CANTON DU VALAIS
KANTON WALLIS

gemeinde
3919 blatten

Blatten4Science

Observational Research Data of the 2025 Nesthorn – Birchgletscher Process Cascade

Technical Documentation

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Mandated by the **Canton of Wallis, Natural Hazard Services (SDANA)** with the consent of the **Municipality of Blatten im Lötschental**

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Abstract

The project ‘Blatten4Science’, mandated by the Canton of *Wallis* with the consent of the data-owning Municipality of *Blatten im Lötschental* provides a comprehensive data cube of the process cascade which unfolded in May 2025. Initial rockfalls on *Kleines Nesthorn* quickly escalated to the sudden collapse of *Unterer Birchgletscher*, which led to a disastrous rock-ice avalanche burying most of the village of *Blatten i.L.* on May 28, 2025, and the consecutive filling of a temporary lake behind the debris cone.

This project provides the research community with open access to the imagery and diverse measurements collected during the months May and June 2025.
The aim is to enable the most detailed, comprehensive and accurate scientific analysis possible. Therefore, the data has been completely post-processed, corrected and gap-filled. It is important to note that the dataset is of a much higher quality and consistency than the one available to decision-makers at the time of the crisis in May 2025. Consequently, **the dataset provided here cannot be used as a basis for analyzing the crisis management or decisions made at that time** but rather serves as a basis to better understand the physical processes that were at play during and immediately after the catastrophic event.

Please read the technical report and the corresponding sensor / station factsheets carefully before working with this data.

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- 08 – Webcam Lonza – View from SW
- 09 – Webcam Blatten
- 10 – GNSS Weissenried
- 11 – GNSS Nesthorn
- 13 – Drone Survey
- 14 – Helimap
- 17 – Lake Level – Geoazimut
- 18 – Lonza River Discharge – Upstream
- 19 – Lonza River Discharge – Blatten
- 20 – Lonza River Discharge – Kippel
- 21 – Lonza River Discharge - Gampel

Supplement

1 Gassner, J (2026): *Technical Report on Measurements of Kleines Nesthorn and Birchgletscher with a Ground Based Interferometric RADAR May/June 2025*. Canton of Wallis SDANA, OF1200293.01. GEOPREVENT AG, Zürich, March 31, 2026.

1 Context

1.1 Blatten4Science

1.1.1 Goal

The project 'Blatten4Science', led by the Canton of *Wallis* with the consent of the data-owning Municipality of *Blatten im Lötschental*, aims at compiling, organizing and making available the diverse measurements and observational data recorded during the rapid process cascade which led to the disastrous rock-ice avalanche on May 28, 2025. Its goal is to ensure open access to the data for the global research community.

With the above, a comprehensive collection of diverse and reliable data from the event – henceforth referred to as 'data cube' – is published, whereas some flawed, incomplete or poor-quality datasets were deliberately omitted. Some of the data underwent significant reprocessing efforts, making it more complete, accurate and reliable than it was at the time of its use for real-time risk management.
As a variety of measurement campaigns continued until or started only long after the event, the temporal scope of this curated collection is limited to data gathered from May 1 to June 30, 2025. Some datasets containing repeated measurements (e.g. webcam images or hydrological data) may extend beyond this period, but no completeness is warranted in such cases. Measurement campaigns which started after June 30 were omitted from the data cube altogether.

1.1.2 Contributors & Licensing

All data and reports published in the framework of this project are licensed under **CC BY-NC-SA 4.0**[1]. Users are free to share and adapt the material for non-commercial use, under the condition that appropriate credit is given and resulting contributions are shared under the same license without any additional restrictions.
The published data fall under the ownership of the Municipality of *Blatten im Lötschental*, who during the unravelling of the process cascade commissioned specialized companies to conduct a variety of measurements. Table 1 lists the main products and services provided by private and public contributors.

Public data, for which open access is already warranted within the framework of Switzerland's Open Government Data OGD[2], is not included in this data cube. The most common points of access for cartographic (*swisstopo*) and meteorological (*MeteoSchweiz*) and nivological

[1] https://creativecommons.org/licenses/by-nc-sa/4.0/.
[2] Information: https://www.bfs.admin.ch/bfs/en/home/services/ogd.html; Data portal: https://opendata.swiss/en.

(*Swiss Avalanche Research Institute SLF*) data are linked on the Blatten4Science data-distribution webpage: https://blatten-data.epfl.ch/.

Company / Institution	Products & Services	Related Sensors / Stations
geoformer igp AG	Overall coordination of the project Blatten4Science, technical documentation	-
GEOPRAEVENT AG	Interferometric radar sensing and processing, remotely controllable webcams, image deformation analysis, online data portal	02 – FlexCam Birchgletscher 04 – DEFOX Birchgletscher 06 – Interferometric Radar Kleines Nesthorn
Terradata AG	Airborne (drone & helicopter) imagery, elevation models (2D & 3D), thermal imagery	13 – Drone Survey 14 – Helimap
SensAlpin GmbH	Webcam	01 – Sensalpin Camera
Canton of Wallis / Guardaval / CREALP	Hydrological measurements, webcams, compiling public data	08 – Webcam Lonza – View from SW 18 - Lonza river discharge – upstream 20 - Lonza river discharge – Kippel 21 – Lonza River Discharge - Gampel
Geoazimut	Webcams, hydrological measurements	07 – Webcam Geoazimut – Lonza 09 – Webcam Blatten 17 - Lake level – Geoazimut
Glaciorisk	GNSS-Data	10 - GNSS Weissenried 11 - GNSS Nesthorn
Federal Office for the Environment FOEN	Hydrological measurements	19 - Lonza river discharge - Blatten
ETHZ (VAW)	Coordination, IT solutions	-
EPFL (ALPOLE)	IT solutions, Webhosting	-

Table 1

Overview of products and services provided by the participating contributors. The number of the sensors / stations corresponds with the 'Sensor ID' number in the dataset referral code. Similarly, the names correspond to the 'Sensor Name' field used in the dataset. Detailed factsheets about the sensors can be found in Appendix C.

2 Data Overview

All data collected about *Kleines Nesthorn*, *Unterer Birchgletscher*, *Oberer Birchgletscher*, *Birchbach*, *Lonza*, *Blattnersee* (see map in Figure 1) and other nearby places were mainly intended as an aid in risk management. *Integral Risk Management*[3] has been applied in *Lötschental* for several decades according to Swiss national guidelines. With increasing activity of *Kleines Nesthorn*, data sampling became completer and more frequent both temporally and spatially. Nevertheless, the focus of the data acquisition remained clearly on decision-making processes, as opposed to scientific precision and completeness.

[3] PLANAT (2025): Integral risk management – a holistic concept. https://www.planat.ch/en/translate-to-englisch-strategie/integral-risk-management (accessed: 2026/02/24).

2.1 Toponyms

While all documentation related to this project is provided in English, toponyms such as *Kleines Nesthorn* or *Unterer Birchgletscher* are written in the original language as widely used and/or seen on Swiss national maps. Wherever possible, italics indicate such untranslated toponyms.

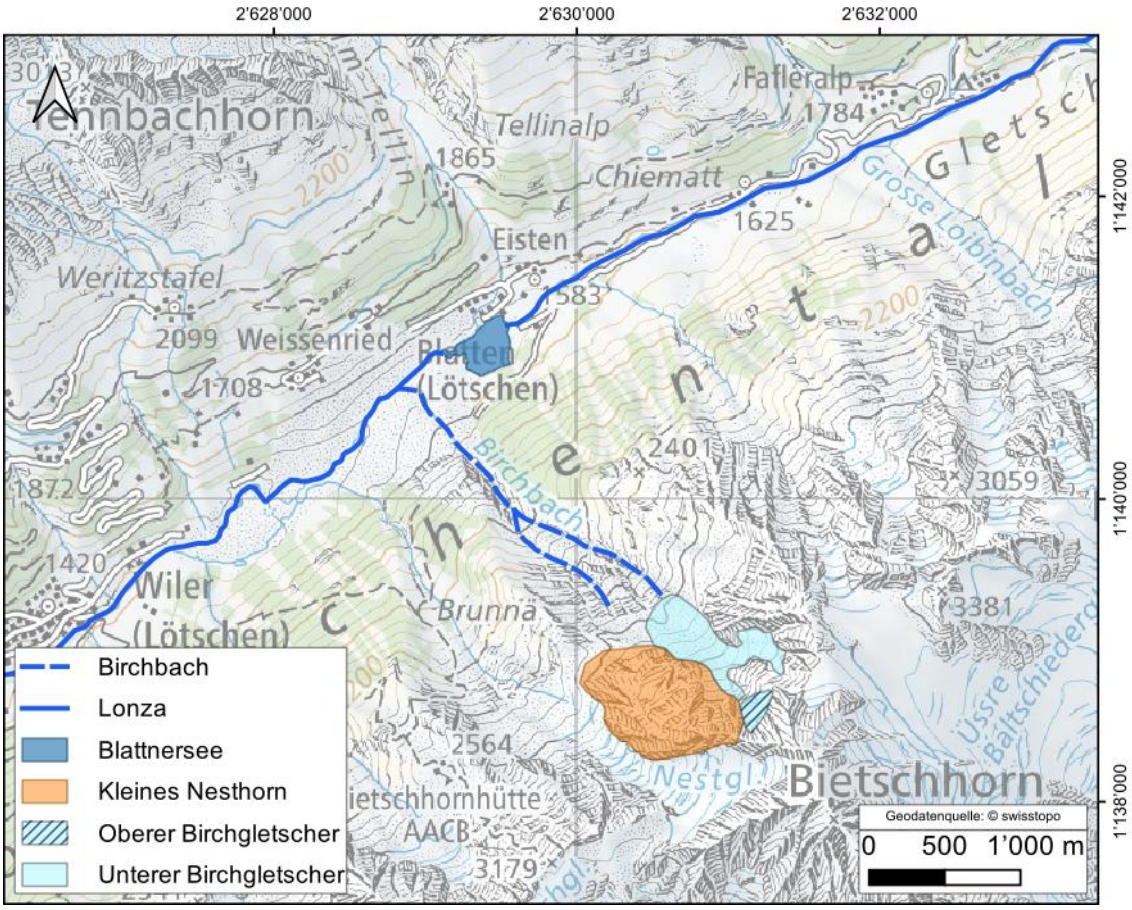


Figure 1

Location of most frequeently used toponyms. Note that the outlines of Kleines Nesthorn and both parts of Birchgletscher can only be approximated.

2.2 Stations and Sensors

Figure 2 displays the location of the stationary sensors in the process area. A more detailed map including most downstream hydrological stations can be found in Appendix B.

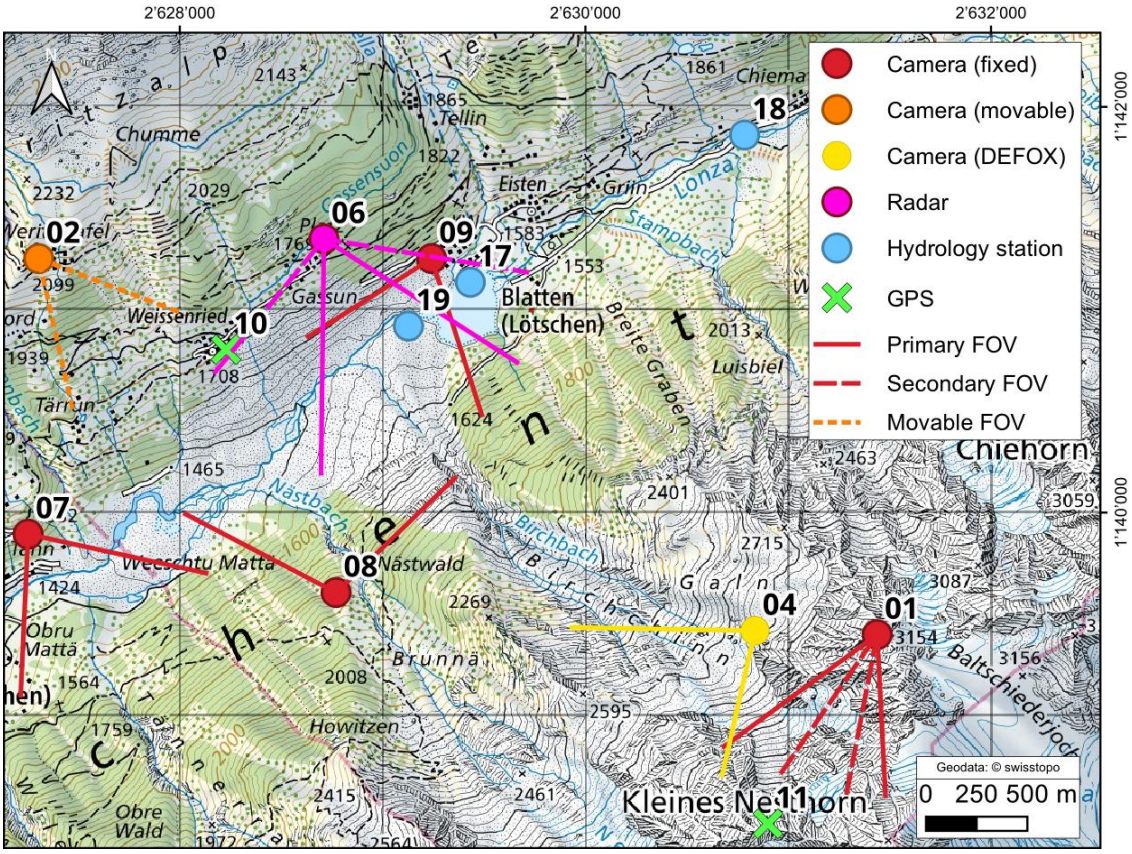


Figure 2

Location of stationary sensors in the vicinity of the landslide area. Some hydrological stations further downvalley are not visible. 'FOV' stands for Field of View.

Some of the sensors have been operated for years prior to the detection of the slope instabilities on *Kleines Nesthorn*:

> Two webcams (*01 – Sensalpin Camera* and *02 – FlexCam Birchgletscher*) covering the northern slopes of *Kleines Nesthorn* have been operated to monitor potential ice-avalanches from the hanging glacier *Oberer Birchgletscher*.

> Two hydrological stations (*21 – Lonza river discharge – Gampel* and *19 – Lonza river discharge – Blatten*) have been measuring water level and along the *Lonza* river. The second station, located in the village of *Blatten*, was destroyed by the landslide.

In the days after detecting the first activities on *Kleines Nesthorn*, more sensors were installed within short-term. The aim was to quantify movement velocities and movement extent in order to allow reliable risk assessment and emergency response:

> A GNSS-sensor (*10 – GNSS Nesthorn*) was placed near the summit of *Kleines Nesthorn*. It registered data for only a few days, after which it is suspected to have been destroyed by early rockfall activity.

> A ground based interferometric radar system GBIR (*06 – Interferometric Radar Kleines Nesthorn*) was set up on May 19 on the opposite side of the valley, measuring and tracking

displacement velocities of the northern slopes and both *Unterer* and *Oberer Birchgletscher*. See Supplement 1 for a detailed technical report on the GBIR setup and data.

> Another webcam with automated deformation analysis (*04 – DEFOX Birchgletscher*) was installed on May 27 on the lateral moraine of *Unterer Birchgletscher*, overlooking the rockfall depositions on the tongue of the lower glacier and the glacier itself. Again, Supplement 1 provides additional technical information on the deformation analysis.

> An airborne mapping mission (*14 – Helimap*) was conducted on May 23, resulting in an orthophoto (*14Da01*), a digital surface model DSM (*14la01*) as well as a digital terrain model DTM (*14Ja01*).

After the burial of the village of *Blatten* by the main rock-ice avalanche on May 28, additional measurement campaigns were initiated, focusing not only on continued activities of the mountain slopes but also on secondary processes and damage assessment in the depositional area:

> A second GNSS sensor (*11 – Weissenried*) was installed in the settlement *Weissenried* to detect any potential ground displacement.

> Airborne mapping missions were flown on a regular basis with helicopters (*14 – Helimap*) or drones (*13 – Drone Survey*), generating accurate and up-to-date orthophotos, digital elevation models as well as point clouds.

> Additional webcams were installed capturing the depositional area from various angles (*07 – Webcam Geoazimut – Lonza*, *08 – Webcam Lonza – View from SW* and *09 – Webcam Blatten*)

> Additional hydrological stations were installed to monitor the volume of the lake which was created by the deposition (*17 – Lake level – Geoazimut) as well as* discharge along the *Lonza* river (*18 – Lonza river discharge – upstream* and *20 – Lonza river discharge – Kippel*).

2.3 (Post-)Processed Data

Some of the acquired data, such as radar and airborne recordings, has been processed in detail by the operating companies to allow for easy analysis and a wide range of applications. It is important to note that the radar system calibration as well as post-processing of the data have been executed in parallel to the rapid unfolding of the process cascade. In the weeks following the event, more sophisticated post-processing was carried out. Therefore, **the data provided here does not represent the real-time data available to experts and decision makers at the time of the event!** Consequently, the dataset cannot be used as a basis for analyzing the crisis management or decisions made at that time. A detailed report by the operating company Geoprevent AG on the radar data acquisition and processing is provided in Supplement 1.

3 Data Cube Structure

The data provided in this project covers a wide range of formats, acquisition frequencies and spatial footprints. Efforts were made to structure the data in a comprehensive yet comprehensible way, which is explained in this chapter.

The metadata and IDs used for structuring the data cube are implemented into the Blatten4Science data-distribution webpage and additionally made available as a CSV table for local lookup and filtering.

3.1 ID-Code

The smallest downloadable unit – a 'data bundle' – is labelled using a unique ID-Code containing four parts: Sensor ID – Product Type ID – Dataset ID – Bundle ID. These four parts can be used as filters when searching for specific data. An exemplary ID-Code is broken down in chapter 3.1.5.

3.1.1 Sensor ID

Each sensor or measurement campaign has its own unique two-digit ID. As the data was regrouped after the establishment of the code structure, some numbers (e.g., 03, 05) are unoccupied. Table 2 lists all sensors and measurement campaigns for which data is provided in the framework of Blatten4Science.

Note that some station names date back to a time when only a few stations have been operated. For consistency, these names were kept, accepting the fact that some of them may not seem intuitive for proper distinction.

Sensor ID	Name
01	Sensalpin Camera
02	FlexCam Birchgletscher
04	DEFOX Birchgletscher
06	Interferometric Radar Kleines Nesthorn
07	Webcam Geoazimut - Lonza
08	Webcam Lonza - view from SW
09	Webcam Blatten
10	GNSS Weissenried

Sensor ID	Name
11	GNSS Nesthorn
13	Drone Survey
14	Helimap
17	Lake level - Geoazimut
18	Lonza river discharge - upstream
19	Lonza river discharge - Blatten
20	Lonza river discharge - Kippel
21	Lonza river discharge - Gampel

Table 2
ID and names of all sensors and measurement campaigns in the framework of Blatten4Science.

Detailed information about each station and measurements campaign can be found in the respective factsheets in Appendix C.

3.1.2 Product Type ID

Each type of data product is referred to using a single character. Table 3 displays a complete list of all product types and their respective IDs. Note again that some characters (e.g., Q, R) are missing due to late restructuring of the data.

Product ID	Name
A	Webcam-Image
B	Deformation Analysis - Image
C	Deformation Analysis - ROI[4] Zones
D	Orthophoto
E	Radar Velocity - DTM[5]
F	Radar Velocity - Map
G	Radar Velocity - ESRI[6]
H	Radar Velocity - ROI Zones
I	Digital Surface Model DSM[7]

Product ID	Name
J	Digital Terrain Model DTM
K	Point Cloud
L	3D-Model
M	GNSS-Data
N	Thermal Image
O	Hydrology - River
P	Hydrology - Lake
U	Radar Interferograms
V	Radar Coherence

Table 3
ID and names of all product types in the framework of Blatten4Science.

3.1.3 Dataset ID

'Datasets' contain distinct subgroups of a specific product type of a specific sensor and are referred to with a lowercase character, always starting with the letter 'a'. For instance, the webcam *01 – Sensalpin Camera* takes images (Product Type ID: *A*) at two different angles. Thus, the following datasets are available:

- 01Aa 'Overview'
- 01Ab 'Zoom: Upper Birchgletscher'

A table of all available dataset IDs, grouped by sensor and product type, is available in Appendix A. Some of the products have as many as 10 different Dataset IDs.

3.1.4 Bundle ID

'Data bundles' are the smallest downloadable unit into which the provided data has been grouped. 'Bundles' are used to separate datasets with varying characteristics such as changing acquisition frequency (e.g., webcams), acquisition dates of large files (e.g., airborne campaigns) or reprocessing periods (e.g., average radar velocities) into consistent units. Bundle IDs consist of a two-digit number, starting with *00* or *01.*
Data bundles with the ID *00* contain the whole dataset. Either, because there is only one bundle or by compiling all following data bundles (redundant).
Data bundles with an ID of *01* or higher contain a subunit of the complete dataset.

[4] ROI = Region of Interest
[5] DTM = Digital Terrain Model
[6] ESRI = Environmental Systems Research Institute (ArcGIS)
[7] DSM = Digital Surface Model

Again, using the webcam *01 – Sensalpin Camera* as an example:

> 01Aa00	'All Frames'	All 'overview' images, varied frequency
> 01Aa01	'Phase 1 – 2x/d'	'Overview' images taken 2-3-times a day
> 01Aa02	'Phase 2 – 2h interval'	'Overview' images taken every 2 hours
> 01Aa03	'Phase 2-4 – 30min interval'	'Overview' images taken every 30 minutes

Here, 01Aa00 compiles the bundles *01Aa01, 01Aa02* and *01Aa03* into one bundle.
Note that due to the different data sources, such a 'whole dataset bundle' is not always available.

3.1.5 ID-Code Example

The ID-Code of the drone-based orthophoto of the rockfall area taken on June 26 is **13Db02**:

> Sensor ID	two-digit number	**13**	(Drone Survey)
> Product Type ID	single capital letter	**D**	(Orthophoto)
> Dataset ID	single lowercase letter	**b**	(Rockfall area)
> Bundle ID	two-digit number	**02**	(second instance; 2025-06-26)

3.2 Filters

To facilitate the targeted download of specific subsets of the data cube, the data can be filtered according to the Phase of acquisition, Processing Level, Format, Data Source, and Date of first and last acquisition. The individual metadata are briefly explained hereafter.

> **Phase**

The timeline of the process cascade has been split into four phases:

○ Phase 1	Prior to frequent rockfalls	before 2025-05-21
○ Phase 2	Frequent rockfalls until main collapse	2025-05-21 – 2025-05-28
○ Phase 3	Direct post-collapse and settlement	2025-05-28 – 2025-06-30
○ Phase 4	Long-term post-collapse (incomplete)	after 2025-06-30

> **Processing Level**

Data has been grouped into four levels of processing, roughly corresponding to processing levels 1 – 4 common in remote sensing[8]. The grouping is intended to facilitate sorting and filtering through the broad diversity of datasets. No strict methodology was applied and assigned processing levels can thus be inconsistent at times.
As no unprocessed instrument data is published, level 0 is not listed as a filter option.

[8] NASA (2026): *Data Processing Levels.* EarthData. https://www.earthdata.nasa.gov/learn/earth-observation-data-basics/data-processing-levels (updated: 2026/02/19).

  - Level 1 In-sensor processing e.g., GNSS-position
  - Level 2 Simple unit conversion / data aggregation water height, images
  - Level 3 Complete processing / aggregation DSM, pixel velocities
  - Phase 4 Intense processing DTM, regional velocities
- **Format**
  Data format (e.g. PNG, TIF, CSV, …)
- **Data Source**
  Data provider / station operator
- **Date first / last**
  Date of first / last provided datapoint / frame. Note that for some sensors, additional exists prior to or after the provided period. Data sets outside this curated period are only inconsistently available.

3.3 Data Tree

Table 4 lists all datasets provided within the data cube. The list is available in Appendix A as well. The units for the various metrics are listed either directly in the data or in the corresponding factsheets.

Sensor	Product	Dataset	Code
01 - Sensalpin Camera	A - Webcam-Image	a - Overview	**01Aa**
		b - Zoom: Upper Birchgletscher	**01Ab**
02 - FlexCam Birchgletscher	A - Webcam-Image	a - Overview	**02Aa**
		b - Birchgletscher	**02Ab**
		c - Upper Birchgletscher	**02Ac**
		d - Lower Birchgletscher	**02Ad**
		e - Nestgletscher	**02Ae**
		f - Kleines Nesthorn	**02Af**
		g - Lower Birchgletscher - Left	**02Ag**
		h - Birchbach - Channel	**02Ah**
		i - Kleines Nesthorn - Central	**02Ai**
		j - Nestgletscher - Middle	**02Aj**
04 - DEFOX Birchgletscher	A - Webcam-Image	a - HDR (automatic), compressed	**04Aa**
		b - HDR (automatic), full Resolution	**04Ab**
		c - LDR (manually triggered)	**04Ac**
		d - Conversion Factors Px --> metric	**04Ad**
	B - Deformation Analysis - Image	a - Scale up to 8Px/d	**04Ba**
		b - Scale up to 12Px/d	**04Bb**
	C - Deformation Analysis - ROI Zones	a - Velocities per ROI	**04Ca**
06 - Interferometric Radar Kleines Nesthorn	A - Webcam-Image	a - Kleines Nesthorn - Overview	**06Aa**
	E - Radar Velocity - DTM	a - AIM ShiftedPhase	**06Ea**
		b - AIM UnwrappedPhase	**06Eb**
		d - Guardian	**06Ed**
		f - GBIR	**06Ef**
	F - Radar Velocity - Map	a - AIM ShiftedPhase	**06Fa**
		b - AIM UnwrappedPhase	**06Fb**
		d - Guardian	**06Fd**
		f - GBIR[9]	**06Ff**
	G - Radar Velocity - ESRI	a - AIM ShiftedPhase	**06Ga**
		b - AIM UnwrappedPhase	**06Gb**
		d - Guardian	**06Gd**
		f - GBIR	**06Gf**
	H - Radar Velocity - ROI Zones	a - Velocities per ROI, all models	**06Ha**
	U - Radar Interferograms	a - AIM ShiftedPhase	**06Ua**
		b - AIM UnwrappedPhase	**06Ub**
		f - GBIR	**06Uf**
	V - Radar Coherence	f - GBIR	**06Vf**
07 - Webcam Geoazimut - Lonza	A - Webcam-Image	a - Deposition Weeschtu Mattä	**07Aa**
08 - Webcam Lonza - View from SW	A - Webcam-Image	a - Deposition Birchmattä Blatten	**08Aa**
09 - Webcam Blatten	A - Webcam-Image	a - Deposition Blatten	**09Aa**

Sensor	Product	Dataset	Code
10 - GNSS Weissenried	M - GNSS-Data	a - Position Weissenried WRI1	**10Ma**
11 - GNSS Nesthorn	M - GNSS-Data	a - Position Kleines Nesthorn NES1	**11Ma**
13 - Drone Survey	D - Orthophoto	a - Deposition	**13Da**
		b - Rockfall area	**13Db**
	I - Digital Surface Model DSM	a - Deposition	**13Ia**
		b - Rockfall area	**13Ib**
14 - Helimap	D - Orthophoto	a - Rockfall area	**14Da**
		b - Kleines Nesthorn	**14Db**
	I - Digital Surface Model DSM	a - Rockfall area	**14Ia**
	J - Digital Terrain Model DTM	a - Rockfall area	**14Ja**
	L - 3D-Model	a - Kleines Nesthorn	**14La**
	N - Thermal Image	a - Deposition	**14Na**
17 - Lake level - Geoazimut	P - Hydrology - Lake	a - Water surface level	**17Pa**
		b - Lake volume	**17Pb**
18 - Lonza river discharge - upstream	O - Hydrology - River	a - Water Height	**18Oa**
		b - Discharge	**18Ob**
19 - Lonza river discharge - Blatten	O - Hydrology - River	a - Discharge measured (pneumatic)	**19Oa**
		b - Water level (pneumatic)	**19Ob**
20 - Lonza river discharge - Kippel	O - Hydrology - River	a - Water Height	**20Oa**
		b - Discharge	**20Ob**
21 - Lonza river discharge - Gampel	O - Hydrology - River	a - Water Height	**21Oa**
		b - Water Surface Level	**21Ob**
		c - Discharge	**21Oc**

Table 4

Hierarchical dataset tree sorted by sensor and product type. The data units are listed either in the data itself or in the corresponding factsheets.

3.4 STAC-API

All the datasets are made available via STAC-API at https://blatten-data.epfl.ch/stac.

[9] GBIR = Ground-based Interferometric Radar

4 Remarks

4.1 Support

Please read this report and the factsheets corresponding to the datasets in question thoroughly. Remaining questions can be addressed to data-blatten@admin.vs.ch.

4.2 Outlook

After publication, no additional curation, extension or updating of the data is planned. In particular, no additional data will be published within the framework of this project.

Appendix A - Table of all available dataset IDs

Sensor	Product	Dataset	Code
01 - Sensalpin Camera	A - Webcam-Image	a - Overview	01Aa
		b - Zoom: Upper Birchgletscher	01Ab
02 - FlexCam Birchgletscher	A - Webcam-Image	a - Overview	02Aa
		b - Birchgletscher	02Ab
		c - Upper Birchgletscher	02Ac
		d - Lower Birchgletscher	02Ad
		e - Nestgletscher	02Ae
		f - Kleines Nesthorn	02Af
		g - Lower Birchgletscher - Left	02Ag
		h - Birchbach - Channel	02Ah
		i - Kleines Nesthorn - Central	02Ai
		j - Nestgletscher - Middle	02Aj
04 - DEFOX Birchgletscher	A - Webcam-Image	a - HDR (automatic), compressed	04Aa
		b - HDR (automatic), full Resolution	04Ab
		c - LDR (manually triggered)	04Ac
		d - Conversion Factors Px --> metric	04Ad
	B - Deformation Analysis - Image	a - Scale up to 8Px/d	04Ba
		b - Scale up to 12Px/d	04Bb
	C - Deformation Analysis - ROI Zones	a - Velocities per ROI	04Ca
06 - Interferometric Radar Kleines Nesthorn	A - Webcam-Image	a - Kleines Nesthorn - Overview	06Aa
	E - Radar Velocity - DTM	a - AIM ShiftedPhase	06Ea
		b - AIM UnwrappedPhase	06Eb
		d - Guardian	06Ed
		f - GBIR	06Ef
	F - Radar Velocity - Map	a - AIM ShiftedPhase	06Fa
		b - AIM UnwrappedPhase	06Fb
		d - Guardian	06Fd
		f - GBIR	06Ff
	G - Radar Velocity - ESRI	a - AIM ShiftedPhase	06Ga
		b - AIM UnwrappedPhase	06Gb
		d - Guardian	06Gd
		f - GBIR	06Gf
	H - Radar Velocity - ROI Zones	a - Velocities per ROI, all models	06Ha
	U - Radar Interferograms	a - AIM ShiftedPhase	06Ua
		b - AIM UnwrappedPhase	06Ub
		f - GBIR	06Uf
	V - Radar Coherence	f - GBIR	06Vf
07 - Webcam Geoazimut - Lonza	A - Webcam-Image	a - Deposition Weeschtu Mattä	07Aa
08 - Webcam Lonza - View from SW	A - Webcam-Image	a - Deposition Birchmattä Blatten	08Aa
09 - Webcam Blatten	A - Webcam-Image	a - Deposition Blatten	09Aa
10 - GNSS Weissenried	M - GNSS-Data	a - Position Weissenried WRI1	10Ma
11 - GNSS Nesthorn	M - GNSS-Data	a - Position Kleines Nesthorn NES1	11Ma
13 - Drone Survey	D - Orthophoto	a - Deposition	13Da
		b - Rockfall area	13Db
	I - Digital Surface Model DSM	a - Deposition	13Ia
		b - Rockfall area	13Ib
14 - Helimap	D - Orthophoto	a - Rockfall area	14Da
		b - Kleines Nesthorn	14Db
	I - Digital Surface Model DSM	a - Rockfall area	14Ia
	J - Digital Terrain Model DTM	a - Rockfall area	14Ja
	L - 3D-Model	a - Kleines Nesthorn	14La
	N - Thermal Image	a - Deposition	14Na
17 - Lake level - Geoazimut	P - Hydrology - Lake	a - Water surface level	17Pa
		b - Lake volume	17Pb
18 - Lonza river discharge - upstream	O - Hydrology - River	a - Water Height	18Oa
		b - Discharge	18Ob
19 - Lonza river discharge - Blatten	O - Hydrology - River	a - Discharge measured (pneumatic)	19Oa
		b - Water level (pneumatic)	19Ob
20 - Lonza river discharge - Kippel	O - Hydrology - River	a - Water Height	20Oa
		b - Discharge	20Ob
21 - Lonza river discharge - Gampel	O - Hydrology - River	a - Water Height	21Oa
		b - Water Surface Level	21Ob
		c - Discharge	21Oc

Blatten im Lötschental | Canton of Wallis

Fixed Monitoring Stations (ID)

- Camera (fixed field-of-view)
- Camera (DEFOX)
- Camera (movable lens)
- Hydrology station
- Radar
- GPS

Geodata Sources:
© swisstopo
© Canton of Wallis
Orthophoto from August 11, 2025 (Terradata AG, 13Db10)

Index	Type of Addition / Change	Date	by	Check
	First Edition	2026-01-20	twi	ise
	Refined Sensor Locations	2026-01-28	twi	ise
	Sources & Appendix Info	2026-02-26	twi	ise

Blatten for Science

Appendix B
Fixed Monitoring Stations & Sensors

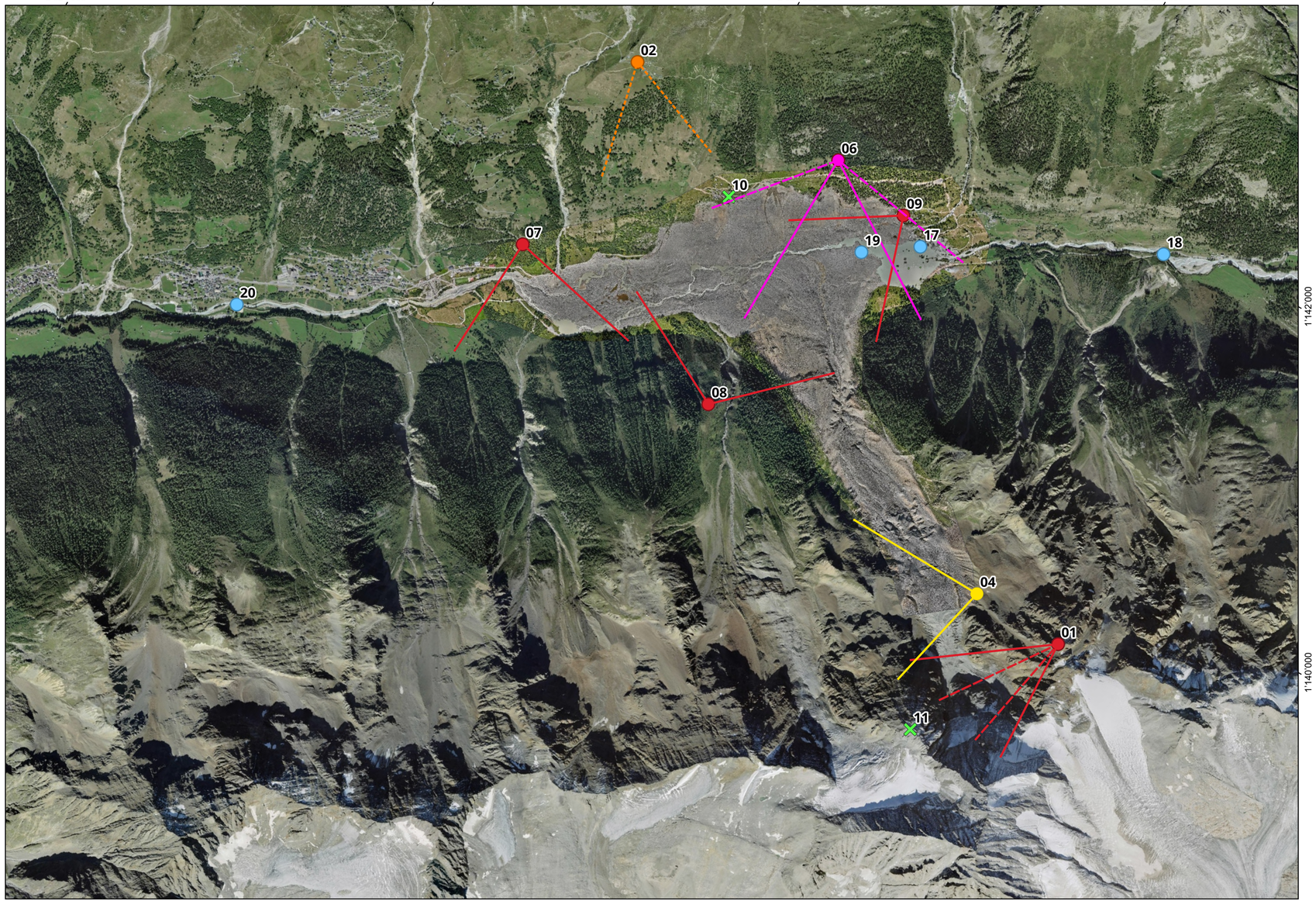
geoformer
INGENIEURE. GEOLOGEN. PLANER

Sebastiansplatz 1
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Tel. +41(0)27 552 15 00

Scale	Layout	twi
1:20’000	Review	ise
	Control	ise
	Date	2026-01-20
Plan Nr.: A350039_1	Format	297 x 630



Station Info

IP-Camera for automated observation of the Oberer Birchgletscher. Installed in 2013.



Sensor ID	01
Sensor Name	**Sensalpin Camera**
Location	2'631'425, 1'139'390 (LV95)
Elevation	3'150 m a.s.l.
Provided Data Period	2020-02-05 – 2025-06-30
Operator / Author	SensAlpin GmbH

Instrumentation

Camera

> Model	M16B	
> Manufacturer	MOBOTIX	
> Resolution	6 MP (3072 x 2048)	
	Birch 1	*Birch 2*
> Sensor	L43 / B079	L135 / B237
> Angle	45°	15°
> Azimuth	ca. 210°	ca. 210°

Remark

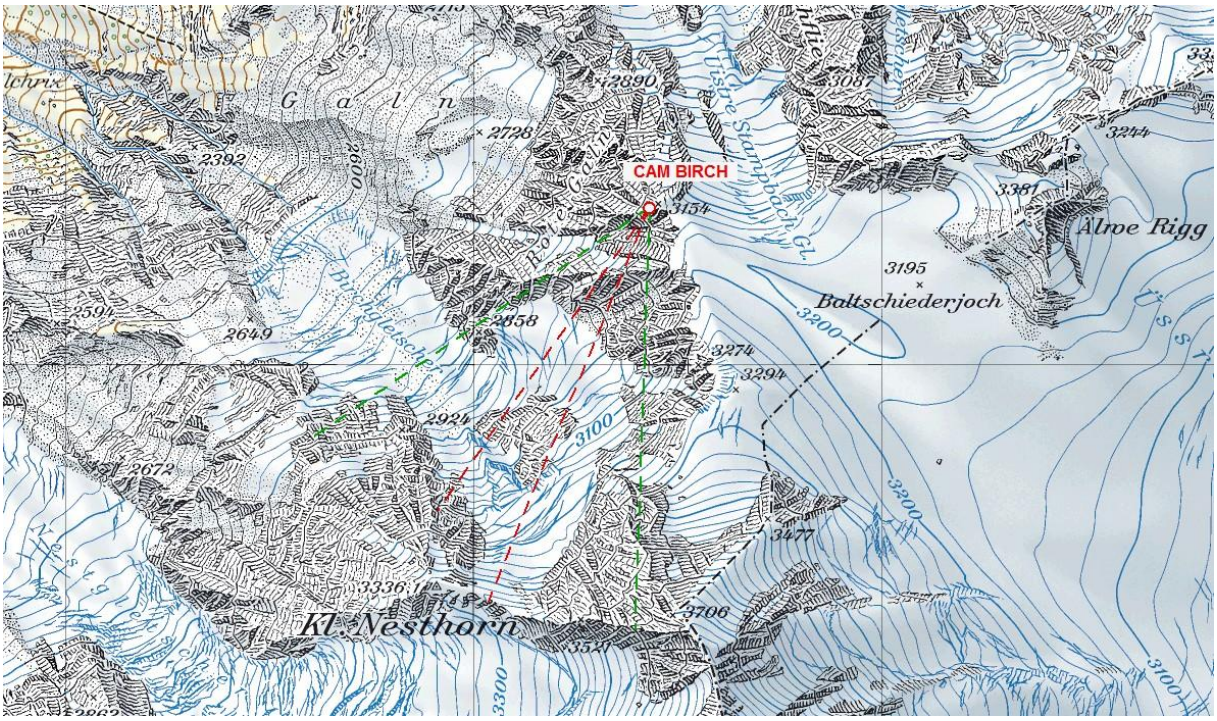
The above information applies to the current camera. Since its installation in 2013, the camera has been dismantled several times for repairs and replaced once completely. Slight changes in alignment may have occurred during reassembly after repairs. In addition, the horizontal opening angles of the sensors have changed during replacements.

Related Data Bundles

01Aa00	**Camera Birch 1** / All images (imaging periods 1+2+3), varied frequency
01Aa01	Imaging period 1: taken twice a day (09:35 / 15:35) from 2020-08-20 to 2025-05-15, additional images from 2020-02-05
01Aa02	Imaging period 2: every 2h during daylight hours from 2025-05-15 to 2025-05-19
01Aa03	Imaging period 3: every 30min during daylight hours from 2025-05-19 onward
01Ab00	**Camera Birch 2 'Zoom'** / All images (imaging periods 1 - 4), varied frequency
01Ab01	Imaging period 1: taken twice a day (09:30 / 15:30) from 2021-01-01 to 2025-05-15
01Ab02	Imaging period 2: every 2h during daylight hours from 2025-05-15 to 2025-05-19
01Ab03	Imaging period 3: every 30min during daylight hours from 2025-05-19 up to 2025-05-20
01Ab03	Imaging period 3: taken three times a day (08:43 / 12:43 / 16:43) from 2025-05-20 onward

Additional Images

Location and field of view



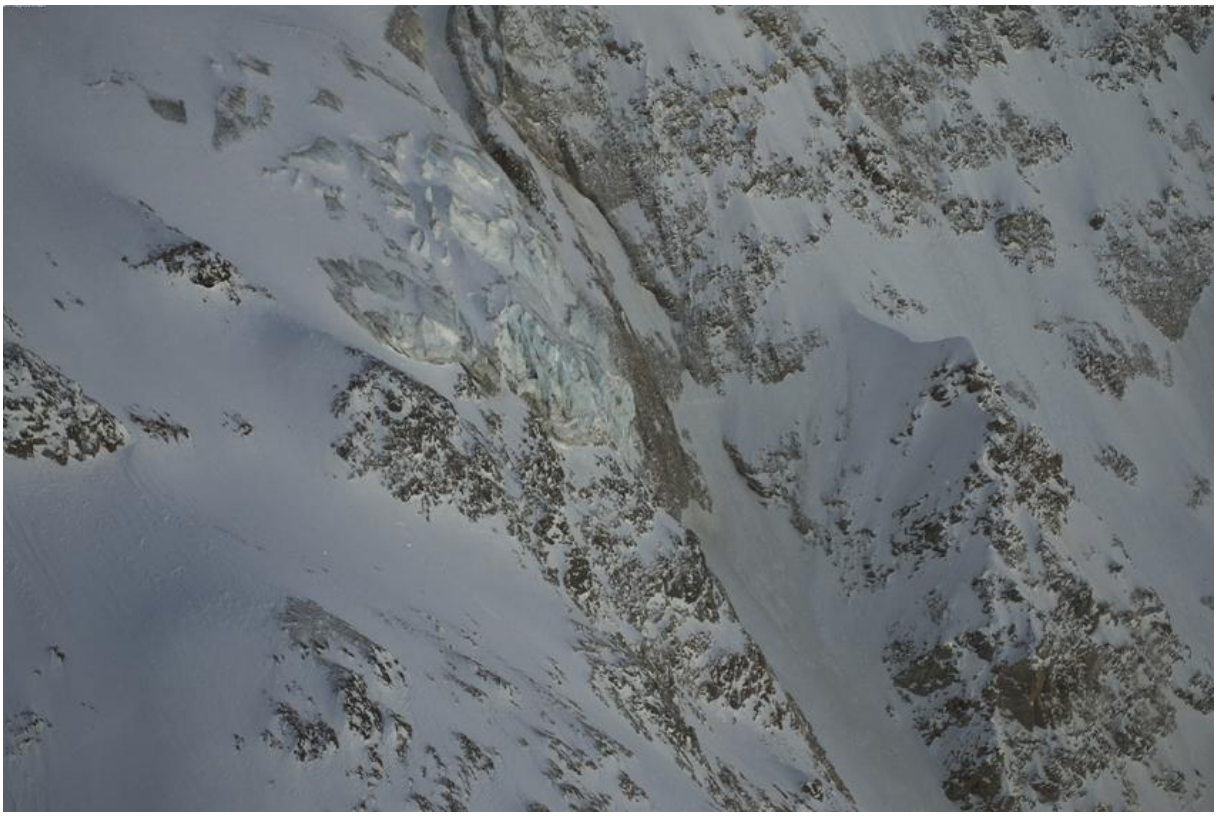
Example image

Birch 1 / 2026-02-02 12:42



Example image

Birch 2 / 2026-02-02 12:42



See Supplement 1 – Gassner J (March 2026): ***"Technical Report on Measurements of Kleines Nesthorn and Birchgletscher with a Ground Based Interferometric RADAR - May/June 2025"*** for detailed description of the data acquisition and project setup.

Station Info

PTZ (pan-tilt-zoom) Webcam for automated observation of *Birchgletscher* and *Nestgletscher*. Pictures with different focuses are taken hourly.



Sensor Name	**02 - FlexCam Birchgletscher**
Location	2'627'304, 1'141'251 (LV95)
Elevation	2'102 m a.s.l.
Provided Data Period	2024-12-16— 2025-09-30
Operator / Author	Geoprevent AG

Instrumentation

Camera

>	Model	Q6135-LE PTZ Network Camera
>	Manufacturer	AXIS
>	Resolution	2 MP (1920x1080)
>	Pan range	360 endless
>	Tilt range	+20 to -90
>	Optical zoom	32
>	Digital zoom	12



Remarks

The camera is equipped with an infrared spotlight which allows recording photos at night within a limited range. The camera can be controlled remotely via the GRAVX online data portal.

Related Data Bundles

a - Overview	**02Aa00**	All full frame images, varied imaging frequency
	02Aa01	Full frame images, taken 4-5 times a day
	02Aa02	Full frame images, taken hourly during daylight hours
	02Aa03	Full frame images, taken 4 times a day
b - Birchgletscher	**02Ab00**	All images zoomed to Upper + Lower Birchgletscher, varied imaging frequency
	02Ab01	Images zoomed to Upper + Lower Birchgletscher, taken 4-5 times a day
	02Ab02	Images zoomed to Upper + Lower Birchgletscher, taken hourly during daylight hours
	02Ab03	Images zoomed to Upper + Lower Birchgletscher, taken 4 times a day

c - Upper Birchgletscher	**02Ac00**	All images zoomed to Upper Birchgletscher, varied imaging frequency
	02Ac01	Images zoomed to Upper Birchgletscher, taken 4-5 times a day
	02Ac02	Images zoomed to Upper Birchgletscher, taken hourly during daylight hours
	02Ac03	Images zoomed to Upper Birchgletscher, taken 4 times a day
d - Lower Birchgletscher	**02Ad00**	All images zoomed to Lower Birchgletscher, varied imaging frequency
	02Ad01	Images zoomed to Lower Birchgletscher, taken 4-5 times a day
	02Ad02	Images zoomed to Lower Birchgletscher, taken hourly during daylight hours
	02Ad03	Images zoomed to Lower Birchgletscher, taken 4 times a day
e - Nestgletscher	**02Ae00**	All images zoomed to Nestgletscher, varied imaging frequency
	02Ae01	Images zoomed to Nestgletscher, taken 4-5 times a day
	02Ae02	Images zoomed to Nestgletscher, taken hourly during daylight hours
	02Ae03	All images zoomed to Nestgletscher, taken 4 times a day
f - Kleines Nesthorn	**02Af00**	All images zoomed to Kleines Nesthorn, vaired frequency
	02Af01	All images zoomed to Kleines Nesthorn, taken 4 times a day
	02Af02	All images zoomed to Kleines Nesthorn, taken hourly during daylight hours
	02Af03	All images zoomed to Kleines Nesthorn, taken 4 times a day
g - Lower Birchgletscher - Left	**02Ag00**	All images zoomed to the viewer's left part of Lower Birchgletscher, varied frequency
	02Ag01	All images zoomed to the viewer's left part of Lower Birchgletscher, taken 4 times a day
	02Ag02	All images zoomed to the viewer's left part of Lower Birchgletscher, taken hourly during daylight hours
	02Ag03	All images zoomed to the viewer's left part of Lower Birchgletscher, taken 4 times a day
h - Birchbach - Channel	**02Ah00**	All images zoomed to the channel below Lower Birchgletscher, varied frequency
	02Ah01	All images zoomed to the channel below Lower Birchgletscher, taken 4 times a day
	02Ah02	All images zoomed to the channel below Lower Birchgletscher, taken hourly during daylight hours
	02Ah03	All images zoomed to the channel below Lower Birchgletscher, taken 4 times a day
i - Kleines Nesthorn - Central	**02Ai00**	All images zoomed to the central part of Kleines Nesthorn, varied frequency
	02Ai01	All images zoomed to the central part of Kleines Nesthorn, taken hourly during daylight hours
	02Ai02	All images zoomed to the central part of Kleines Nesthorn, taken 4 times a day
j - Nestgletscher - Middle	**02Aj00**	All images zoomed to the tongue of Nestgletscher, varied frequency
	02Aj01	All images zoomed to the tongue of Nestgletscher, taken hourly during daylight hours
	02Aj02	All images zoomed to the tongue of Nestgletscher, taken 4 times a day

Additional Images

Location and field of view PTZ Birchbach (displayed is the selected viewing angle, theoretically, 360° are possible)



View of the PTZ Birchbach, all fixed zoom positions a-j





Appendix C 02 - FlexCam Birchgletscher

















See Supplement 1 – Gassner J (March 2026): ***"Technical Report on Measurements of Kleines Nesthorn and Birchgletscher with a Ground Based Interferometric RADAR - May/June 2025"*** for detailed description of the data acquisition and project setup.

Station Info

PROCam for automated observation of the Birch glacier with high resolution (42MP) and HDR (High-Dynamic-Range) pictures. The Pictures are processed in the backend based on a cross-correlation algorithm to measure deformation rates at the surface of the glacier.



Sensor Name	**04 - DEFOX Birchgletscher**
Location	2'630'838, 1'139'383 (LV95)
Elevation	2'700 m a.s.l.
Provided Data Period	2025-05-27 — 2025-06-30
Operator / Author	Geoprevent AG

Instrumentation

Camera

- Model: PROCam (Sony a7RIII)
- Resolution: 42 MP (7952 x 5304)
- Camera orientation: 216.73° N
- Camera elevation: -16.35°
- Camera tile: -0.61°
- Lens opening angles: 89.4° x 59.6°



Remarks

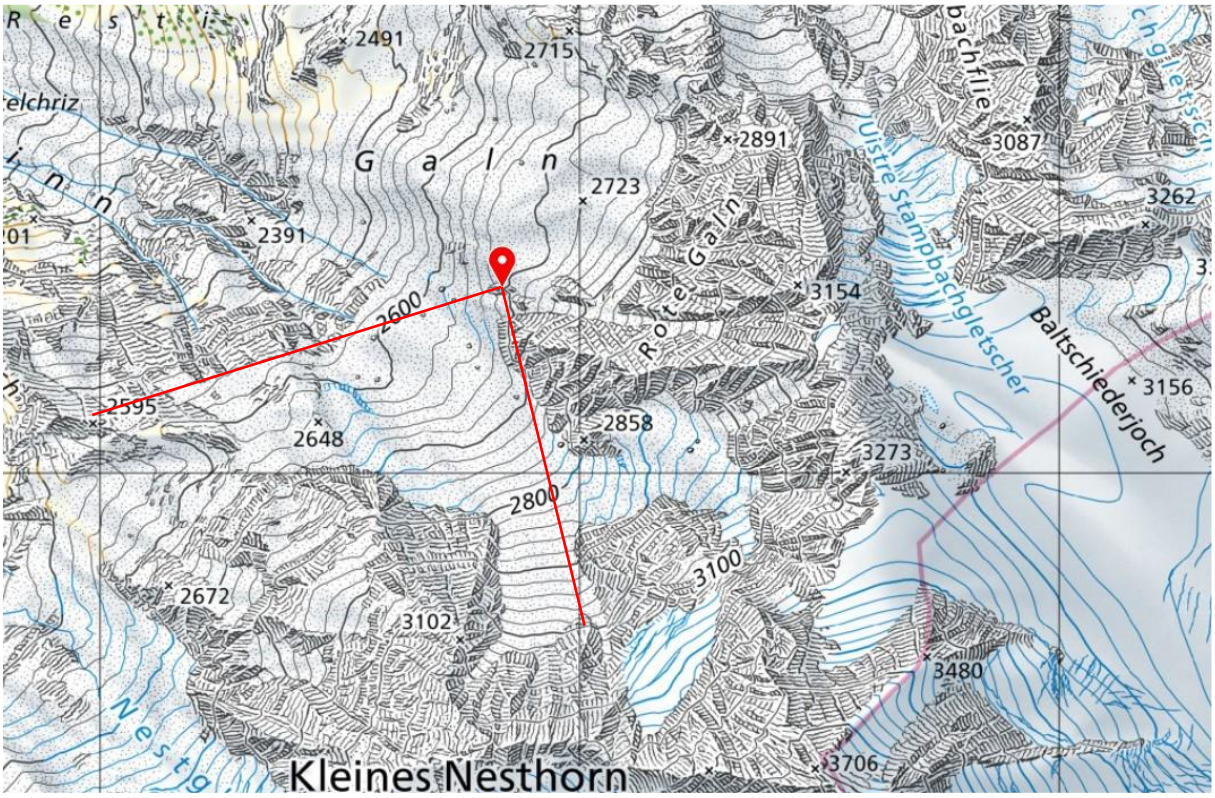
Daily deformation analysis is performed (24h-interval) on the images using a cross-correlationg algorithm, resulting in pixel-per-day deformation rates. These values relate to the image plane and are not to be mistaken for actual displacements in the terrain. The algorithms work automatically and select images of good enough quality for the deformation computation.
HDR processing enhances performance under challenging lighting conditions by increasing contrast. Geoprevent's proprietary algorithms also generate HDR night images, expanding the evaluable area and further improving overall analysis quality.
The orientation of the camera was changed in June after the collapse.

Related Data Bundles

04Aa00	All automatically taken images of the tongue of Lower Birchgletscher, varied frequency. Compressed quality
04Aa01	All automatically taken images of the tongue of Lower Birchgletscher, taken hourly. Compressed quality
04Aa02	All automatically taken images of the tongue of Lower Birchgletscher, taken 4x/h. Compressed quality
04Ab00	All automatically taken images of the tongue of Lower Birchgletscher, varied frequency. Full quality
04Ab01	All automatically taken images of the tongue of Lower Birchgletscher, taken hourly. Full quality
04Ab02	All automatically taken images of the tongue of Lower Birchgletscher, taken 4x/h. Full quality
04Ac00	All manually triggered images of the tongue of Lower Birchgletscher, varied frequency. Compressed quality
04Ad00	for conversion of camera pixels into real world metric distances on image and DTM
04Ba00	All Deformation analyses, varied frequency
04Ba01	Deformation analyses, processed 2 times per day
04Ba02	Deformation analyses, processed once per day
04Bb00	Deformation analysis with wider scale
04Ca00	Deformation rates per ROI
04Da00	Conversion Factors Pixels to real-world metric distance

Additional Images

Location and field of view



Unterer Birchgletscher, shortly before the collapse



See Supplement 1 – Gassner J (March 2026): ***"Technical Report on Measurements of Kleines Nesthorn and Birchgletscher with a Ground Based Interferometric RADAR - May/June 2025"*** for detailed description of the data acquisition and project setup.

Station Info

Interferometric Radar for day time and weather independent monitoring of the Birchgletscher and Nestgletscher.



Sensor Name	**06 - Interferometric Radar Kleines Nesthorn**
Location	2'628'710, 1'141'349 (LV95)
Elevation	1'795 m a.s.l.
Provided Data Period	2025-05-19 — 2025-06-30
Operator / Author	Geoprevent AG

Instrumentation

Interferometric Radar

> Model	IBIS-FM EVO 2m SAR
> Manufacturer	IDS GeoRadar s.r.l.
> Microwave frequency	17.2 GHz λ ≈ 17.53 mm), 200 MHz Bandwidth
> Spatial resolution @ 3km	0.75 m (Range) x 12.9 m (Lateral)
> Location	Gassun, Blatten VS, Switzerland
> CH1903+ / LV95	2'628'689, 1'141'335, 1'794m, 157°N
> Distance to target area	2'700 – 4'000 m
> Uncertainty geocoding	few Meters, manual orientation
> Measurement start	19 May 2025 12:46 CEST
> Operation mode	permanent
> Typical scan period	61s (May), 121s (June)
> Number of scans	14'645 (May), 20'483 (June)
> Power supply	230V AC (until 28 May 2025), methanol fuel cell, solar panels (starting from 5 June 2025)

Remarks

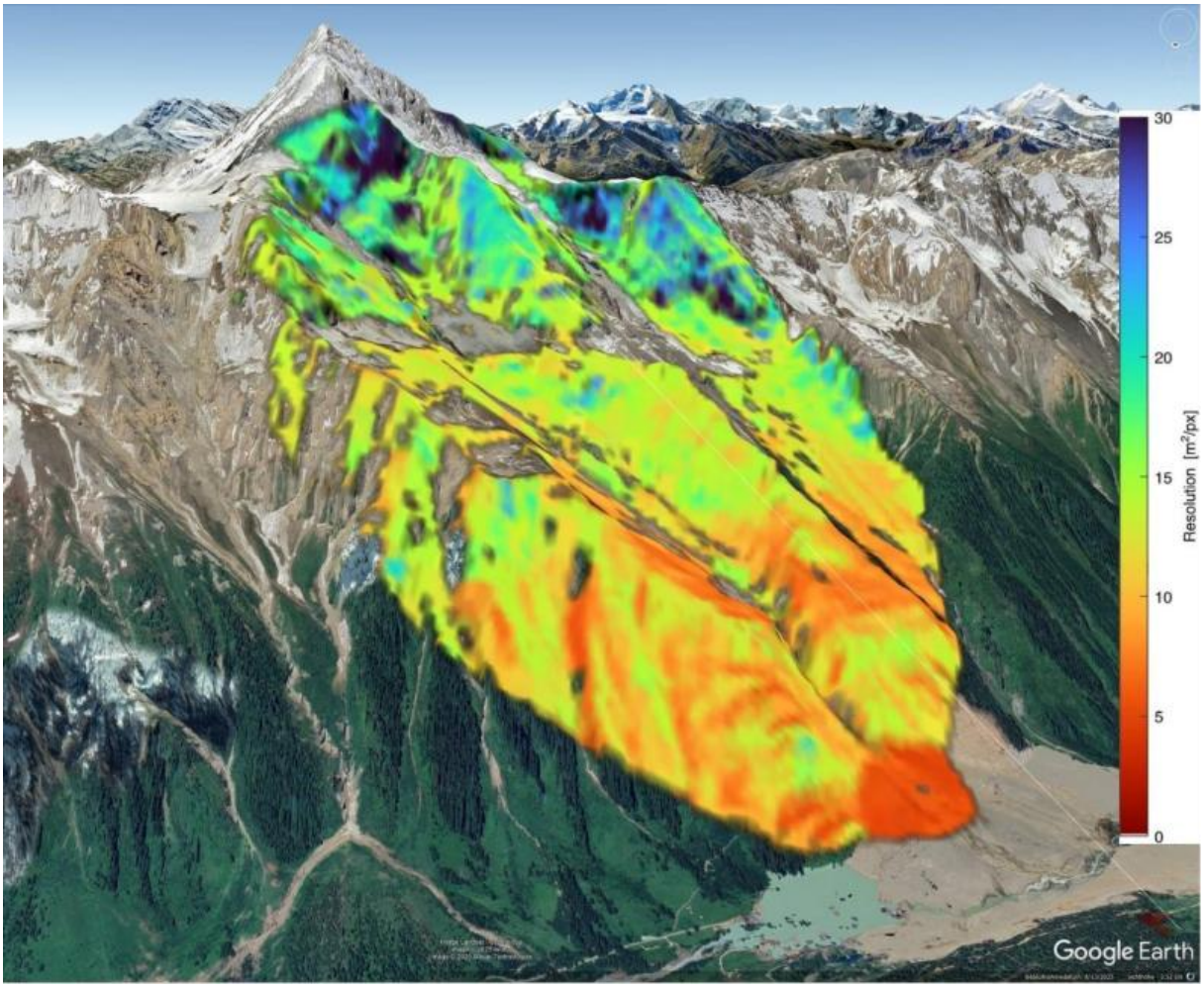
Due to the high media presence and the corresponding streaming activity in the valley prior and after the event, GEOPREVENT faced some technical difficulties to transmit all the data (about 1 GB per day) to the cloud. The bandwith limitations faced could be overcome as the local network provider gently offered a prioritized access to GEOPREVENT system's router.

Related Data Bundles

06Aa00	All images of GBIR camera on opposite valley side, taken hourly
06Ea01	Standard GP AIM Processing
06Ea02	Standard GP AIM Processing
06Ea03	Standard GP AIM Processing
06Ea04	Standard GP AIM Processing
06Eb01	Experimental Phase Unwrapping approach
06Eb02	Experimental Phase Unwrapping approach
06Ed01	"Guardian" model results 24h average velocities in DTM
06Fa01	Standard GP AIM Processing
06Fa02	Standard GP AIM Processing
06Fa03	Standard GP AIM Processing
06Fa04	Standard GP AIM Processing
06Fb01	Experimental Phase Unwrapping approach
06Fb02	Experimental Phase Unwrapping approach
06Fd01	"Guardian" model results 24h velocities on hillshade map
06Ga01	Standard GP AIM Processing
06Ga02	Standard GP AIM Processing
06Ga03	Standard GP AIM Processing
06Ga04	Standard GP AIM Processing
06Gb01	Experimental Phase Unwrapping approach
06Gb02	Experimental Phase Unwrapping approach
06Gd01	"Guardian" model results 24h average velocities as raster file
06Ha01	Median, max and inverse velocities per ROI, Standard GP AIM Processing, 24h average, 1-3h frequency
06Ha02	Median, max and inverse velocities per ROI, Standard GP AIM Processing, 6h average, 1-3h frequency
06Hb01	Median, max and inverse velocities per ROI, Experimental Phase Unwrapping approach, 1h frequency
06Hd01	Median, max and inverse velocities per ROI, "Guardian" model, 3h frequency
06Ua01	running average of 100 Interferograms, Standard GP AIM processing
06Ub01	running average of 100 Interferograms, Experimental Phase Unwrapping approach
06Uf00	ca. 1min interferograms, including coherence maps, varied frequency
06Uf01	ca. 1min interferograms, including Coherence Map
06Uf02	ca. 1min interferograms, including Coherence Map
06Uf03	ca. 1min interferograms, including Coherence Map
06Vf01	3h Coherence Map

Additional Images

The simulated radar resolution from the chosen location near Blatten Gassun.



The interferometric radar with view on Kleines Nesthorn and Birchgletscher (left), as well as the methanol powered fuel cell which delivered the electricity for the radar.
Note: At the very beginning the power was taken from a nearby house until the power network was down, then the fuel cells sprang into action.





Station Info

Webcam installed to monitor the lower part of the depositional area.



Sensor ID	07
Sensor Name	**Webcam Geoazimut Lonza**
Location	2'627'252, 1'139'893 (LV95)
Elevation	1'531 m a.s.l.
Provided Data Period	2025-05-31 — 2025-09-22
Operator	GEOAZIMUT / CREALP

Instrumentation

Camera

> Model: Mobotix MxOne
> Resolution: 4K (3840x2160px)
> Field of View: 95°
> Camera Orientation: 124°
> Energy Supply: Solar Panel
> Data Transmission: GSM / 4G
> Imaging Frequency: 10min

Remarks

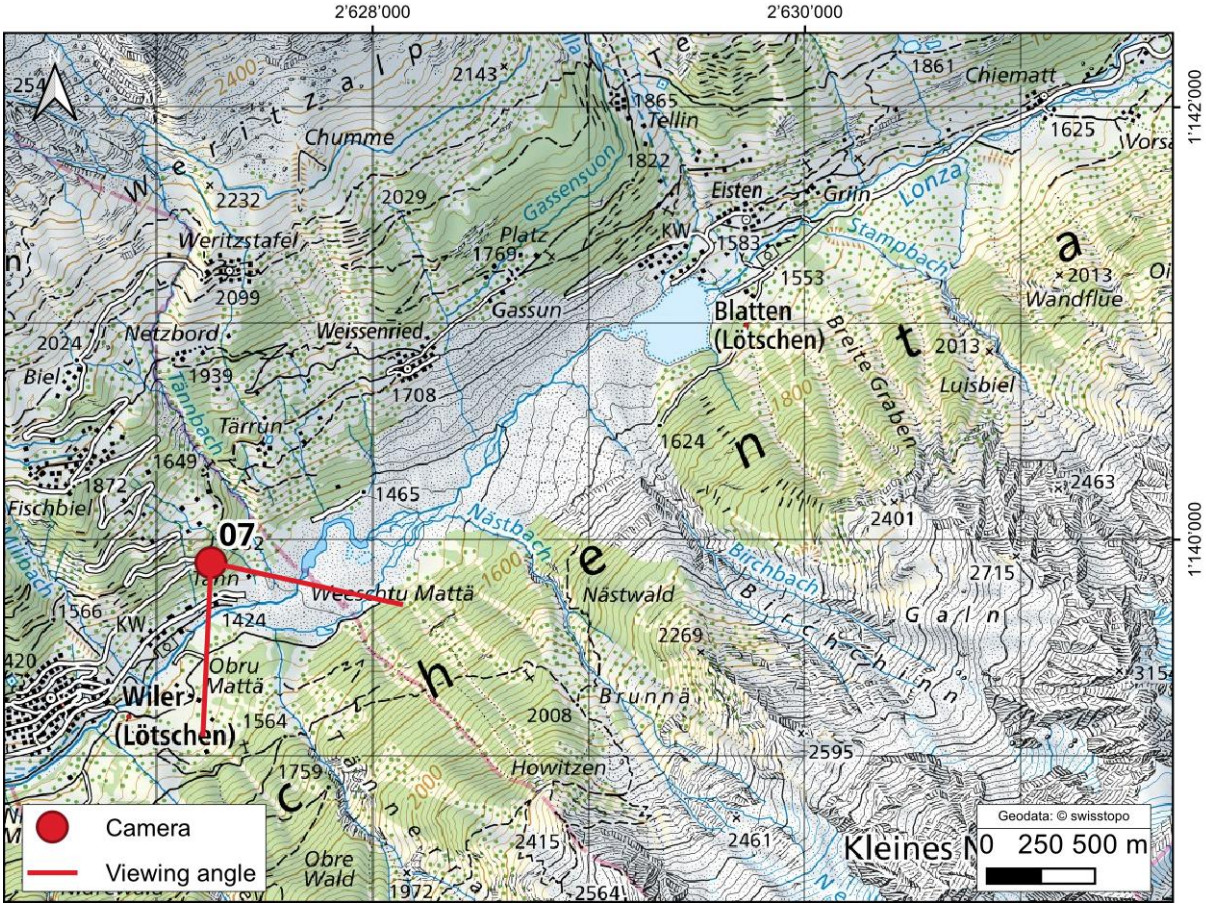
-

Related Data Bundles

07Aa00	All images, taken with a 10 min frequency

Additional Images

Location of camera



Webcam-image taken on 2025-05-31 15:20



Station Info

Webcam installed to monitor the depostitional area.



Sensor ID	08
Sensor Name	**Webcam Lonza – View from SW**
Location	2'628'771, 1'139'605 (LV95)
Elevation	1'859 m a.s.l.
Provided Data Period	2025-05-29 — 2025-09-22
Operator	GUARDAVAL / CREALP

Instrumentation

Camera

> Model Mobotix Mx-M73A
> Resolution 4K (3840x2160px)
> Field of View 120°
> Camera Orientation 357°
> Energy Supply Solar Panel
> Data Transmission GSM / 4G
> Imaging Frequency 30min

Remarks

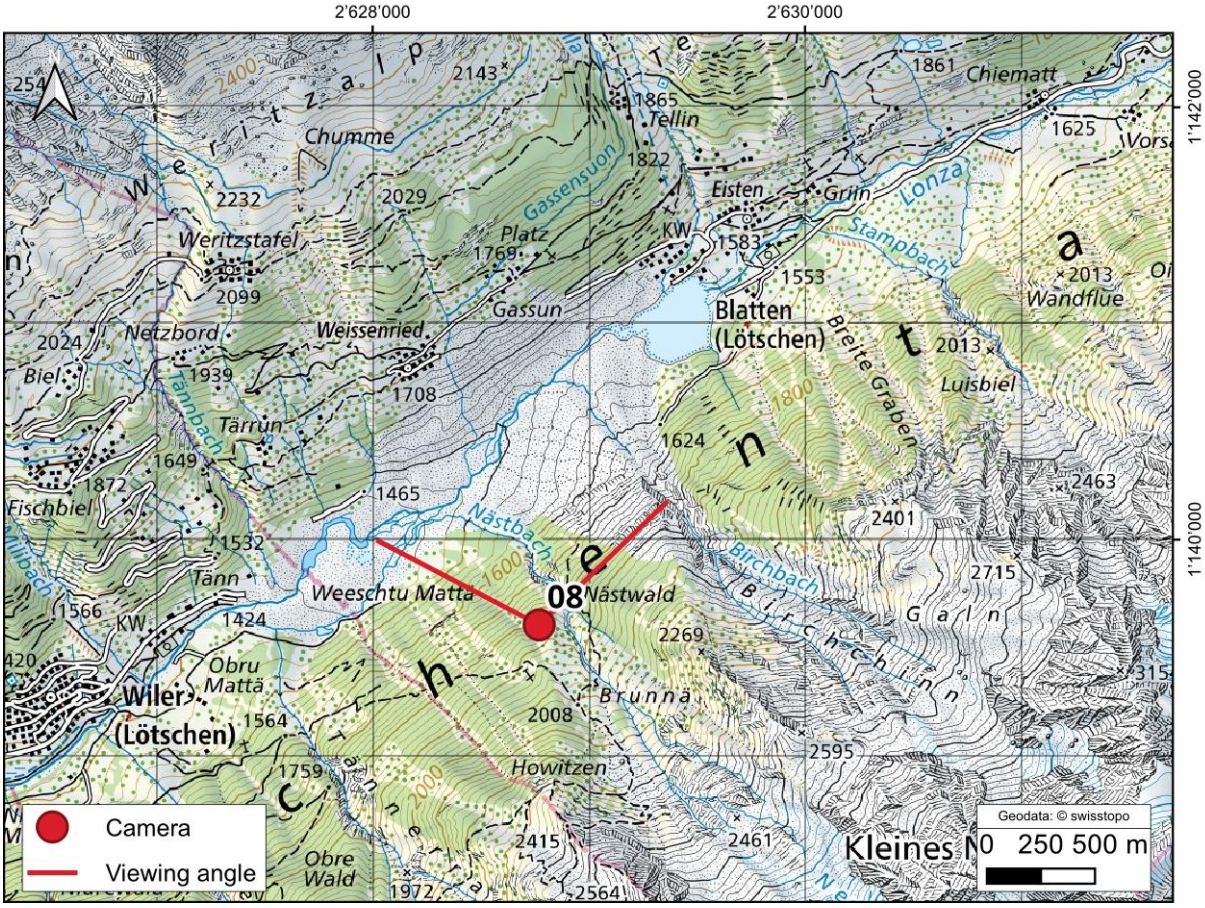
-

Related Data Bundles

08Aa00	All images of deposition area - taken with varied frequency
08Aa01	Images of deposition area – images taken hourly (2025-05-29 – 2025-06-01)
08Aa02	Images of deposition area – images taken every 30 minutes (2025-06-01 – 2025-06-30)

Additional Images

Location of camera



Webcam-image taken on 2025-05-29 18:00



Station Info

Webcam installed in Blatten to monitor the depositional area.



Sensor ID	09
Sensor Name	**Webcam Blatten**
Location	2'629'242, 1'141'252 (LV95)
Elevation	1‘595 m a.s.l.
Provided Data Period	2025-06-10 — 2025-09-22
Operator	GEOAZIMUT / CREALP

Instrumentation

Camera

> Model Mobotix MxOne
> Resolution 4K (3840x2160px)
> Field of View 95°
> Camera Orientation 200°
> Energy Supply Solar Panel
> Data Transmission GSM / 4G
> Imaging Frequency 10min

Remarks

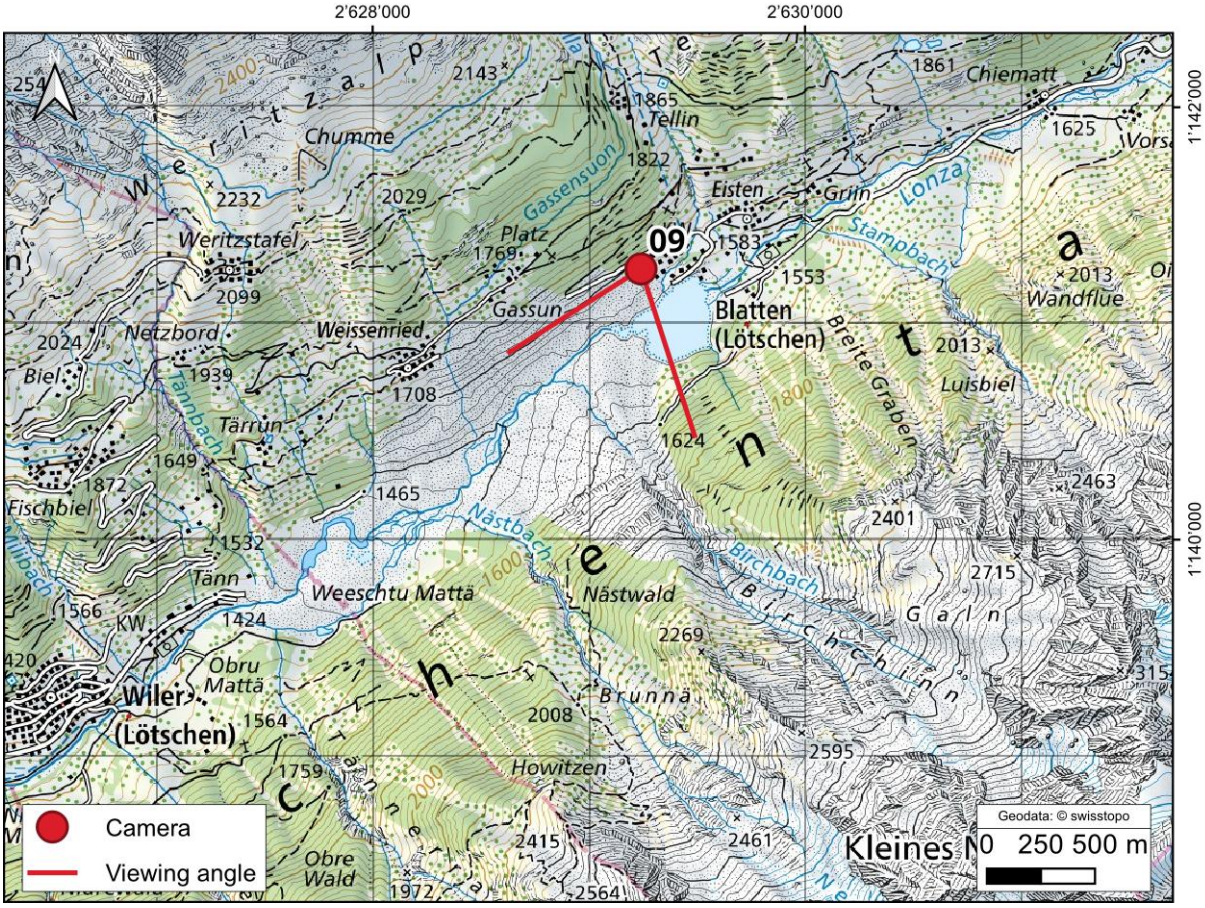
-

Related Data Bundles

09Aa00	All images, taken with a 10 min frequency

Additional Images

Location of camera



Webcam-image taken on 2025-06-11 12:00



Station Info

GNSS Sensor (WRI1) installed to monitor potential displacement of the settlement of Weissenried.



Sensor ID	10
Sensor Name	**GNSS Weissenried**
Location	2'628'228, 1'140'803 (LV95)
Elevation	1‘707 m a.s.l.
Provided Data Period	2025-06-04 — 2025-09-22
Operator	Glaciorisk / SDANA / CREALP

Instrumentation

> System Multi-constellation GNSS Antenna
> Energy Supply Solar Panel
> Data Transmission GSM / 4G
> Data Frequency 1 h
> Precision Centimeter-level

Remarks

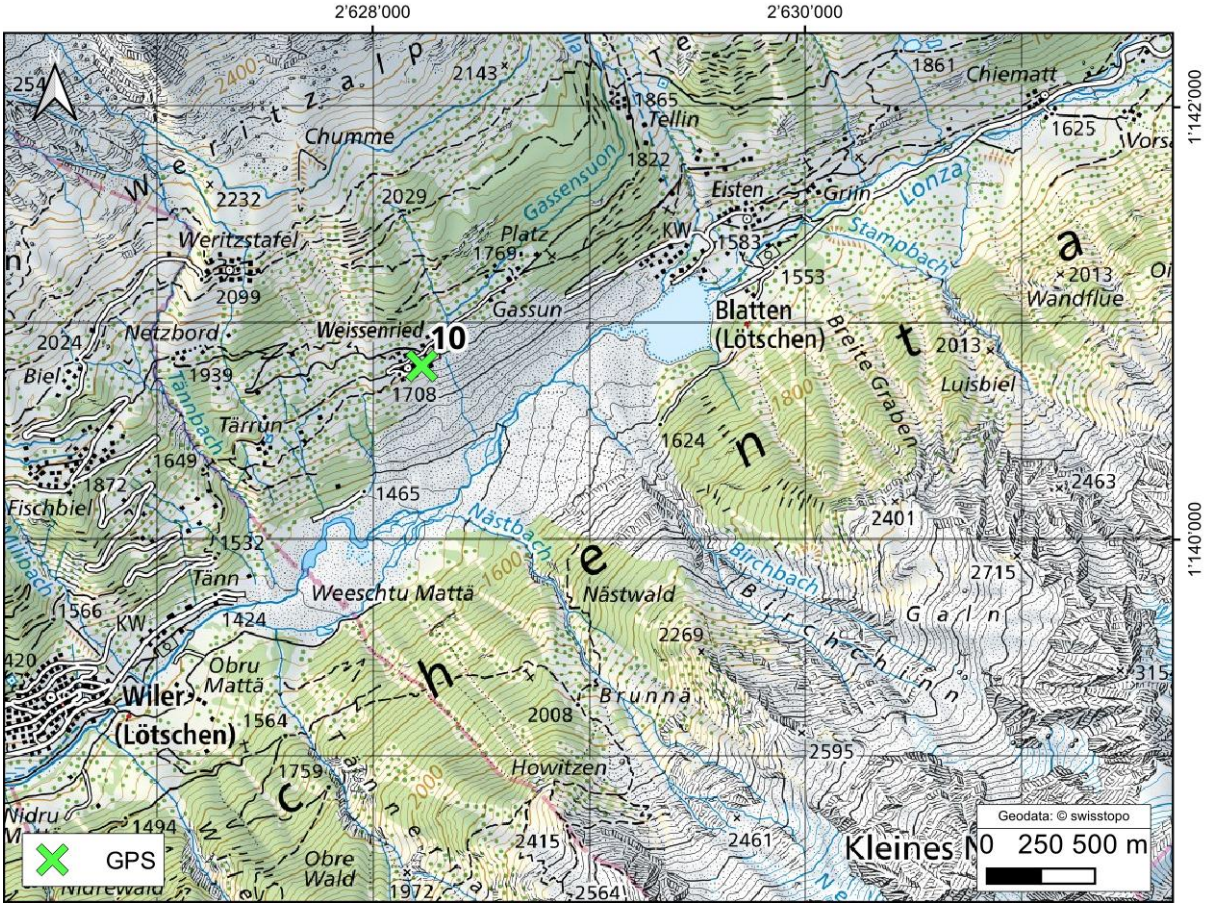
-

Related Data Bundles

10Ma00	All data points

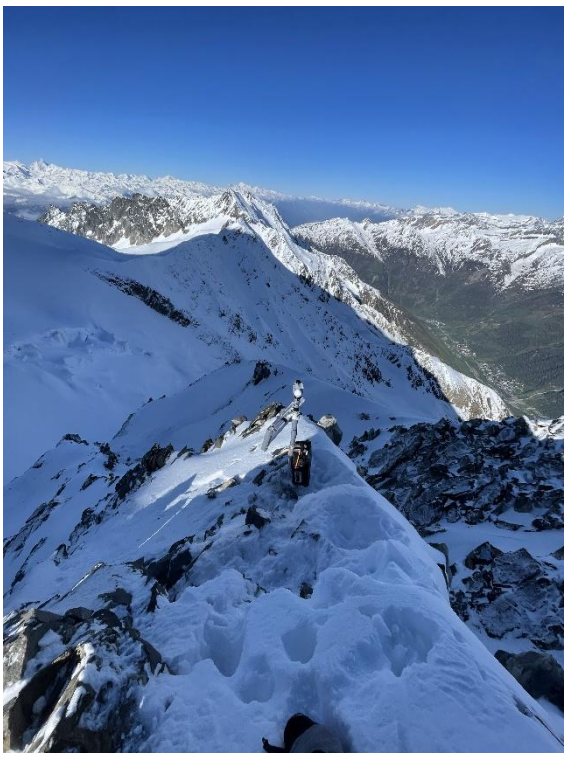
Additional Images

Location of sensor



Station Info

GNSS Sensor (NES1) installed on the peak of Kleines Nesthorn. Destroyed during a rockfall event on May 19th 2025.



Sensor ID	11
Sensor Name	**GNSS Nesthorn**
Location	2'630'901, 1'138'465 (LV95)
Elevation	3'322 m a.s.l.
Data Period	2025-05-16 — 2025-05-19
Operator	Glaciorisk / SDANA / CREALP

Instrumentation

> System	Multi-constellation GNSS Antenna
> Energy Supply	Solar Panel
> Data Transmission	GSM / 4G
> Data Frequency	1 h
> Precision	Centimeter-level

Remarks

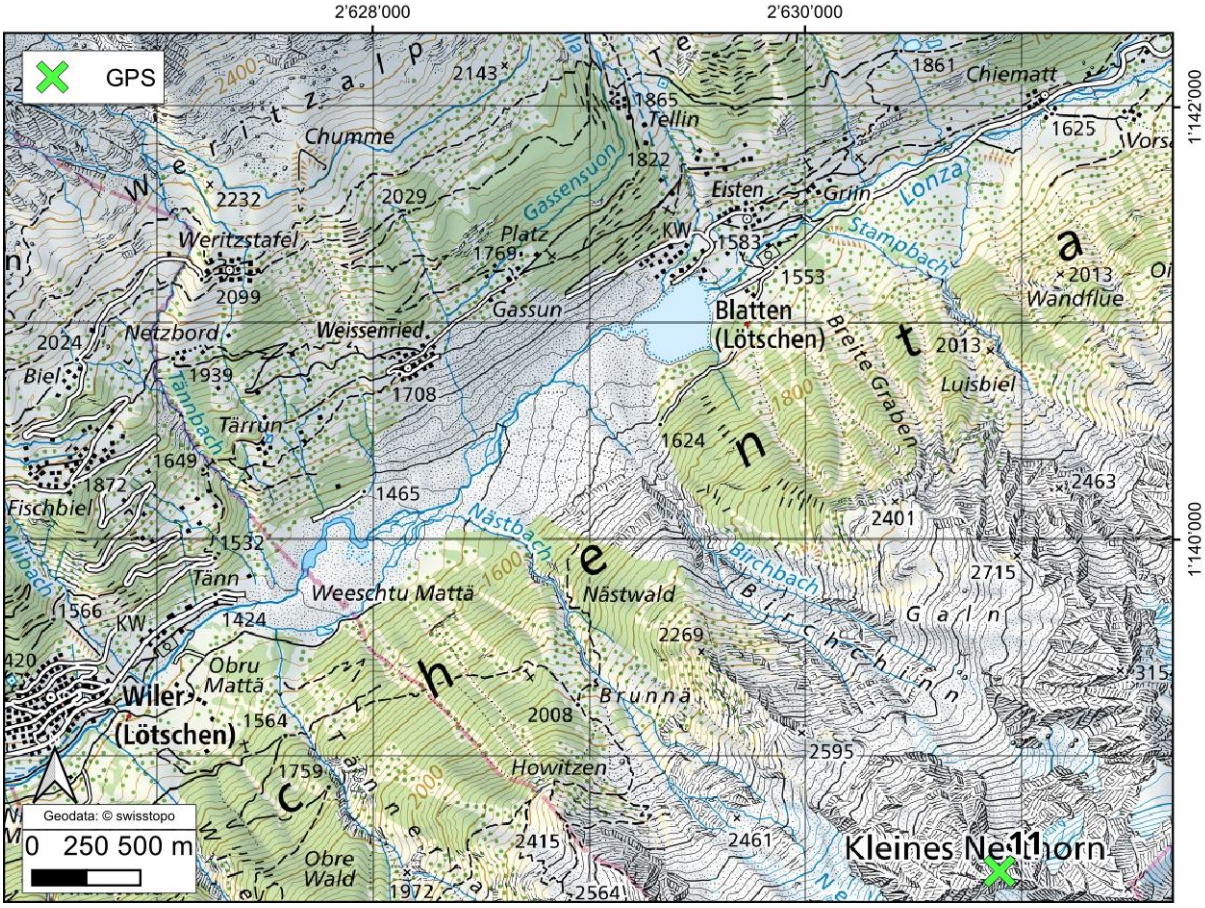
-

Related Data Bundles

11Ma00	All data points

Additional Images

Location of sensor





Station Info

Survey flight using a drone to monitor the debris cone.



Sensor ID	13
Sensor Name	**Drone Survey**
Location	2'627'020, 1'139'551 (LV95)
Elevation	1'417 m a.s.l.
Provided Data Period	2025-05-30 – 2025-09-03
Operator / Author	Terradata AG

Instrumentation

Setup 1 (2025-05-30 – 2025-07-28)

Dock

> Model	Dock 2
> Manufacturer	DJI
> Drone	DJI Matrice 3D

Camera

> Model	Wide-angle camera
> Manufacturer	DJI
> Properties	4/3“ CMOS
	24 mm full-frame equivalent
	20 MP effective pixels
	Mechanical shutter

Setup 2 (2025-08-04 – 2025-09-03)

Dock

> Model	Dock 3
> Manufacturer	DJI
> Drone	DJI Matrice 4D

Camera

> Model	Telecamer
> Manufacturer	DJI
> Properties	1/1.3“ CMOS
	70 mm full-frame equivalent
	48 MP effective pixels
	Mechanical shutter

Remarks

The flights were carried out at irregular intervals. The images were used to monitor the debris cone. Using photogrammetry, the individual images were used to calculate an elevation model and an orthophoto covering the entire perimeter.

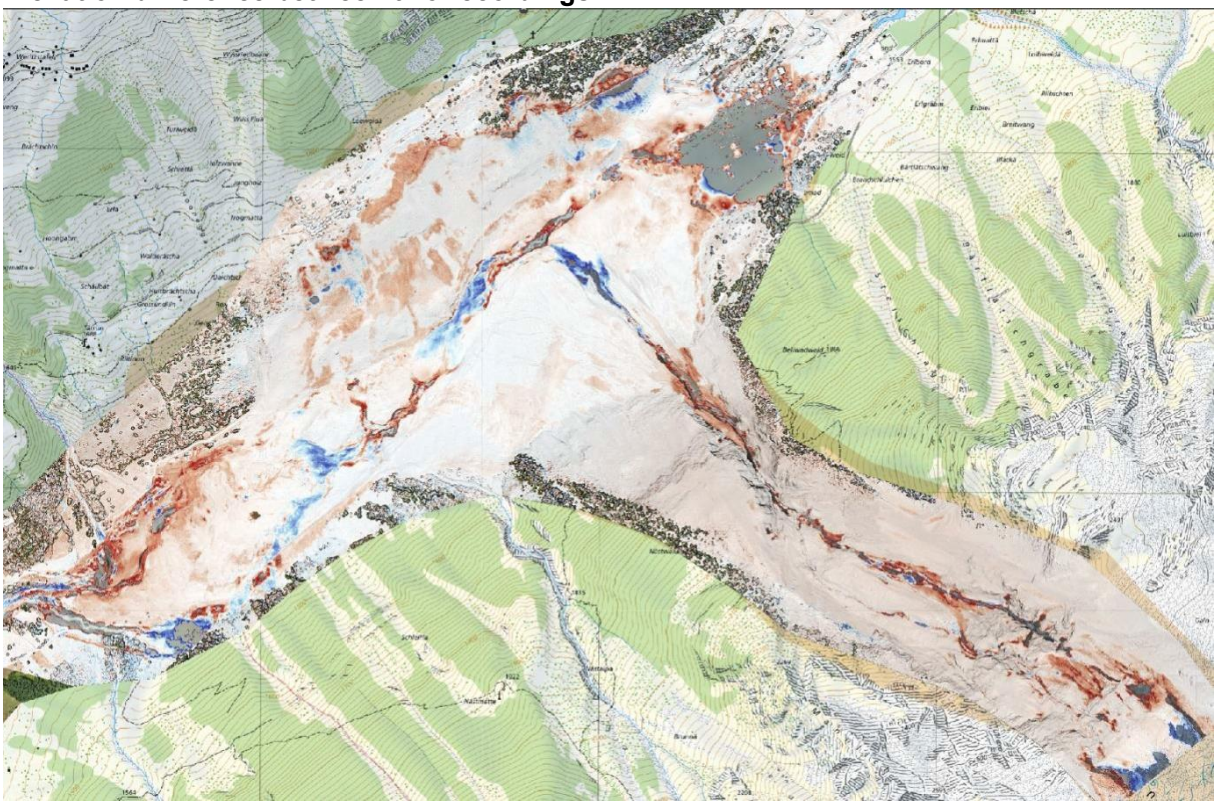
Related Data Bundles

Code	Product Type	Date	GSD [cm]	RMSE XY / Z [cm]	Control points
13Da01	Orthophoto	2025-05-30	5.66	6.9 / 2.6	No
13Ia01	DSM	2025-05-30	-	6.9 / 2.6	No
13Da02	Orthophoto	2025-05-31	6.24	7.5 / 6.6	No
13Ia02	DSM	2025-05-31	-	7.5 / 6.6	No
13Da03	Orthophoto	2025-05-31	6.21	6.4 / 4.3	No
13Ia03	DSM	2025-05-31	-	6.4 / 4.3	No
13Da04	Orthophoto	2025-06-01	6.30	6.3 / 6.0	No
13Ia04	DSM	2025-06-01	-	6.3 / 6.0	No
13Da05	Orthophoto	2025-06-02	6.38	7.9 / 7.7	No
13Ia05	DSM	2025-06-02	-	7.9 / 7.7	No
13Da06	Orthophoto	2025-06-03	6.33	11.2 / 8.9	No
13Ia06	DSM	2025-06-03	-	11.2 / 8.9	No
13Da07	Orthophoto	2025-06-04	6.39	10.1 / 12.7	No
13Ia07	DSM	2025-06-04	-	10.1 / 12.7	No
13Da08	Orthophoto	2025-06-05	6.23	6.6 / 7.9	No
13Ia08	DSM	2025-06-05	-	6.6 / 7.9	No
13Da09	Orthophoto	2025-06-06	6.04	8.1 / 4.8	No
13Ia09	DSM	2025-06-06	-	8.1 / 4.8	No
13Da10	Orthophoto	2025-06-08	6.21	6.5 / 9.7	No
13Ia10	DSM	2025-06-08	-	6.5 / 9.7	No
13Da11	Orthophoto	2025-06-09	6.08	8.7 / 8.8	No
13Ia11	DSM	2025-06-09	-	8.7 / 8.8	No
13Da12	Orthophoto	2025-09-10	6.11	8.2 / 9.7	No
13Ia12	DSM	2025-09-10	-	8.2 / 9.7	No
13Da13	Orthophoto	2025-06-11	6.07	10.3 / 12.4	No
13Ia13	DSM	2025-06-11	-	10.3 / 12.4	No
13Da14	Orthophoto	2025-06-12	6.06	7.6 / 5.8	No
13Ia14	DSM	2025-06-12	-	7.6 / 5.8	No
13Da15	Orthophoto	2025-06-13	6.10	6.4 / 6.0	No
13Ia15	DSM	2025-06-13	-	6.4 / 6.0	No
13Da16	Orthophoto	2025-06-14	6.09	7.7 / 4.5	No
13Ia16	DSM	2025-06-14	-	7.7 / 4.5	No
13Da17	Orthophoto	2025-06-15	6.08	5.8 / 5.0	No
13Ia17	DSM	2025-06-15	-	5.8 / 5.0	No
13Da18	Orthophoto	2025-06-17	6.09	9.8 / 8.1	No
13Ia18	DSM	2025-06-17	-	9.8 / 8.1	No

13Da19	Orthophoto	2025-06-18	6.12	6.4 / 4.6	No
13Ia19	DSM	2025-06-18	-	6.4 / 4.6	No
13Da20	Orthophoto	2025-06-19	6.11	8.5 / 7.0	No
13Ia20	DSM	2025-06-19	-	8.5 / 7.0	No
13Da21	Orthophoto	2025-06-20	6.16	7.2 / 4.5	No
13Ia21	DSM	2025-06-20	-	7.2 / 4.5	No
13Da22	Orthophoto	2025-06-21	5.82	9.1 / 7.5	No
13Ia22	DSM	2025-06-21	-	9.1 / 7.5	No
13Db01	Orthophoto	2025-06-24	4.76	3.7 / 3.8	Yes
13Ib01	DSM	2025-06-24	-	3.7 / 3.8	Yes
13Db02	Orthophoto	2025-06-26	4.70	3.4 / 2.9	Yes
13Ib02	DSM	2025-06-26	-	3.4 / 2.9	Yes
13Db03	Orthophoto	2025-06-30	4.72	3.8 / 1.2	Yes
13Ib03	DSM	2025-06-30	-	3.8 / 1.2	Yes
13Db04	Orthophoto	2025-07-04	4.67	4.3 / 0.6	Yes
13Ib04	DSM	2025-07-04	-	4.3 / 0.6	Yes
13Db05	Orthophoto	2025-07-09	4.46	5.2 / 1.0	Yes
13Ib05	DSM	2025-07-09	-	5.2 / 1.0	Yes
13Db06	Orthophoto	2025-07-14	4.46	3.8 / 1.1	Yes
13Ib06	DSM	2025-07-14	-	3.8 / 1.1	Yes
13Db07	Orthophoto	2025-07-23	4.47	3.6 / 0.5	Yes
13Ib07	DSM	2025-07-23	-	3.6 / 0.5	Yes
13Db08	Orthophoto	2025-07-28	4.48	12.6 / 4.3	Yes
13Ib08	DSM	2025-07-28	-	12.6 / 4.3	Yes
13Db09	Orthophoto	2025-08-04	4.46	13.3 / 5.1	Yes
13Ib09	DSM	2025-08-04	-	13.3 / 5.1	Yes
13Db10	Orthophoto	2025-08-11	4.42	10.9 / 6.8	Yes
13Ib10	DSM	2025-08-11	-	10.9 / 6.8	Yes
13Db11	Orthophoto	2025-08-18	4.41	11.6 / 5.2	Yes
13Ib11	DSM	2025-08-18	-	10.9 / 6.8	Yes
13Db12	Orthophoto	2025-08-27	4.42	10.0 / 5.3	Yes
13Ib12	DSM	2025-08-27	-	10.0 / 5.3	Yes
13Db13	Orthophoto	2025-09-03	4.41	10.4 / 6.8	Yes
13Db13	DSM	2025-09-03	-	10.4 / 6.8	Yes

Additional Images

Elevation difference between two recordings



Station Info

Three rapid-response surveys conducted by helicopter to provide reliable 3D data on the extent of the landslide.





Sensor ID	14
Sensor Name	**Helimap**
Location	-
Elevation	-
Provided Data Period	2025-05-25 / 05-29 / 06-10
Operator / Author	Sixense Helimap SA

Instrumentation

Scanner

> Model	*05-23*	VQ580
	later	VQ780ii
> Manufacturer		RIEGL
> IMU		IXBLUE AirNS

Camera

> Nadir camera	*05-23*	PhaseOne IXUN1000-50 mm
	later	IXMGS120-35mm, 2x IXM100-50mm, 2x IXUR1000-70mm
> Hyperspectral camera		Resonon PIKA L (281 spectral channels 400 – 1000 nm)
> Thermal imagingcamera		Flir SC655

Recording information 2025-05-23

> Vertical and oblique flight at ~450 m above ground level with the HSIII system @ 200 kHz
> Detection speed of ~30 kt
> Average pixel size on ground of ~4 cm
> Nominal LiDAR point density of ~30 points/m^2
> Accuracy: ~5 cm in height measurement, ~5 cm in surface configuration; 1 sigma on hard surfaces

Recording information 2025-05-29

> Vertical and oblique flight at ~750 m above ground level with the V3 system @ 2’000 kHz
> Detection speed of ~60 kt
> Average pixel size on ground of ~7 cm
> Nominal LiDAR point density of ~80 points/m^2
> Accuracy: ~5 cm in height measurement, ~7 cm in surface configuration; 1 sigma on hard surfaces

Recording information 2025-06-10

> Vertical and oblique flight at ~620 m above ground level with the V3 system @ 2'000 kHz
> Detection speed of ~50 kt
> Average pixel size on ground of ~6 cm
> Nominal LiDAR point density of ~120 points/m^2
> Accuracy: ~5 cm in height measurement, ~7 cm in surface configuration; 1 sigma on hard surfaces
> Thermal imaging (flyover at 380 m above ground): resolution of 50 cm
> Hyperspectral imaging: pixel size of ~60 cm

Remarks

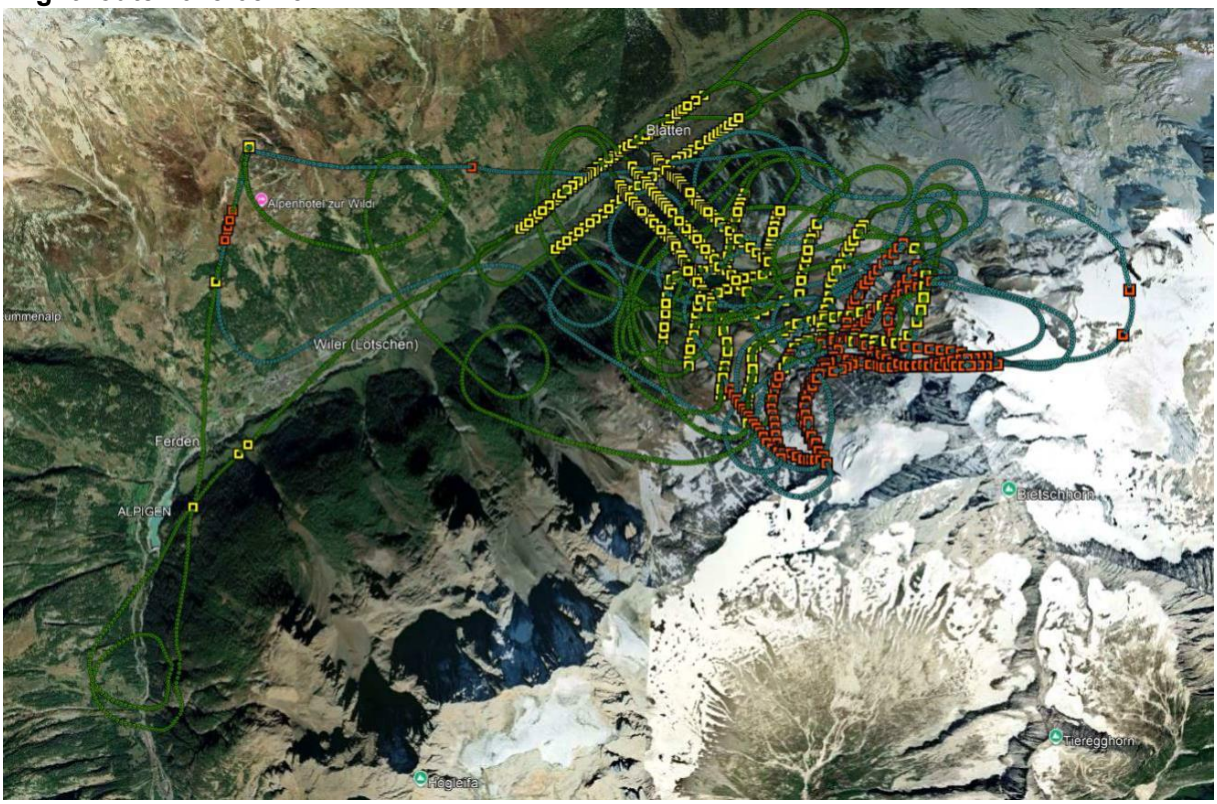
After the landslide, emergency mapping was carried out to provide reliable 3D data on the extent of the landslide. To this end, the entire perimeter was flown over by helicopter and recorded using laser scanners and photographs.

Related Data Bundles

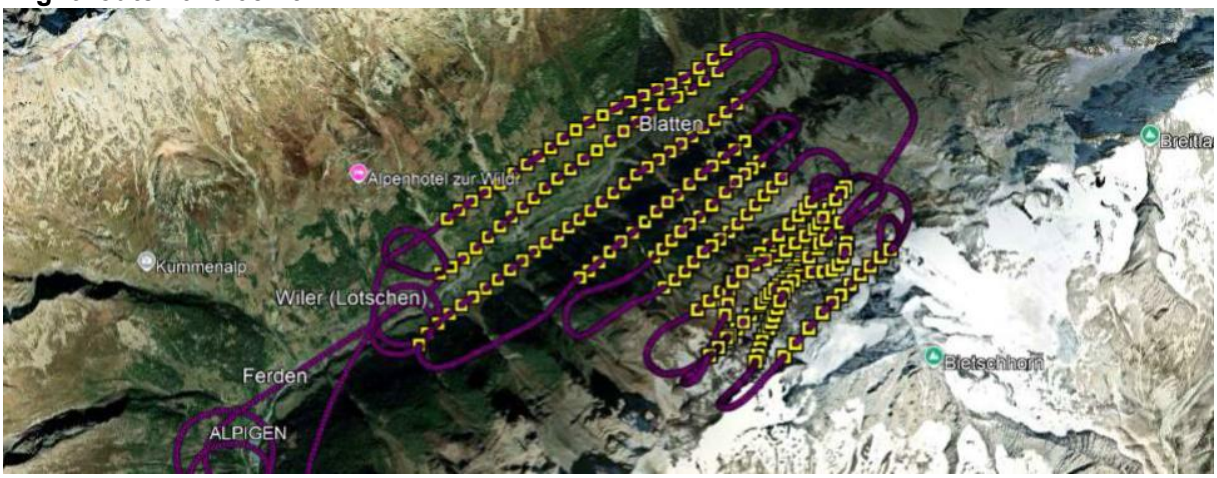
Code	Product Type	Date	GSD [cm]	RMSE XY / Z [cm]	Control points
14Da01	Orthophoto	2025-05-23	4.07	8.9 / 6.5	No
14Ia01	DSM	2025-05-23	-	8.9 / 6.5	No
14Ka01	Pointcloud	2025-05-23	-	8.9 / 6.5	No
14Da02	Orthophoto	2025-05-29	6.92	6.5 / 8.0	No
14Ia02	DSM	2025-05-29	-	6.5 / 8.0	No
14Ka02	Pointcloud	2025-05-29	-	6.5 / 8.0	No
14Da03	Orthophoto	2025-06-10	6.00	7.1 / 6.5	No
14Ia03	DSM	2025-06-10	-	7.1 / 6.5	No
14Ka03	Pointcloud	2025-06-10	-	7.1 / 6.5	No
14Na01	Thermal Image	2025-06-10	-	?	No

Additional Images

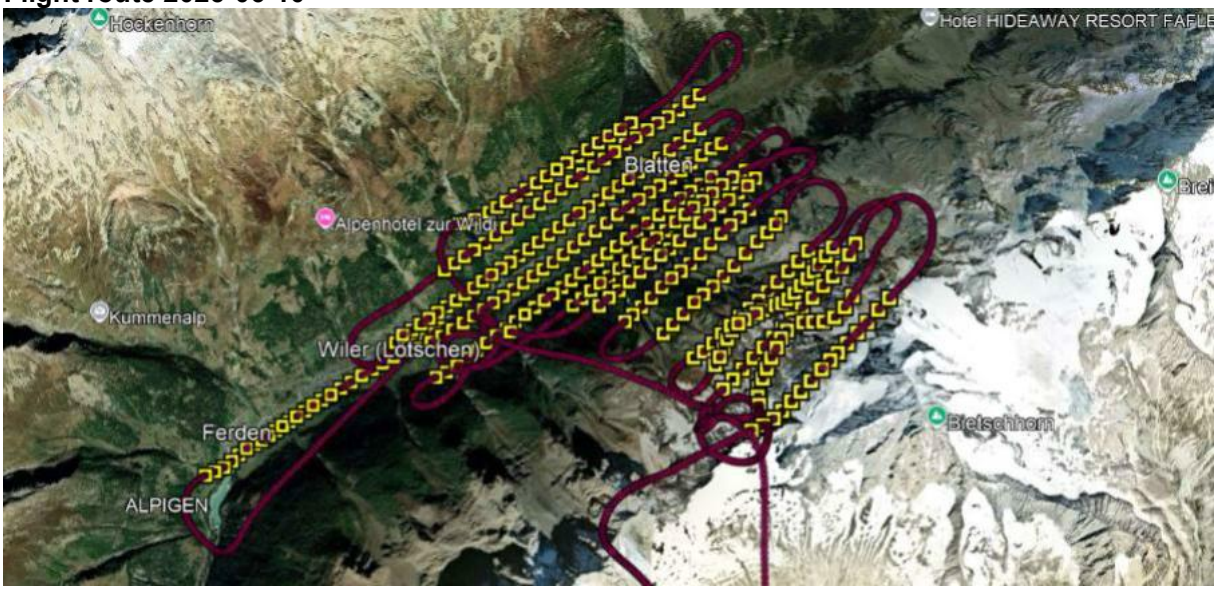
Flight route 2025-05-23



Flight route 2025-05-29



Flight route 2025-06-10



Station Info

Hydrological measurement station detecting lake level and inferring corresponding lake volume.

Sensor ID	17
Sensor Name	**Lake Level - Geoazimut**
Location	2'629'433, 1'141'135 (LV95)
Elevation	1'543 m a.s.l.
Provided Data Period	2025-05-29 — 2025-09-24
Operator / Author	Geoazimut / CREALP

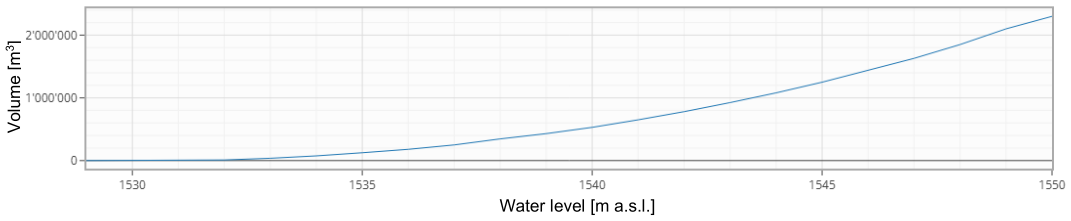
Instrumentation

Setup

> System — Pressure sensor measuring pressure relative to atmospheric pressure, connected to an alarm center which can send messages.
> Sensor — Keller PR26-X
> Logger — Campbell
> Transmission — GSM / 3G
> Measure Frequency — 10 minutes (5 s at alarm center)

Remarks

Lake volume is based on the following calibration curve:



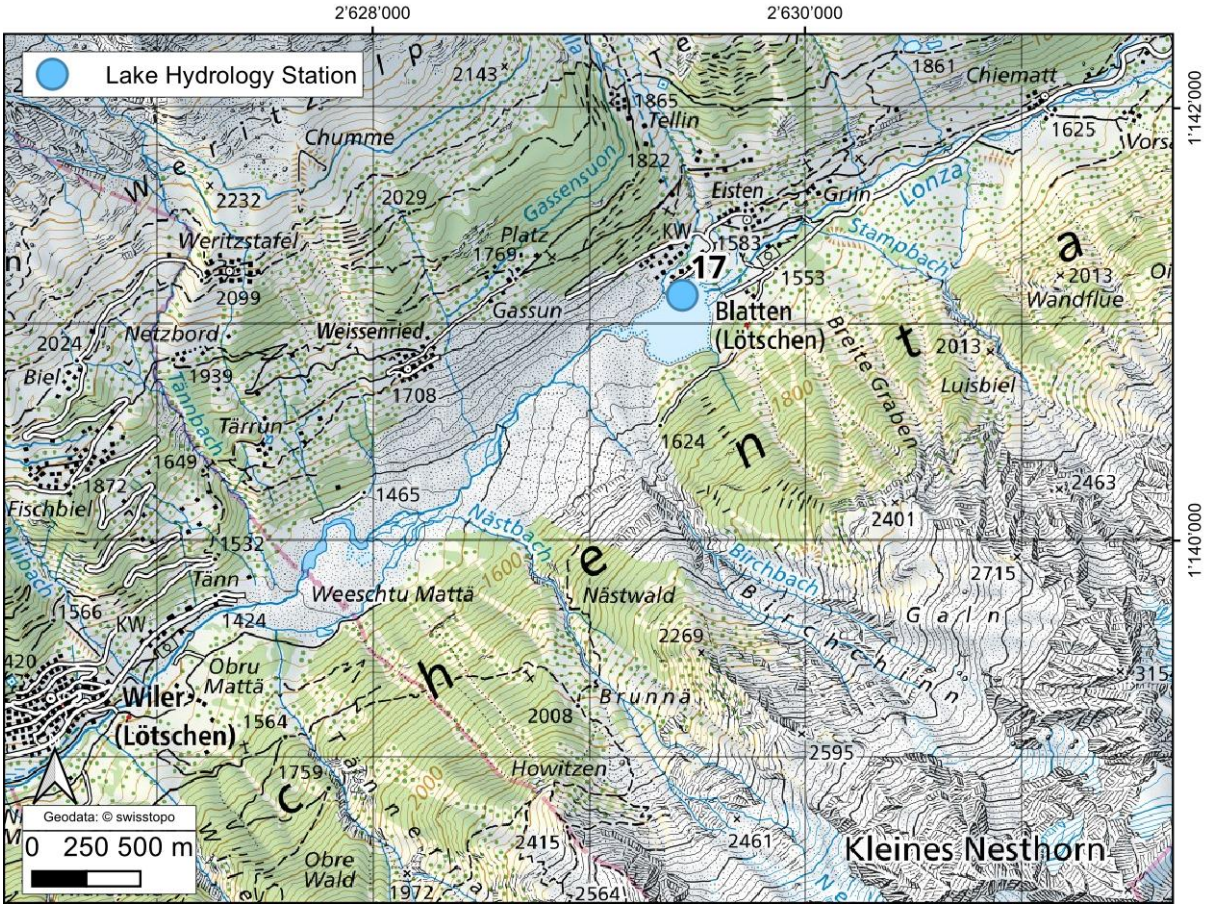
Related Data Bundles

All Data for station 17 is compiled in one file.

17Pa00	Water level
17Pb00	Lake volume

Additional Images

Location of sensor



Station Info

Hydrological measurement station detecting water height and discharge of Lonza river, upstream of the village of Blatten.

Sensor ID	18
Sensor Name	**Lonza river discharge - upstream**
Location	2'630'786, 1'141'861 (LV95)
Elevation	1'604 m a.s.l.
Provided Data Period	2025-05-30 — 2025-09-24
Operator / Author	Hydro VS / CREALP



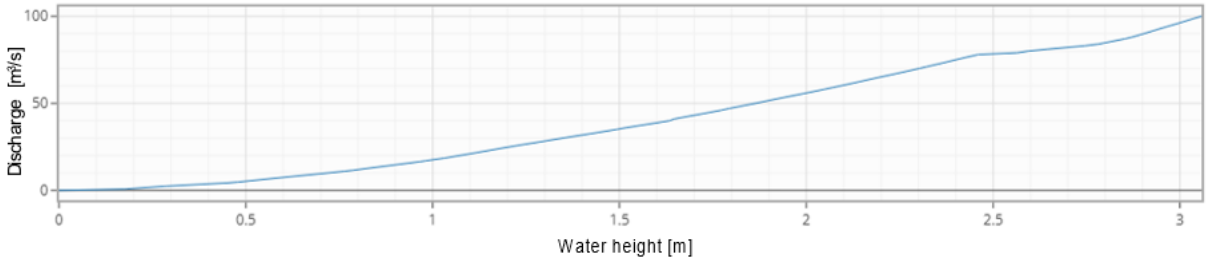
Instrumentation

> Sensor Radar RSL 500 (OTT)
> Logger Netdl 500 (OTT)
> Transmission GSM / 4G
> Energy Supply Solar Panel
> Measure Frequency 2 minutes

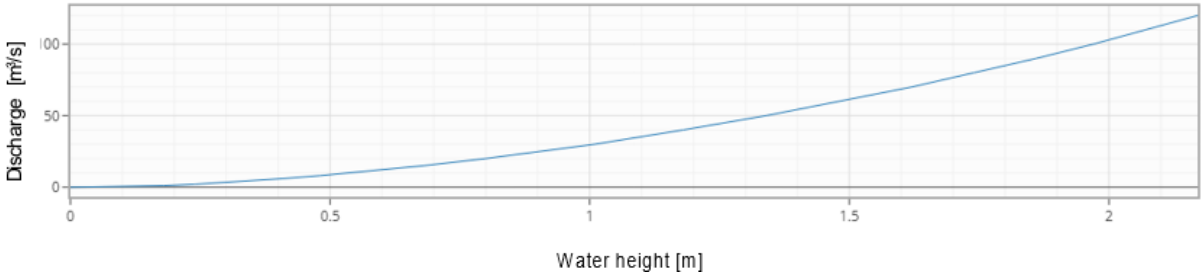
Remarks

The water height to discharge transformation curve was calibrated three times during the data period:

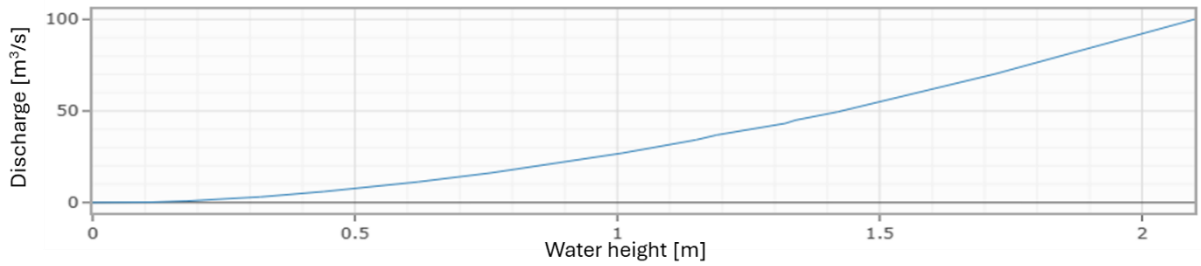
Calibration Curve used from 2025-05-31 to 2025-06-06



Calibration Curve used from 2025-06-06 to 2025-08-16



Calibration Curve used from 2025-08-17 to 2025-09-24



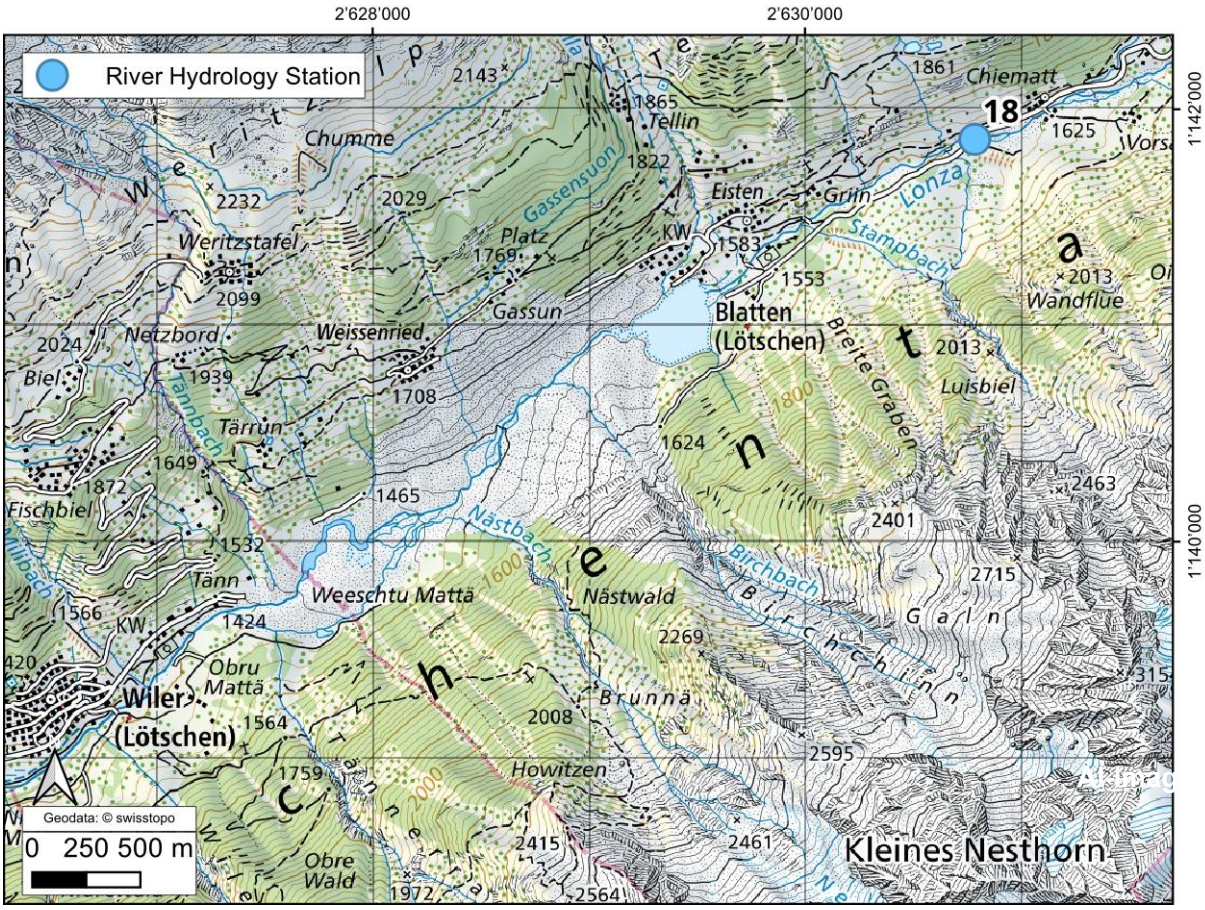
Related Data Bundles

All data bundles from station 18 are compiled in one file.

18Oa01	Water height, valid till 2025-08-16
18Oa02	Water height, valid from 2025-08-17
18Ob01	Discharge – first calibration (used 2025-05-30 – 2025-06-06)
18Ob02	Discharge – second calibration (used 2025-06-06 – 2025-08-16)
18Ob03	Discharge - third calibration (used 2025-08-17 – 2025-09-24)

Additional Images

Location of sensor



Station Info

Hydrological measurement station detecting water height and discharge of Lonza river in Blatten. Destroyed during the landslide.



Sensor ID	19
Sensor Name	**Lonza river discharge - Blatten**
Location	2'629'128, 1'140'919 (LV95)
Elevation	1'523 m a.s.l.
Data Period	2025-05-01 — 2025-05-28
Operator / Author	HYDRO OFEV (BAFU)

Instrumentation

Sensor specifications unknown.
Discharge was measured pneumatically.

Remarks

Station is dysfunctional since it was destroyed during the landslide event on 28.05.2025. Further information may be found on https://www.hydrodaten.admin.ch/fr/seen-und-fluesse/stationen-und-daten/2269.

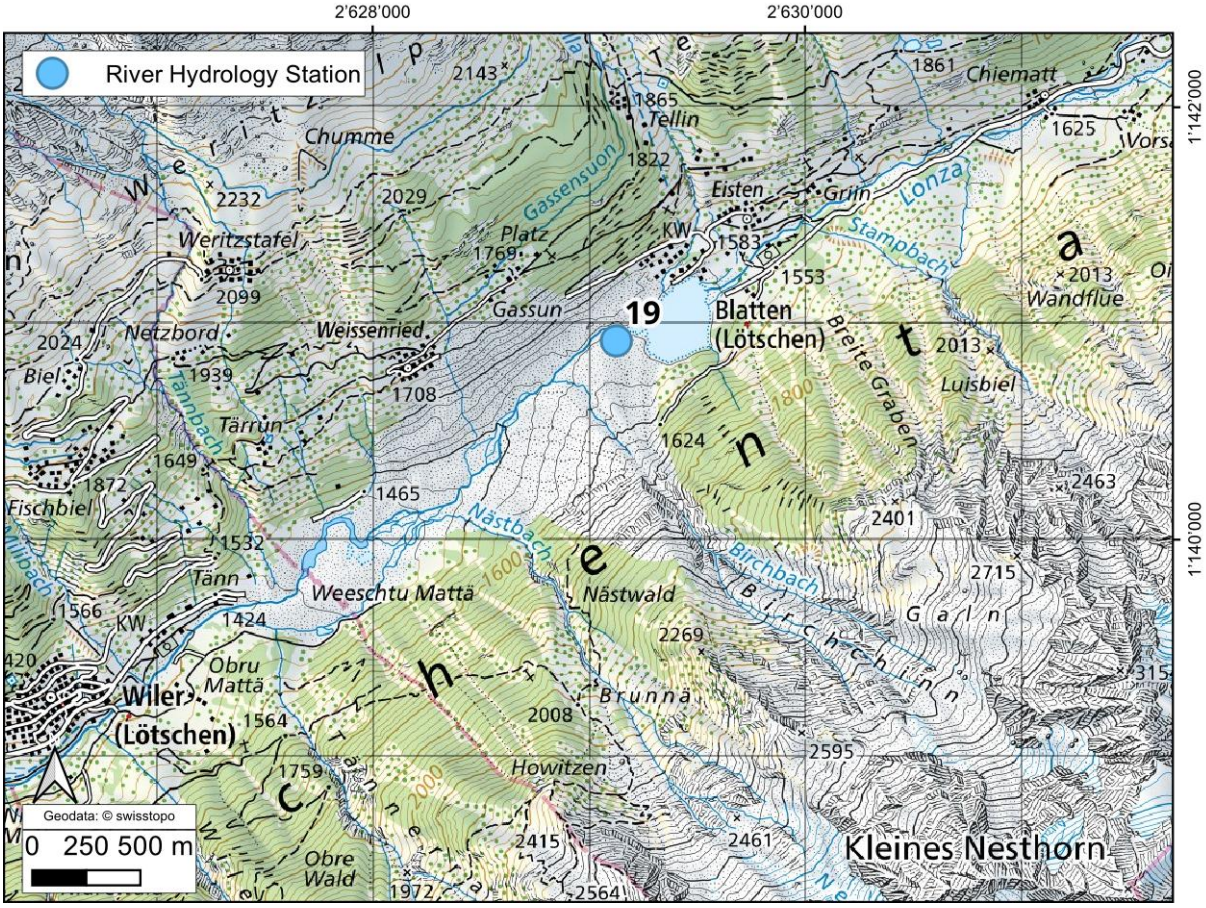
Related Data Bundles

All data bundles of station 19 are compiled in one file.

19Oa00	Discharge (pneumatic)
19Ob00	Water level (pneumatic)

Additional Images

Location of station



Station Info

Hydrological measurement station detecting water height and discharge of Lonza river at the village of Kippel.



Sensor ID	20
Sensor Name	**Lonza river discharge - Kippel**
Location	2'625'879, 1'138'662 (LV95)
Elevation	1’344 m a.s.l.
Provided Data Period	2025-05-31 — 2025-09-24
Operator / Author	HYDRO VS / Guardaval / CREALP

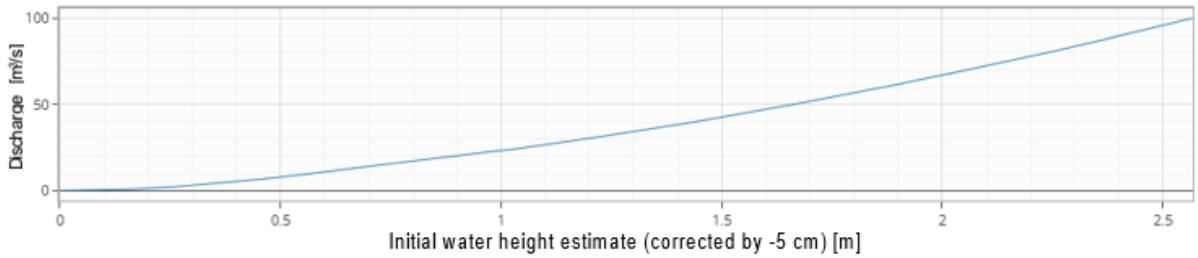
Instrumentation

> Sensor Radar RSL 500 (OTT)
> Logger Netdl 500 (OTT)
> Transmission GSM / 4G
> Energy Supply Solar Panel
> Measure Frequency 10 minutes

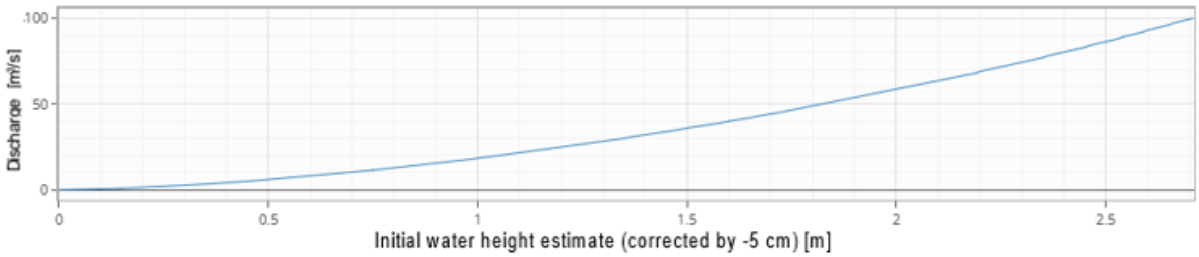
Remarks

The water height to discharge transformation curve was calibrated three times during the data period:

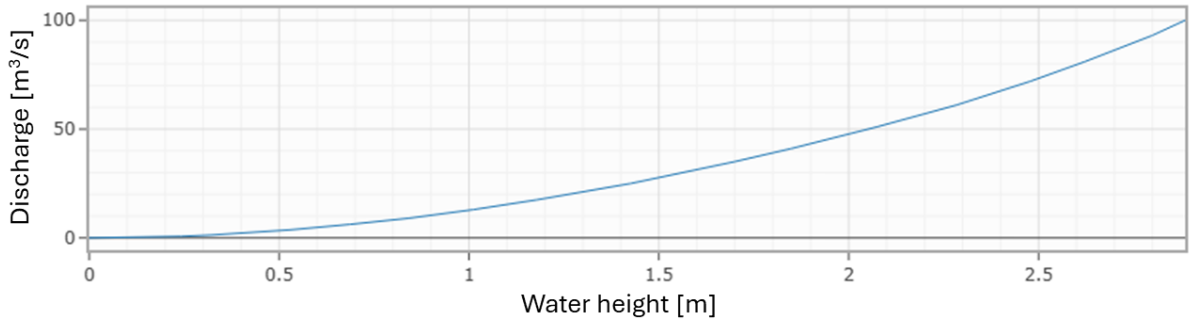
Calibration Curve used from 2025-05-31 to 2025-06-06



Calibration Curve used from 2025-06-06 to 2025-08-27



Calibration Curve used from 2025-08-27 to 2025-09-24



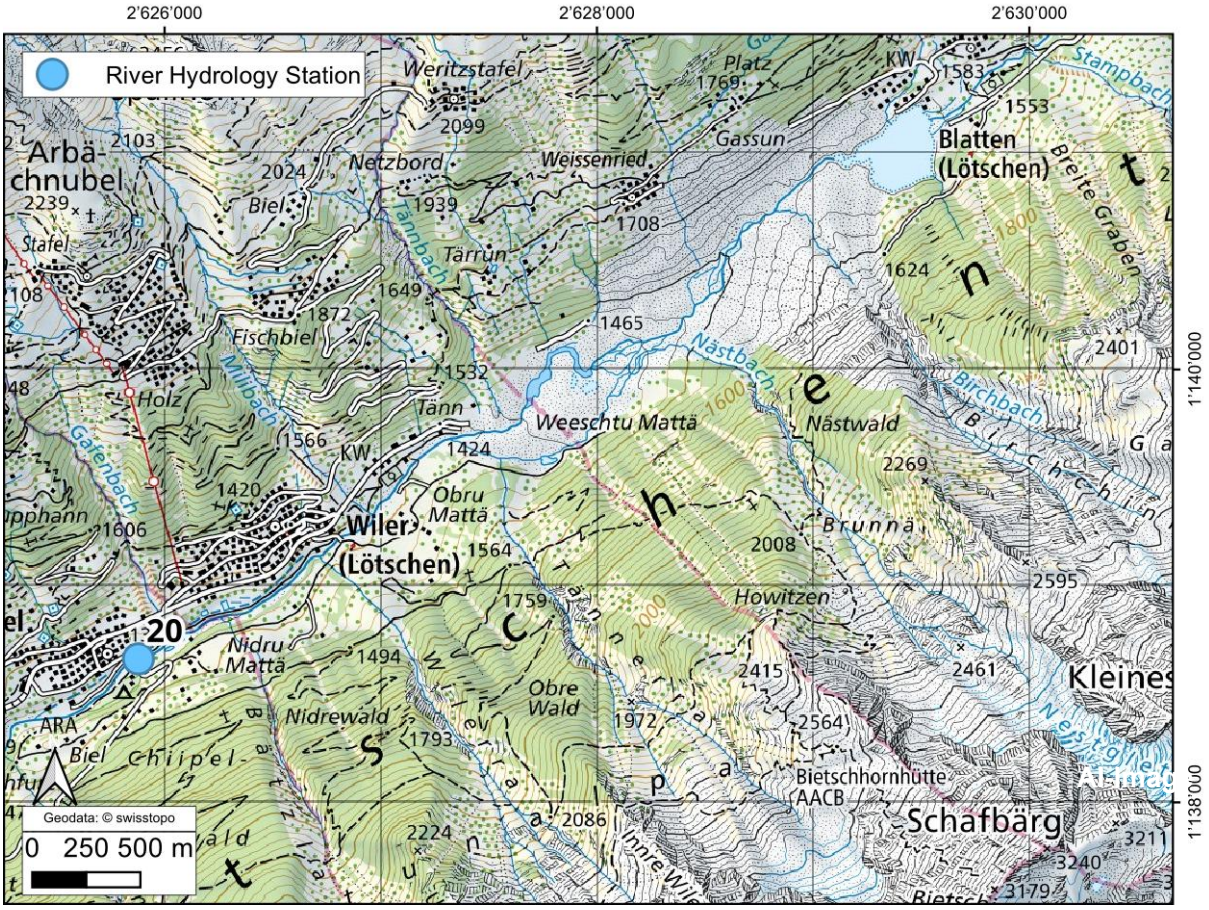
Related Data Bundles

All data bundles for station 20 are compiled in one file.

20Oa00	Water height
20Ob01	Discharge - first calibration (used 2025-05-30 – 2025-06-06)
20Ob02	Discharge - second calibration (used 2025-06-06 – 2025-08-27)
20Ob03	Discharge - third calibration (used 2025-08-27 – 2025-09-24)

Additional Images

Location of sensor



Station Info

Hydrological measurement station detecting water height and discharge of Lonza river at the village of Gampel. Installed 2021-03-30.



Sensor ID	21
Sensor Name	**Lonza river discharge**
Location	2'623'606, 1'128'859 (LV95)
Elevation	635 m a.s.l.
Provided Data Period	2025-05-01 — 2025-09-24
Operator / Author	Municipality of Gampel-Bratsch / CREALP

Instrumentation

> Sensor Radar RLS 500 (OTT)
> Logger netDL 500 (OTT)
> Transmission GSM / 3G
> Energy Supply Solar Panel
> Measure Frequency 10 minutes

Remarks

-

Related Data Bundles

All data bundles for station 21 are compiled in one file.

21Oa00	Water height
21Ob00	Water surface level
21Oc00	Discharge

Additional Images

Location of station

