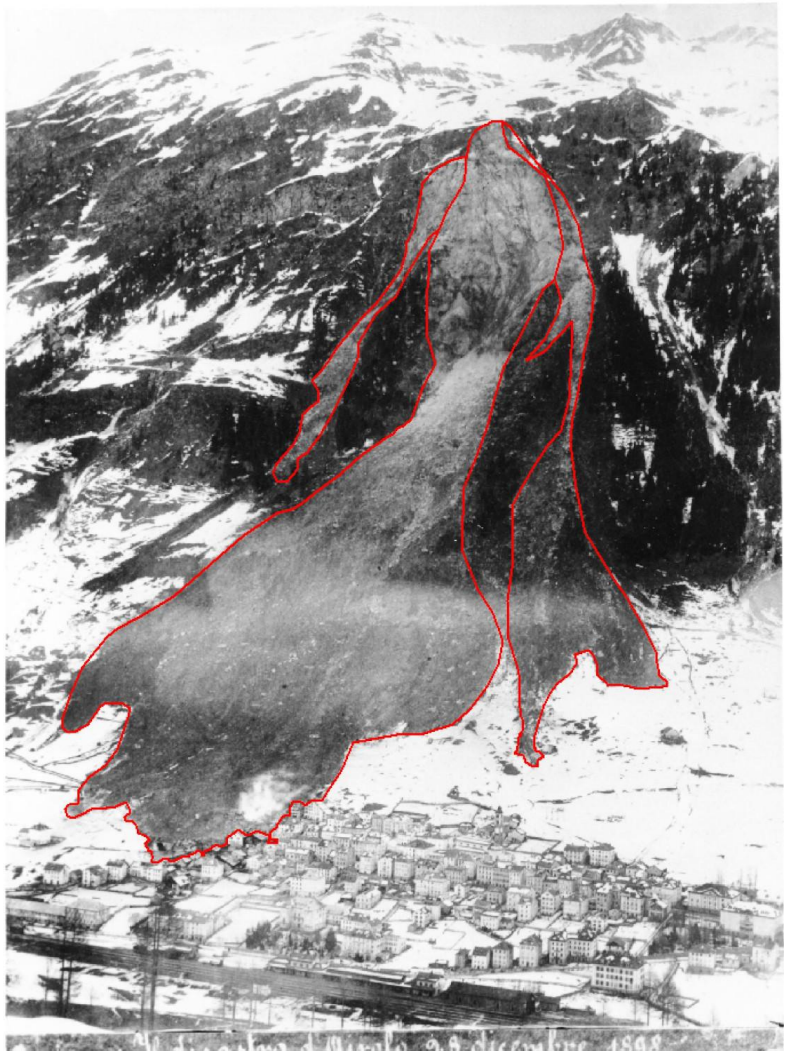
- Summer 1898: first significant slope movements
- December 1988: three slides of increasing size
- December 27: more slides with a total volume of 500,000 m^3

Cartography of the area affected by debris flows:

- Precise cartography by georeferencing images of the event
- The affected area of debris covered about 425,000 m^2



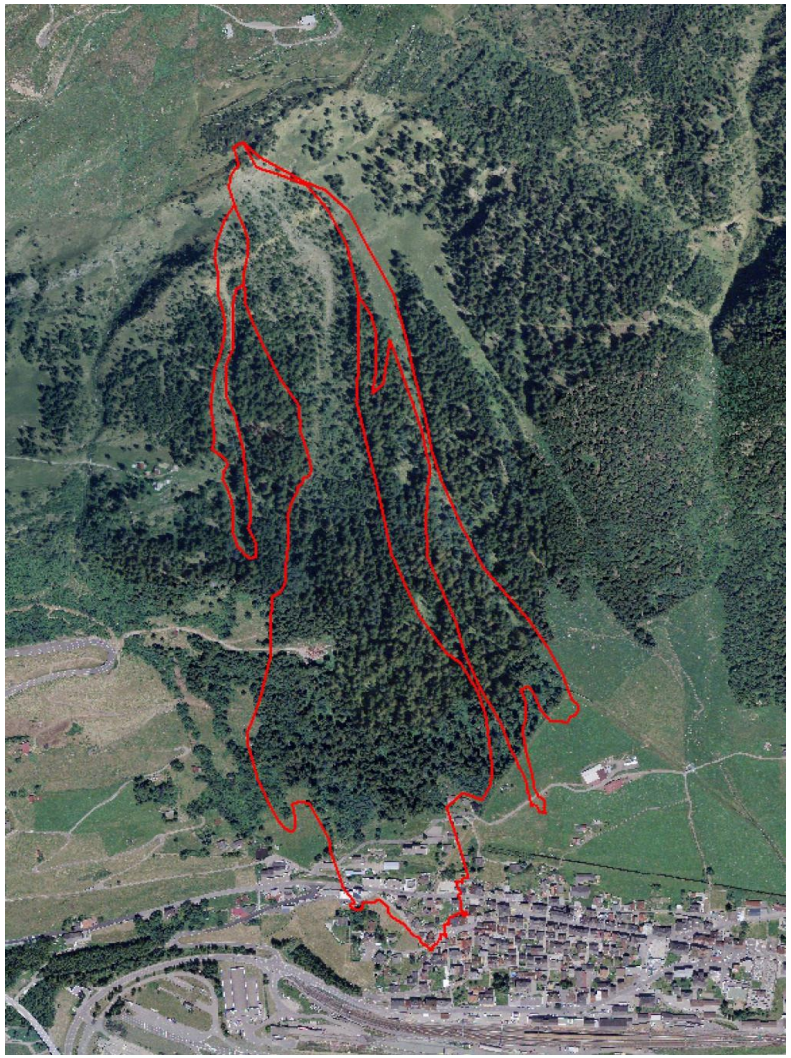
Rockslide of Sasso Rosso in Airolo - Valle Leventina (Canton Ticino, Switzerland, 1898)



Complete photograph of the rockslide.

Partial photograph on the rockslide area.

Rockslide of Sasso Rosso in Airolo - Valle Leventina (Canton Ticino, Switzerland, 1898)



Cartography of the area affected by the flow (*swisstopo*).

Projection of the rockslide perimeter on an oblique terrestrial image of the area prior to the event.

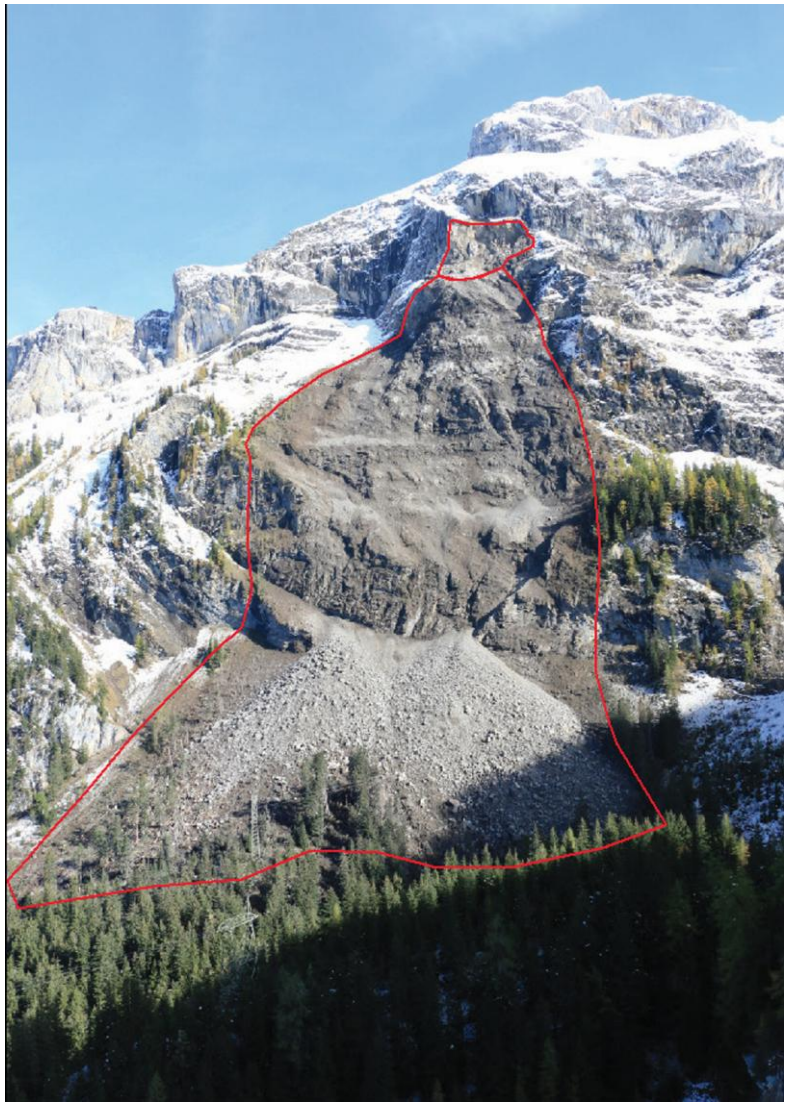
Rockslide of Spitzhorn in Gstaad (Canton Bern, Switzerland, 2017)

Situation:

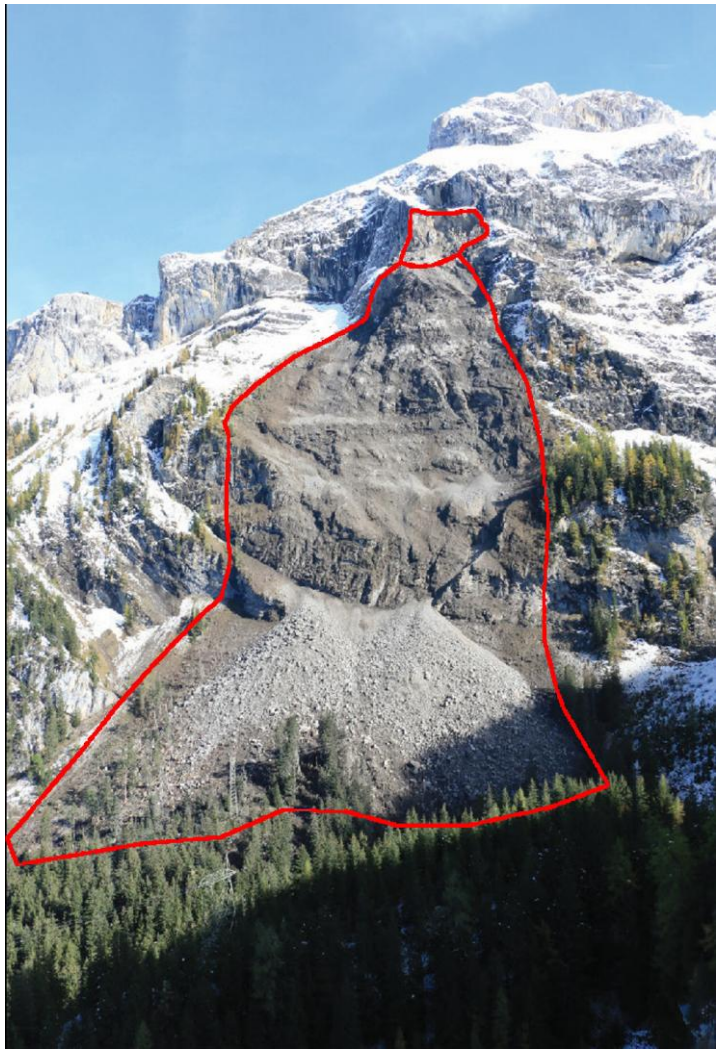
- October 2017: minor slides followed by a single main rockfalls
- Total volume of 50,000 m^3

Cartography of the area affected by debris flows:

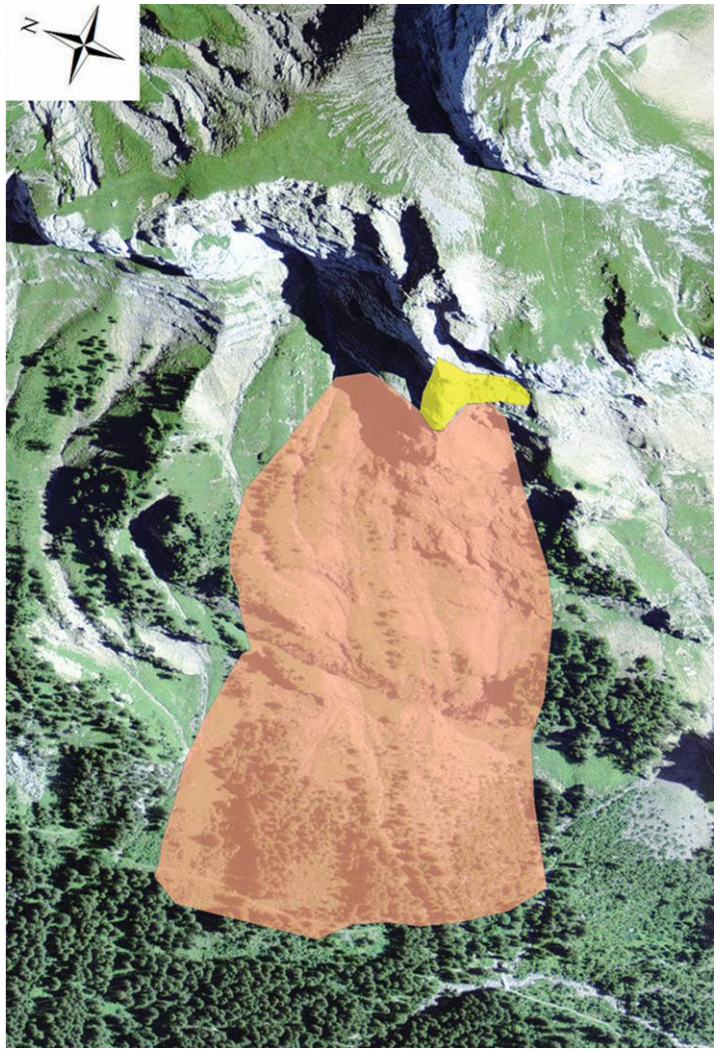
- Precise cartography by georeferencing images of the event
- Identification of the detachment and the transit/deposit zone



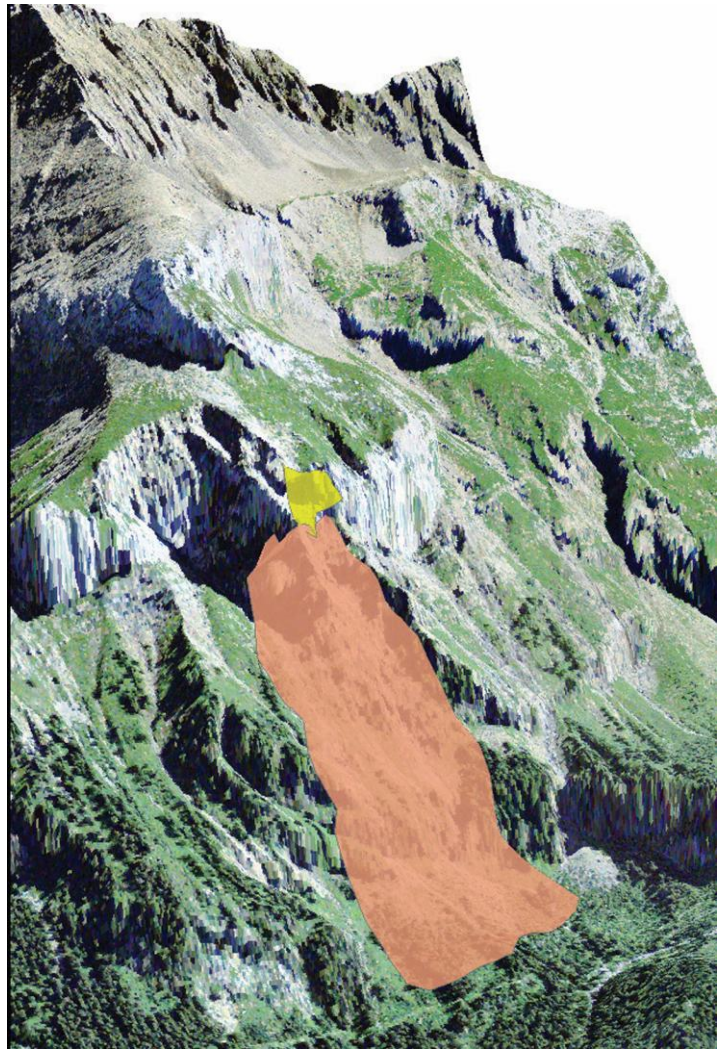
Rockslide of Spitzhorn in Gstaad (Canton Bern, Switzerland, 2017)



Digitalization of the detachment and transit/deposit zone on the original oblique image.



Projection of the detachment (yellow) and transit/deposit (orange) zone on the 2017 orthophoto (*swisstopo*).



Projection and 3D viewing of the digitalized zones in ESRI ArcScene.

Snow Bridges in Adelboden (Canton Bern, Switzerland, 2018)

Situation:

- January 24: helicopter mission after end of heavy snowfall
- Detection of partial blanketing of the snow bridges
- Reduced protective function

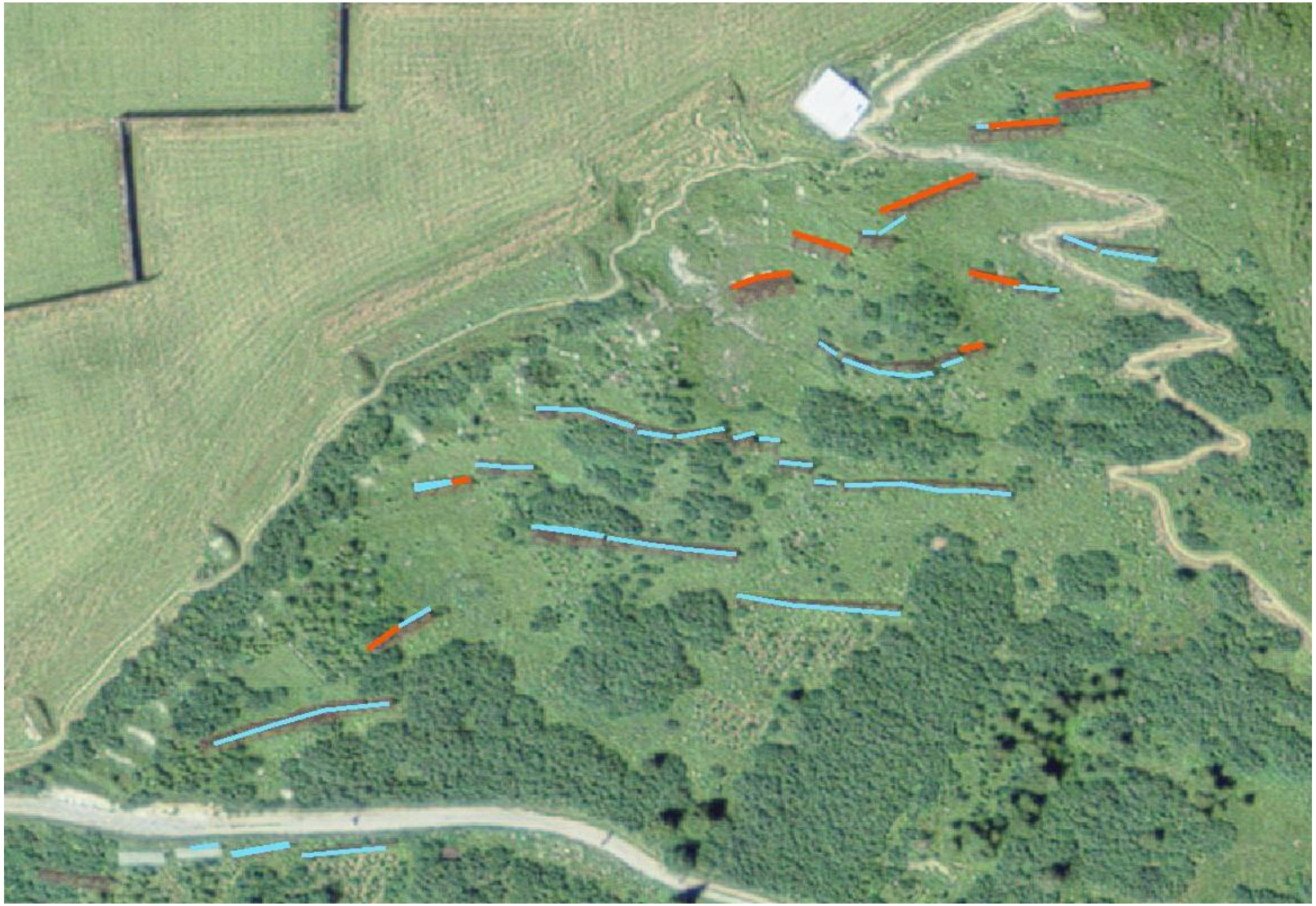
Cartography of the area:

- Precise cartography of the visible parts of the snow bridges
- Comparison with existing cartography
- Identification of covered parts of snow bridges

Snow Bridges in Adelboden (Canton Bern, Switzerland, 2018)

Partial blanketing of the snow bridges, documented during a helicopter mission on January 24, 2018.

Snow Bridges in Adelboden (Canton Bern, Switzerland, 2018)



Mapping the visible parts of the bridges (blue) made it possible to identify the parts covered by snowfall (red), which could potentially fail in their protective function.

Flood in Fontana - Valle Maggia (Canton Ticino, Switzerland, 2024)

Situation:

- June 29-30: violent thunderstorm
- Precipitation up to 200/250 mm
- Unprecedented landslides and flooding
- June 30: publication of individual NADIR photos by *swisstopo*

Cartography of the area (test):

- *image2world* orthorectification of a *swisstopo* NADIR photo
- Immediate (1/2 hour) and precise (accuracy < 1m) result

Flood in Fontana - Valle Maggia (Canton Ticino, Switzerland, 2024)

Orthophoto of 2021 (*swisstopo*).

Orthorectification by *image2world* of a *swisstopo* NADIR image immediately after the event (June 30, 2024).

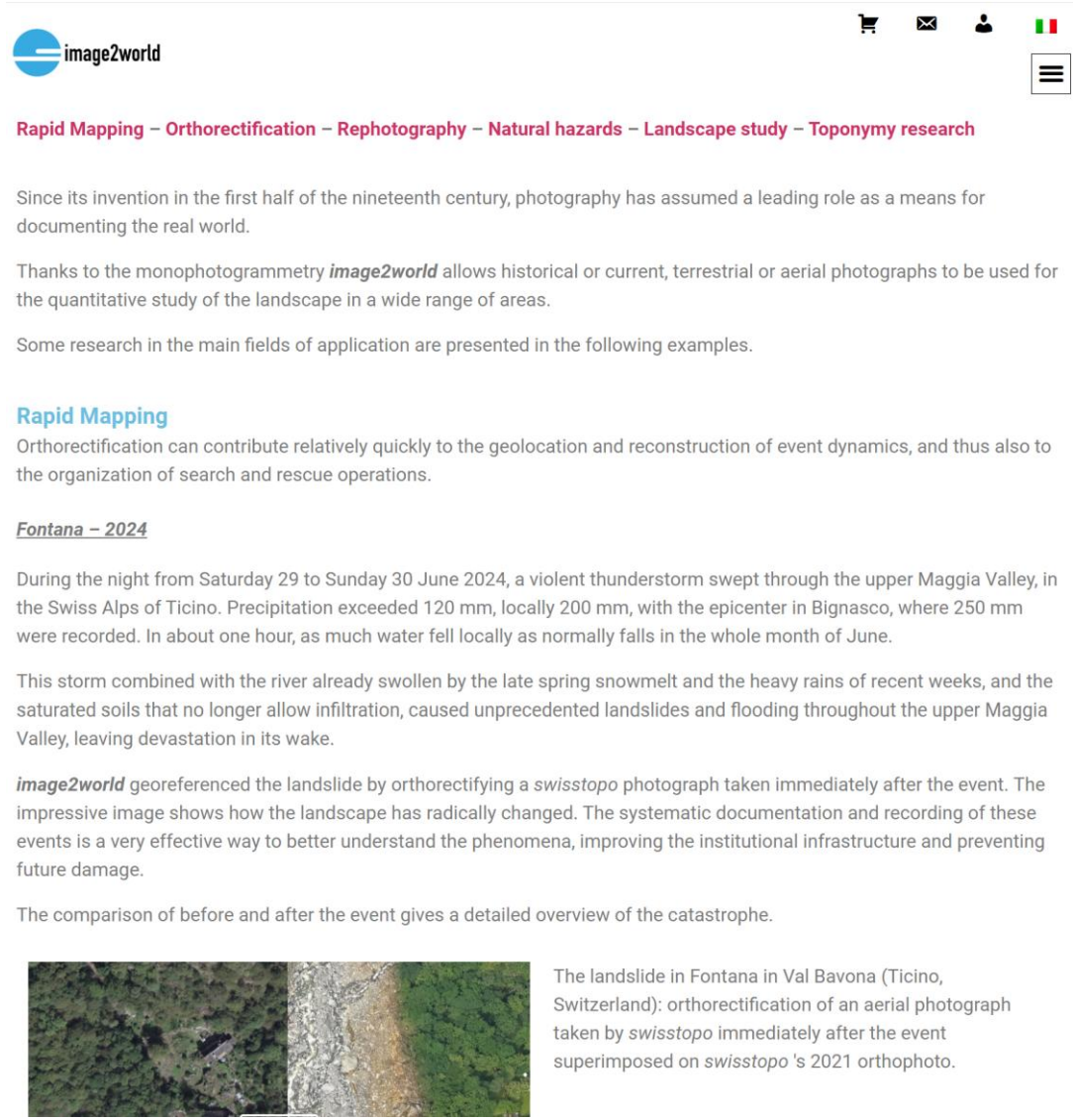
Features of *image2world*

Images:

- Historical or current landscape photos
- Terrestrial or aerial photos
- Oblique or NADIR photos

Features:

- Georeferencing oblique photos
- Orthorectification of NADIR photos (*Rapid Mapping*)
- Digitizing 3D objects directly on the photo
- Native ***ESRI Shapefile*** support



Working with *image2world*

1. Purchase software:

- Buy the software *image2world Std / Pro*
- Learn how to use the software
- Agreement required for institutional or commercial use

2. Purchase services*:*

- Download the free version *image2world Lite*
- Request one of the service offered:
  - Georeferencing
  - Orthorectification
  - Reprojection
- Just use it

3. Purchase support or training:

- Email, online or onsite

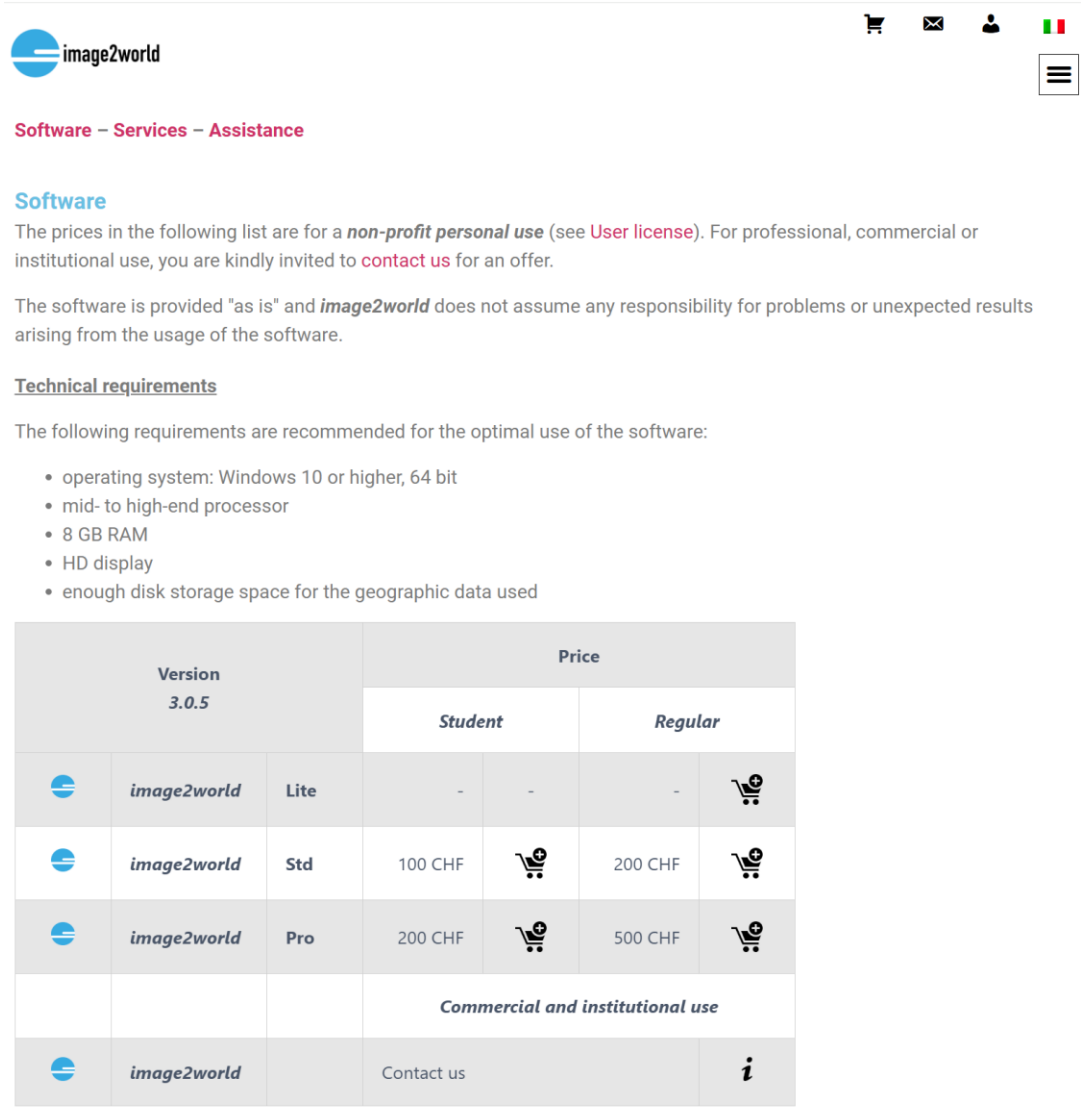


image2world

Software – Services – Assistance

Software

The prices in the following list are for a ***non-profit personal use*** (see User license). For professional, commercial or institutional use, you are kindly invited to contact us for an offer.

The software is provided "as is" and ***image2world*** does not assume any responsibility for problems or unexpected results arising from the usage of the software.

Technical requirements

The following requirements are recommended for the optimal use of the software:

- operating system: Windows 10 or higher, 64 bit
- mid- to high-end processor
- 8 GB RAM
- HD display
- enough disk storage space for the geographic data used

Version 3.0.5			Price			
			Student		Regular	
	image2world	Lite	-	-	-	
	image2world	Std	100 CHF		200 CHF	
	image2world	Pro	200 CHF		500 CHF	
			Commercial and institutional use			
	image2world		Contact us			

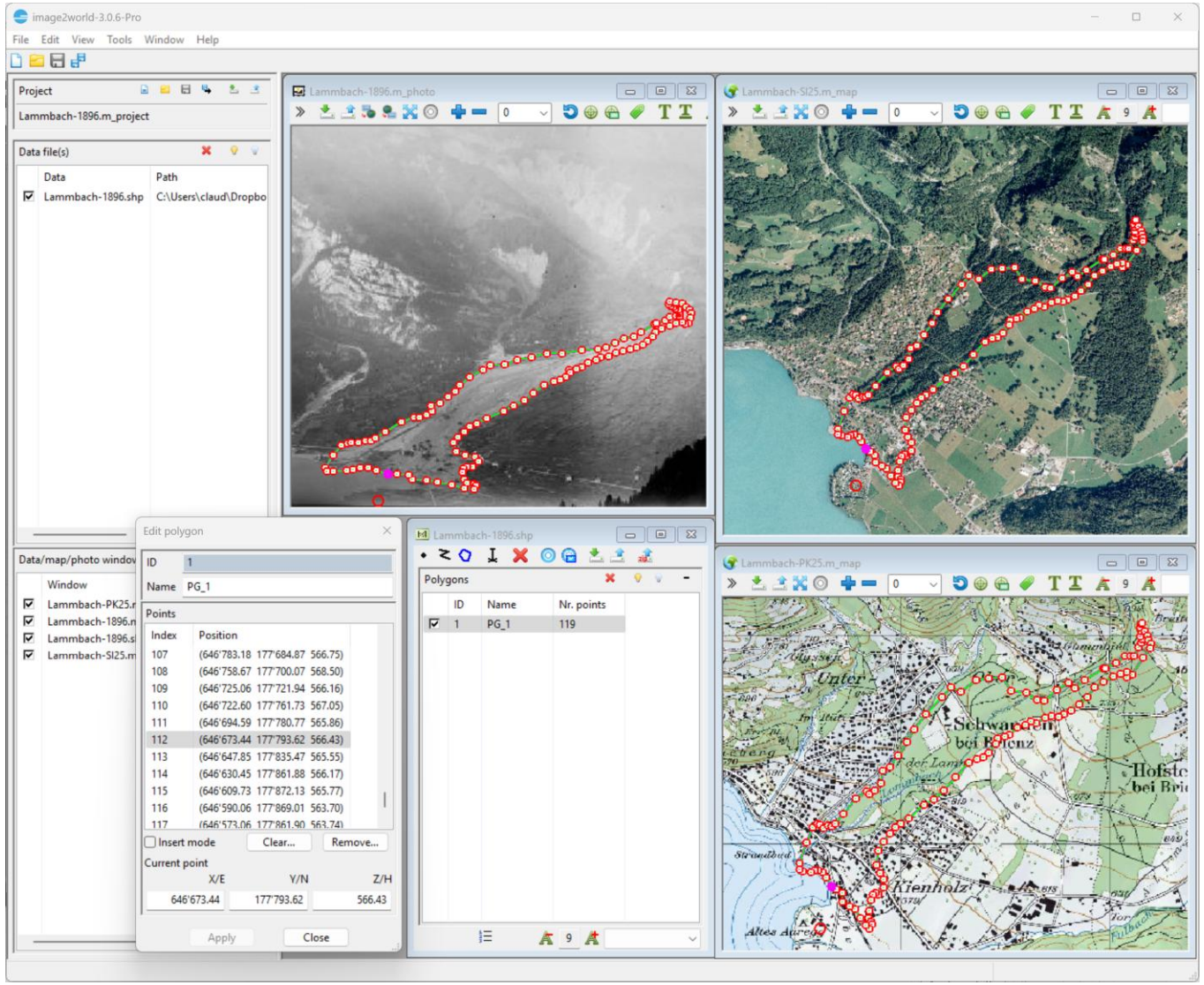
image2world:

easy,

cheap,

effective

way to do 3D cartography!



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Thank you!