



SDC Network **Climate, DRR & Environment**

The Blatten disaster and Integrated Risk Management IRM

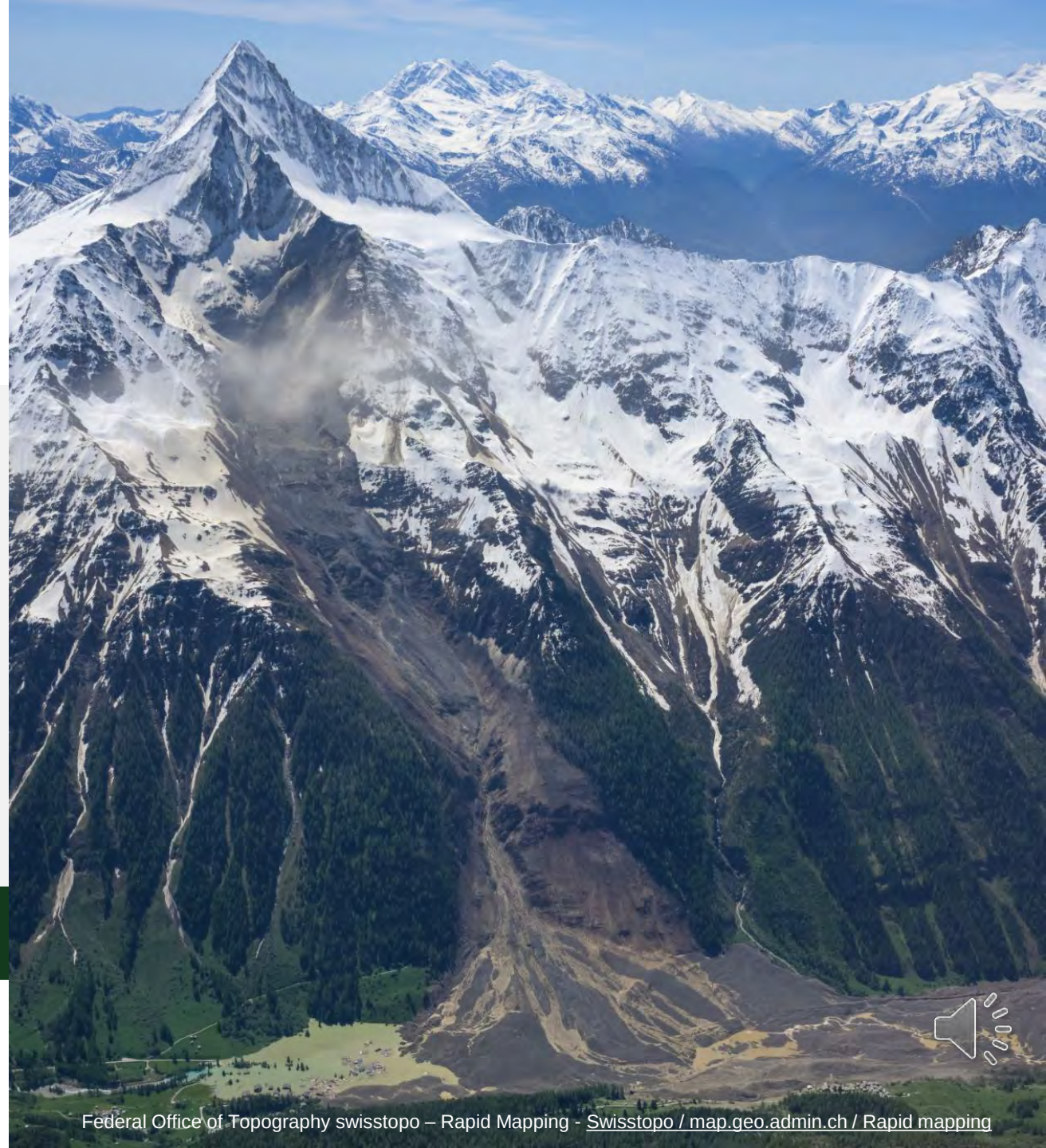
13 November 2025

This online event will start soon



Schweizerische Eidgenossenschaft
Confédération suisse
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Swiss Agency for Development
and Cooperation SDC





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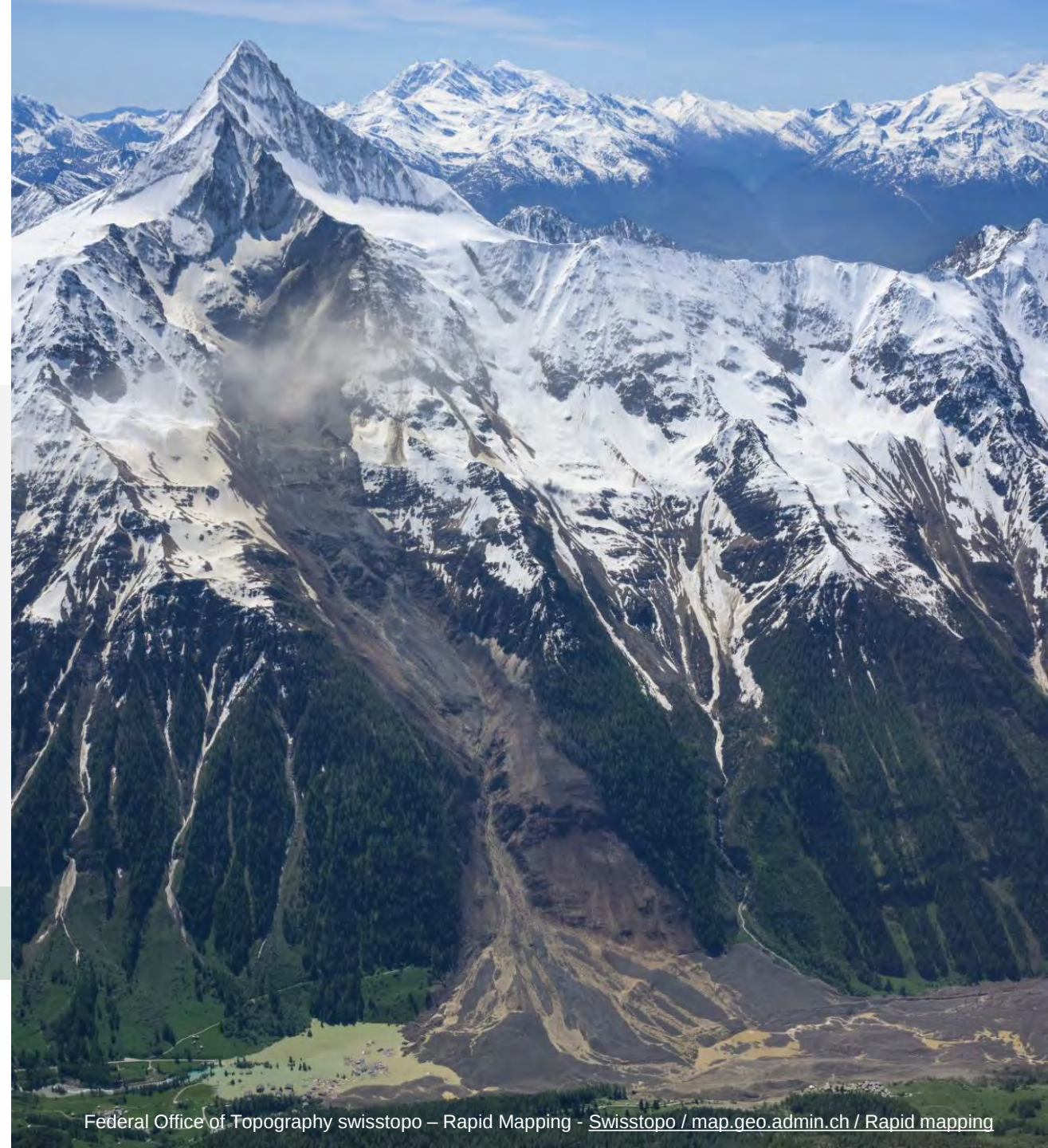
13 November 2025

WELCOME



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC



Federal Office of Topography swisstopo – Rapid Mapping - [Swisstopo / map.geo.admin.ch](https://www.swisstopo.admin.ch/map.geo.admin.ch) / Rapid mapping

Before we start...



Introduce yourself
in the chat



Please write:

- Your name
- Your affiliation
- Where you are joining from

Tech tips (rules of the game)



Please keep your microphone off if you are not speaking



If you can't hear or see: close and restart the meeting, and close other programs



This event is being recorded for internal documentation purposes



Keep your smartphone ready: you will need it a few times.

Team



André Wehrli

Senior Policy Advisor / Focal
Point Climate, DRR,
Environment Network
SDC



Ali Neumann

Head SHA Expert Group
DRR, Environment and Climate
SDC



Cesar Robles

Senior Advisor
Learning & Innovation
Helvetas

The important thing is not to stop questioning – A. Einstein

Keep Asking

**Ask questions
& vote on existing questions,
anytime.**



Questions with most votes will
be addressed.



Scan the code, or go to
[menti.com](https://menti.com/73596852) with code 7359 6852

The Blatten disaster and Integrated Risk Management IRM

BBC

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Le Monde

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Glacier collapse buries most of Swiss village

28 May 2025

Imogen Foulkes

BBC News in Bern

Share Save

Environment

Our planet at 1.5°C Europe turning grey Repairing the Earth Carbon bombs PFAS

In Switzerland, after a glacier collapsed onto Blatten, fear is gripping the mountains

The destruction of the village served as a stark reminder to residents that dramatic collapses are becoming more frequent in the Swiss Alps. Some experts are now daring to raise the possibility that, in time, the most exposed sites may have to be abandoned.



1:01

Watch: Glacier collapse swallows part of Blatten



© Anne Jan Roeleveld

PROGRAM

The Blatten disaster and Integrated Risk Management IRM

A Science Perspective

Christian Huggel,
University of
Zürich



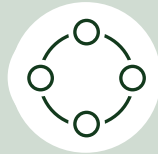
Challenges from High Mountain Hazards in India

Input by
Prabhakar Rai
Intro by
Pierre-Yves Pitteloud



The IRM Approach

Martin Proksch,
Canton du Valais



INTERACTION

Question rounds
based on voted
questions
&
Learning collection



WRAP UP

What do we take
with us?



How much do we know about the Blatten event?

Join at menti.com | use code 7602 0205

 Mentimeter

Instructions

Go to

www.menti.com

Enter the code

7602 0205



Or use QR code

A Science Perspective

*The Blatten disaster and
Integrated Risk Management IRM*

13 November 2025

Christian Huggel

University of Zürich

christian.huggel@geo.uzh.ch

The 2025 Blatten disaster: A science perspective

SDC Thematic Network Climate, DRR
and Environment, 13 November 2025

Christian Huggel



University of
Zurich ^{UZH}

E Clim



Blatten

Rapid Mapping Overflight
30 May 2025



Blatten



Pomona

Bott / Keystone

Blatten - a case of international interest

Why is Blatten of national and international interest?

- The cascading nature of physical processes is rare, spectacular, and has been extremely well monitored, providing a wealth of data for further analysis and learning.
- The avalanche resulting from the glacier collapse buried and wiped out an entire village. For many people, the 'unthinkable' has happened.
- The process of (post-disaster) re-settlement is of great interest in the international context of climate change, limits of adaptation and relocation.

Blatten – scientific understanding

Scientific understanding shaped
through international cooperation

Kolka-Karmadon glacier collapse and avalanche 2002



Рис. Общий вид остановившихся ледовых масс у "Кармадонских ворот". Съемка 21.09.2002 г.

Aru-Co Twin glacier collapses 2016



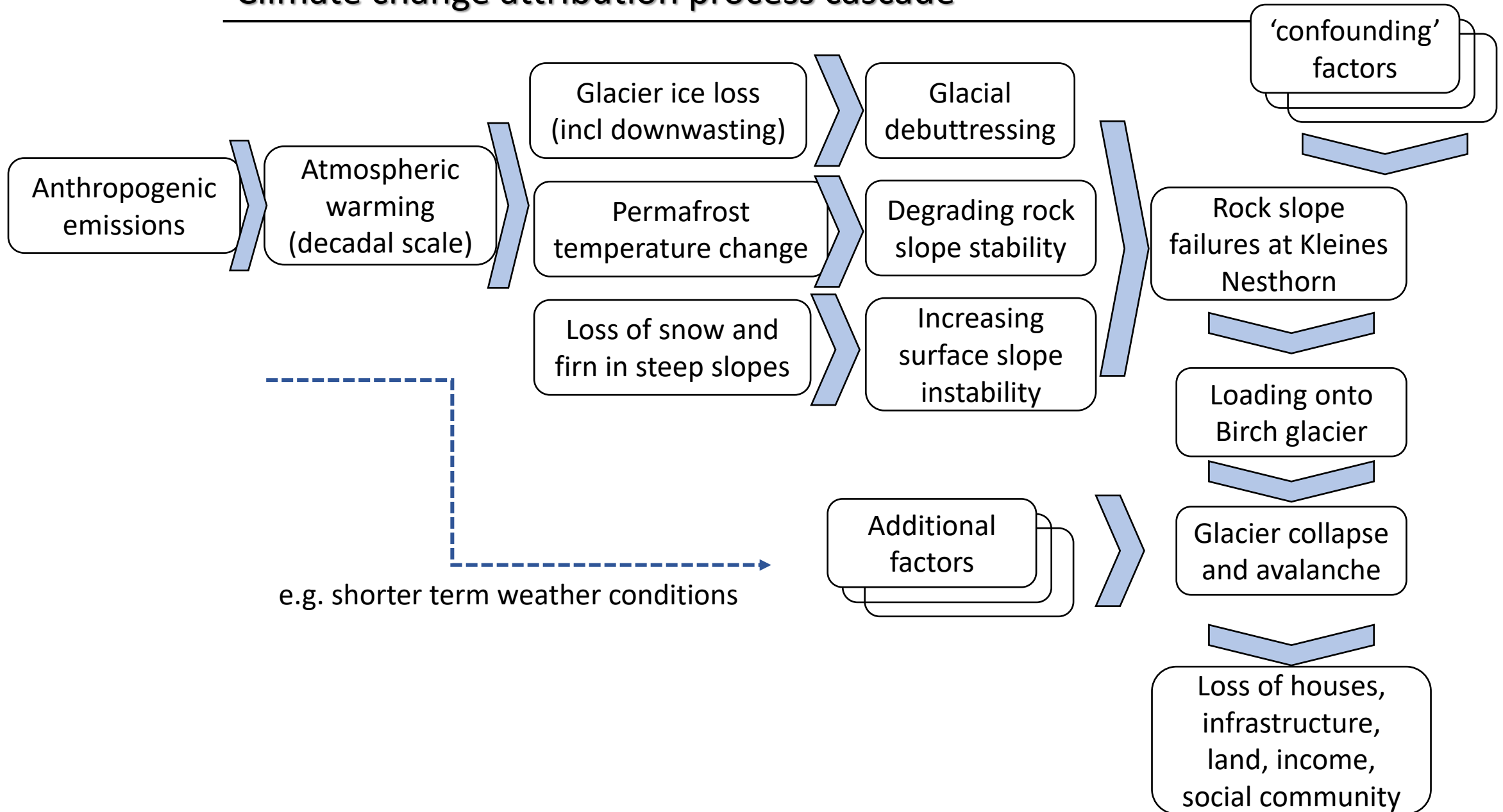
Y. Tadong

Kääb et al. 2018

Blatten: state-of-the-art in avalanche modeling



Climate change attribution process cascade



Climate change impacts on the cryosphere

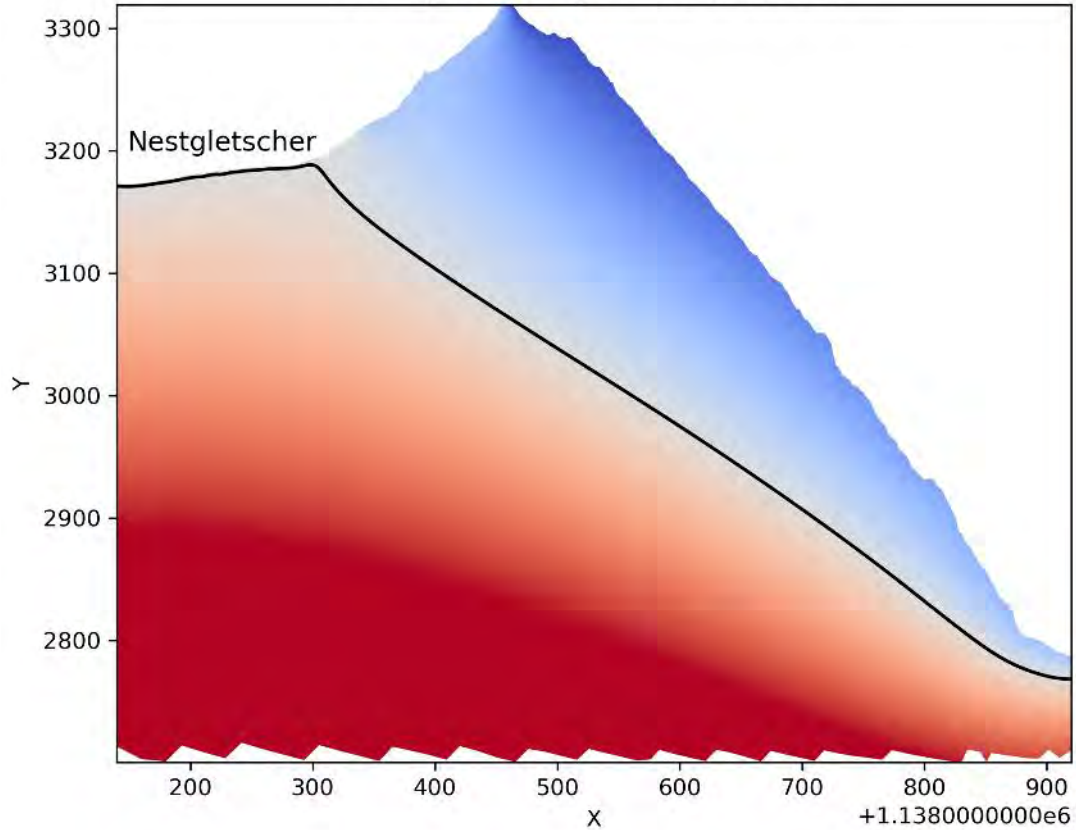


Climate change impacts on the cryosphere



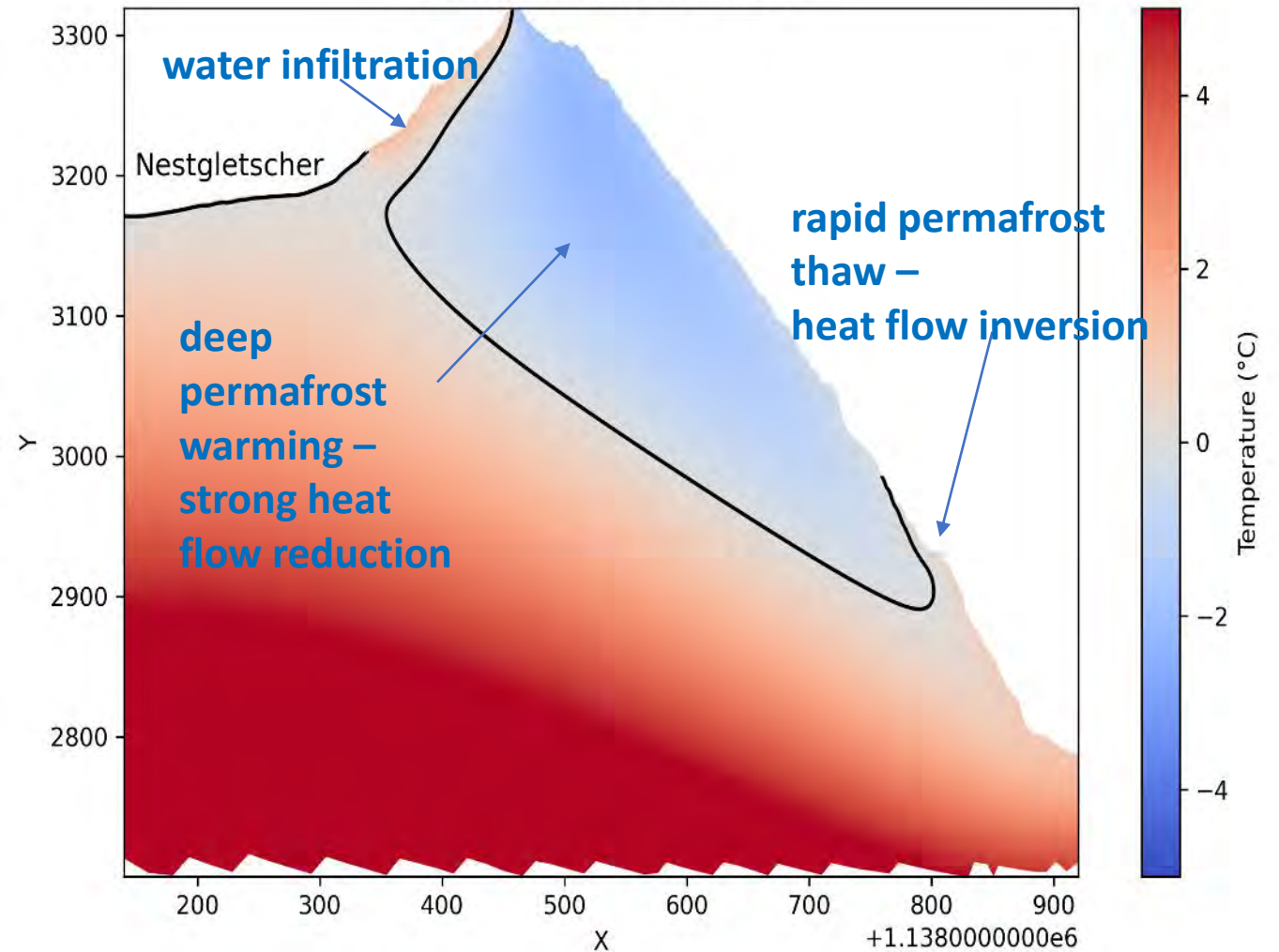
Climate change— rock temperature effects

Steady state temperature 1850 (LIA)



Haeberli, Cohen, Arenson

Transient temperature 2025

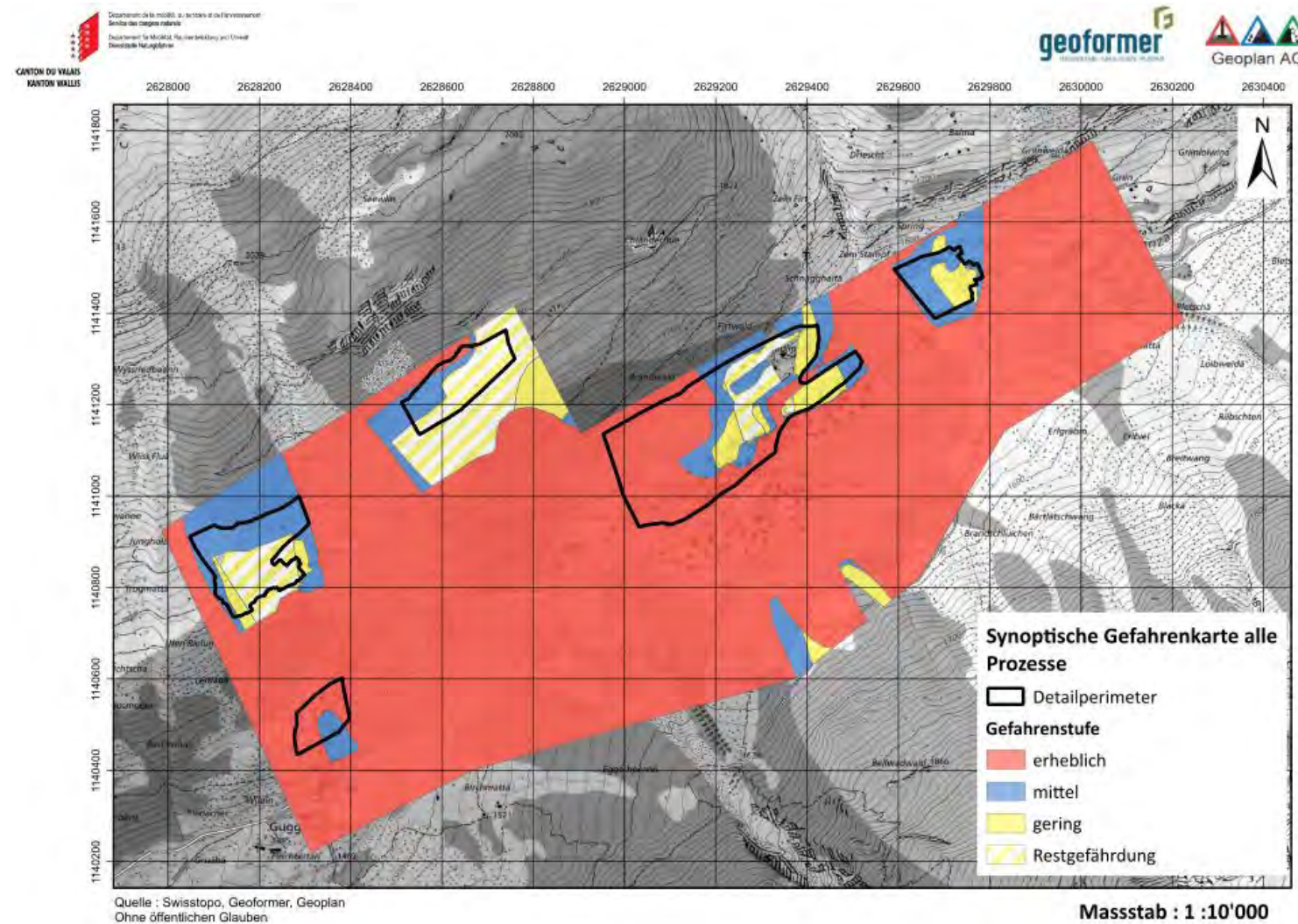


Blatten – the future – which future?



Blatten – re-settlement process

The technical aspects of re-settlement



Kanton Valais



Blatten – re-settlement process

Key question: how to maintain (or re-build) a social community?

Participative, inclusive (governance) processes are essential to achieve sustainable (adaptation) solutions.



Herrgottsgrenadiere, Corpus Christi

Scientific evidence on community based processes

Synthesis from IPCC AR6 WGII (2022)

Inclusive governance contributes to more effective and enduring adaptation outcomes and enables climate resilient development (*high confidence*) (SPM).

Inclusive governance that prioritises equity and justice in adaptation planning and implementation leads to more effective and sustainable adaptation outcomes (high confidence).

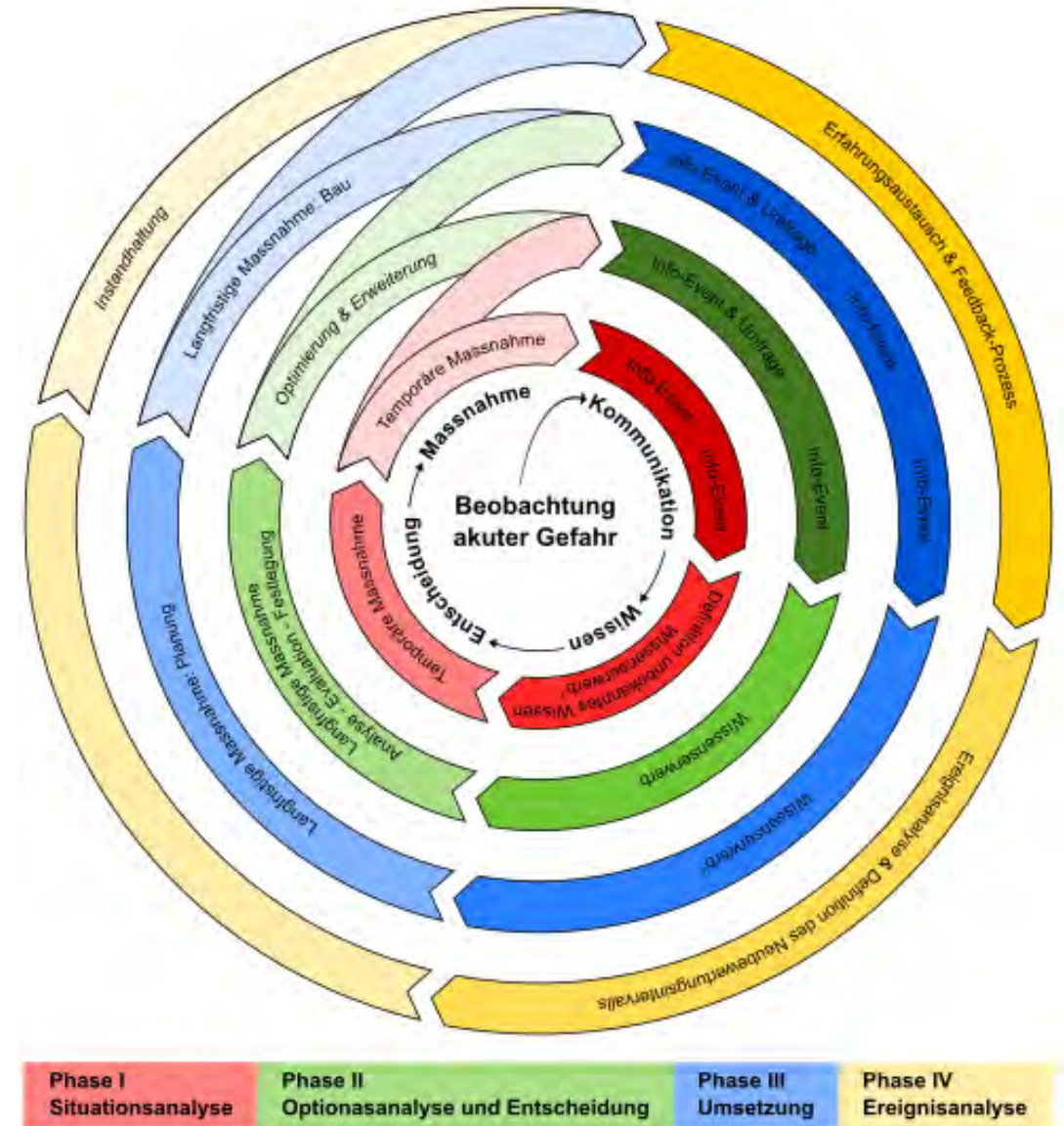
...These approaches [...] include multi-stakeholder co-learning platforms, transboundary collaborations, community-based adaptation and participatory scenario planning... (*high confidence*) (SPM).

Adaptation decision-making processes that engage with and incorporate people's concerns and values and address multiple risks are more robust than those with a narrow focus on single risks (CCP5 Mountains).

Habitability and relocation

Rising questions of

- Cost-benefit of protection measures
- Need certain settlements to be abandoned?
- habitability and relocation



Conclusions and learning

- High-mountain cryosphere environments are highly sensitive to climate change, and we're experiencing rapid change, quickly moving beyond historical precedence, resulting in changing frequency, intensity and location of hazards and risks.
- We have a good understanding of the physical processes that were involved in the rock slope failure, glacier collapse and avalanche (thanks to decades of international collaborative research) which allows us to do reasonably precise forecasts and scenarios
- Anthropogenic climate change has played an important role in the rock slope failure at Kleines Nesthorn and hence the related glacier collapse and avalanche
- Re-settlement (and relocation) processes are highly complex and involve technical, administrative, governance, financial, legal, social, cultural aspects. Inclusive and participatory processes are key to sustainable solutions.
- With warming above 1.5°C, the need for adaptation to address key risks in mountains becomes increasingly urgent (*high confidence*). (IPCC WGII AR6, CCP5 Mountains)
- With higher degrees of warming, limits of adaptation will be reached, and relocation of settlements is likely becoming more frequent.

Thank you for your attention!



Questions of understanding about Blatten



See questions.

Post questions.

Vote for questions.

Scan the code, or go to
menti.com with code 7359 6852

The Integrated Risk Management (IRM) Approach

Clean Air, Climate and Health
Learning Journey

25 September 2025

Martin Proksch

Head of Section AGIR
Integrated Risk
Management Support

Canton du Valais

martin.proksch@admin.vs.ch

Blatten – the Integrated Risk Management (IRM) approach

Martin Proksch, Head of Section AGIR (Integrated Risk Management Support)

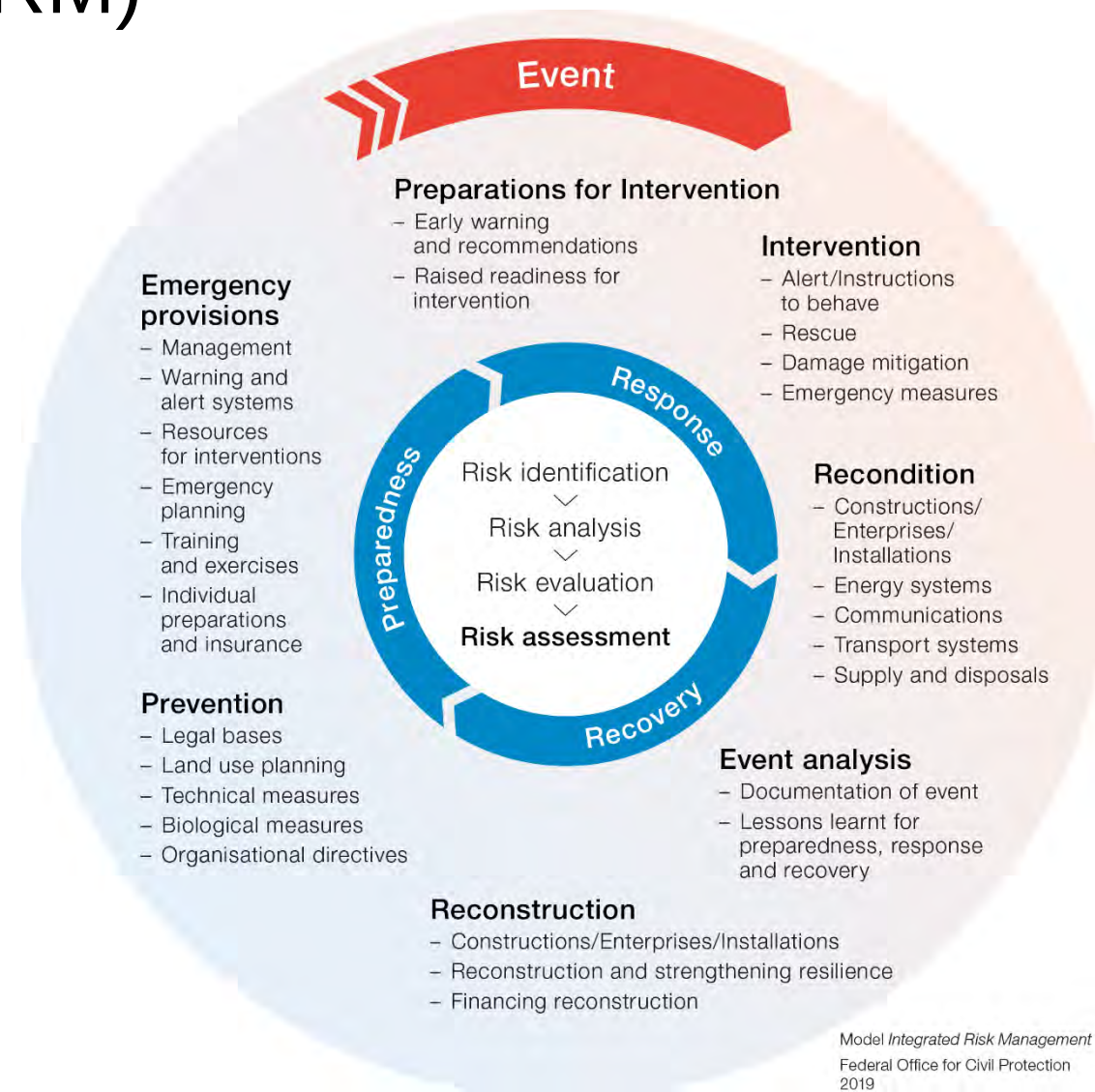
Guillaume Favre-Bulle, Head of Service

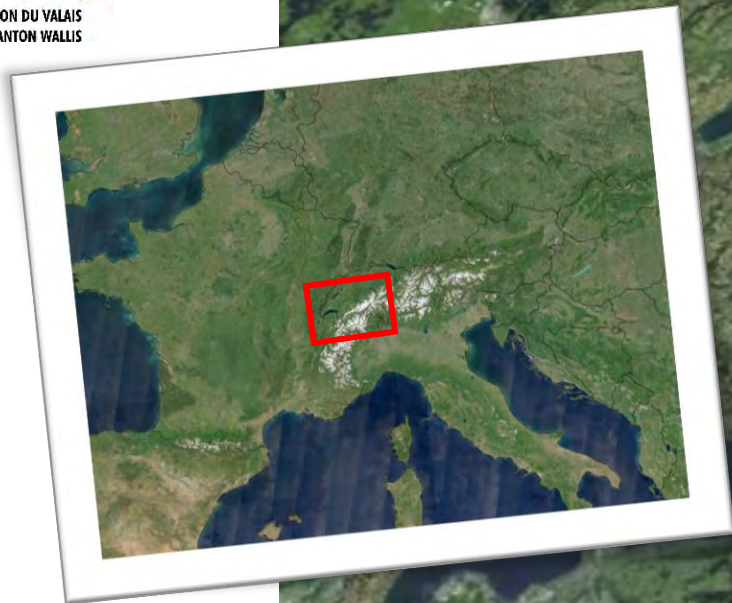
Raphaël Mayoraz, former Head of Service
Natural Hazards Service, Canton of Valais

Integrated Risk Management (IRM)

Basic idea:

- Events can never be avoided
 - We must be prepared for them
 - We must learn from it
- Consider all types of measures
(land use planning, constructive, organizational and biological measures)
- Involve all stakeholders









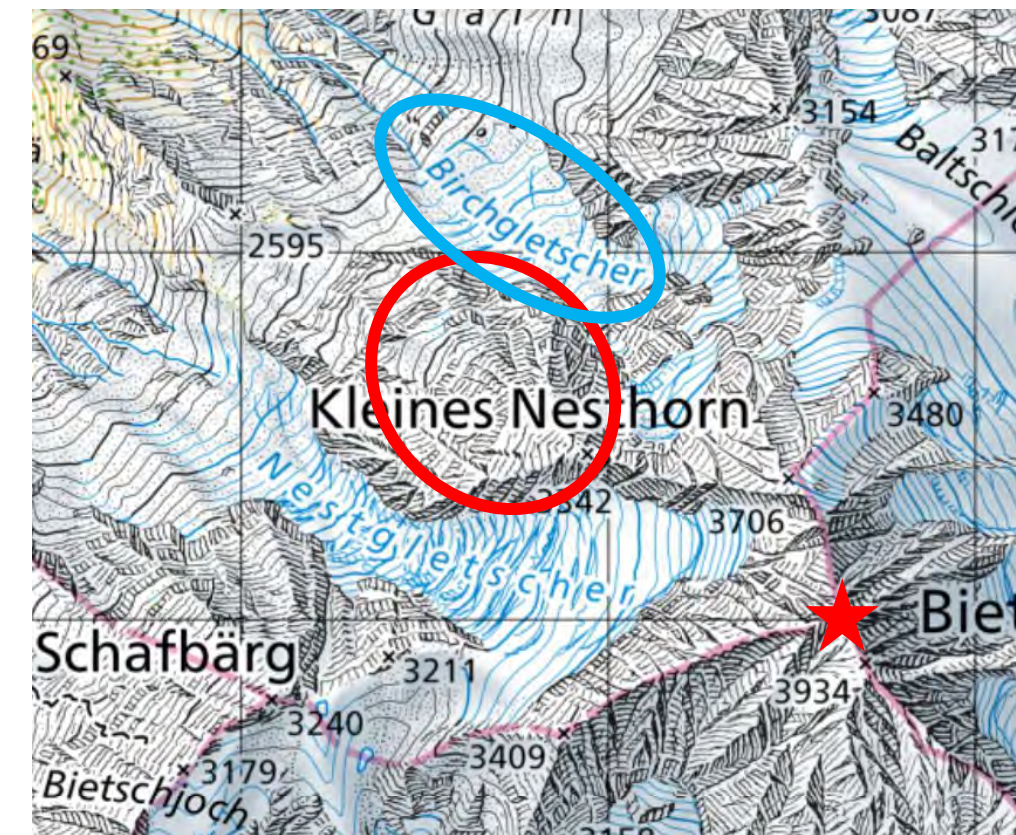


Photo : Georges Sanga



May 13, 2025

Photo: Guardaval webcam



May 14, 2025

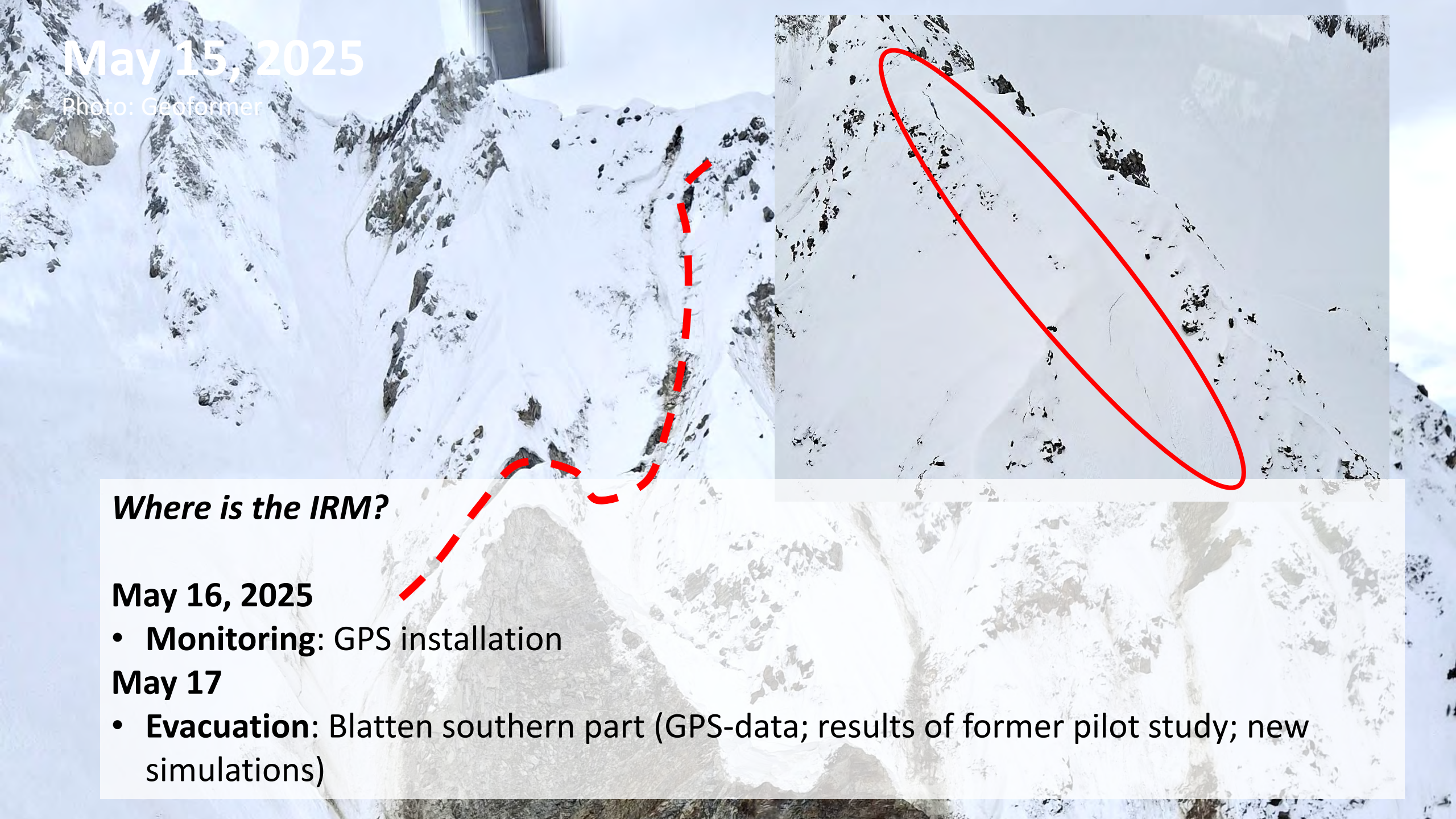
Photo: Guardaval webcam



Where is the IRM?

May 14, 2025

- **Monitoring:** Camera already monitoring glaciers and Nesthorn (since 2013)
- **Natural hazard observer** reports debris flow -> (local) authorities informed
- **Monitoring and analysis:** Radar + camera; helicopter; elevation model -> volume



May 15, 2025

Photo: Geoformer

Where is the IRM?

May 16, 2025

- **Monitoring:** GPS installation

May 17

- **Evacuation:** Blatten southern part (GPS-data; results of former pilot study; new simulations)

May 18, 2025

Photo: DNAGE

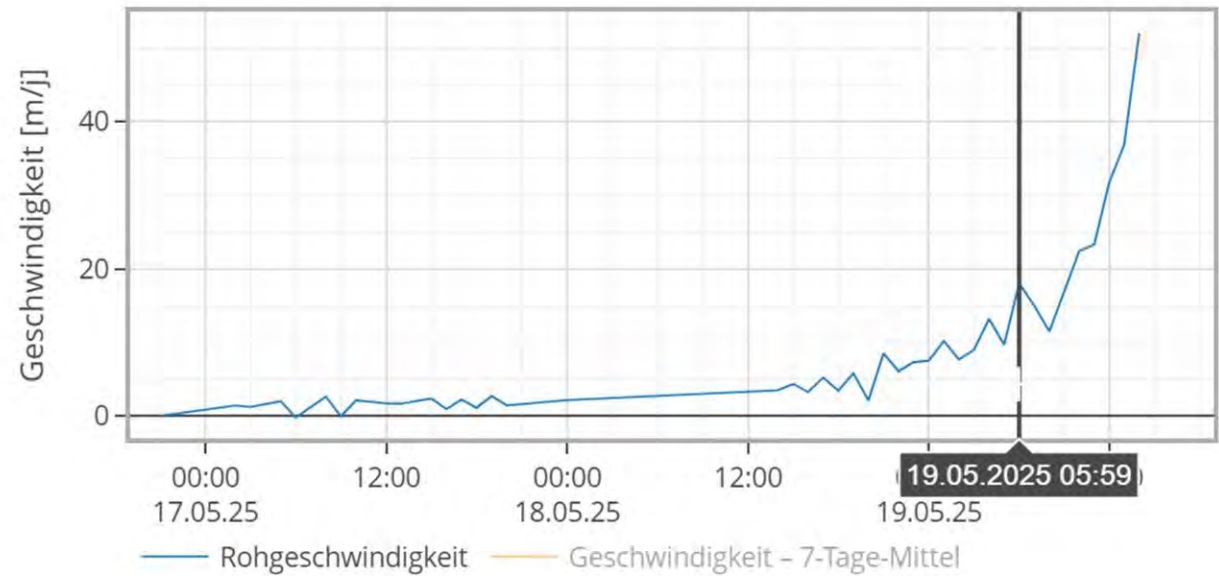


May 18, 2025

Photo: DNAGE

▼ Verschiebungsgeschwindigkeit

Einheit /



Where is the IRM?

May 19, 2025

- **Evacuation:** Blatten + Ried (based on GPS, reanalysis volume, new simulations)

13.05.2025





May 20, 2025

Photo: Guardaval webcam

Where is the IRM?

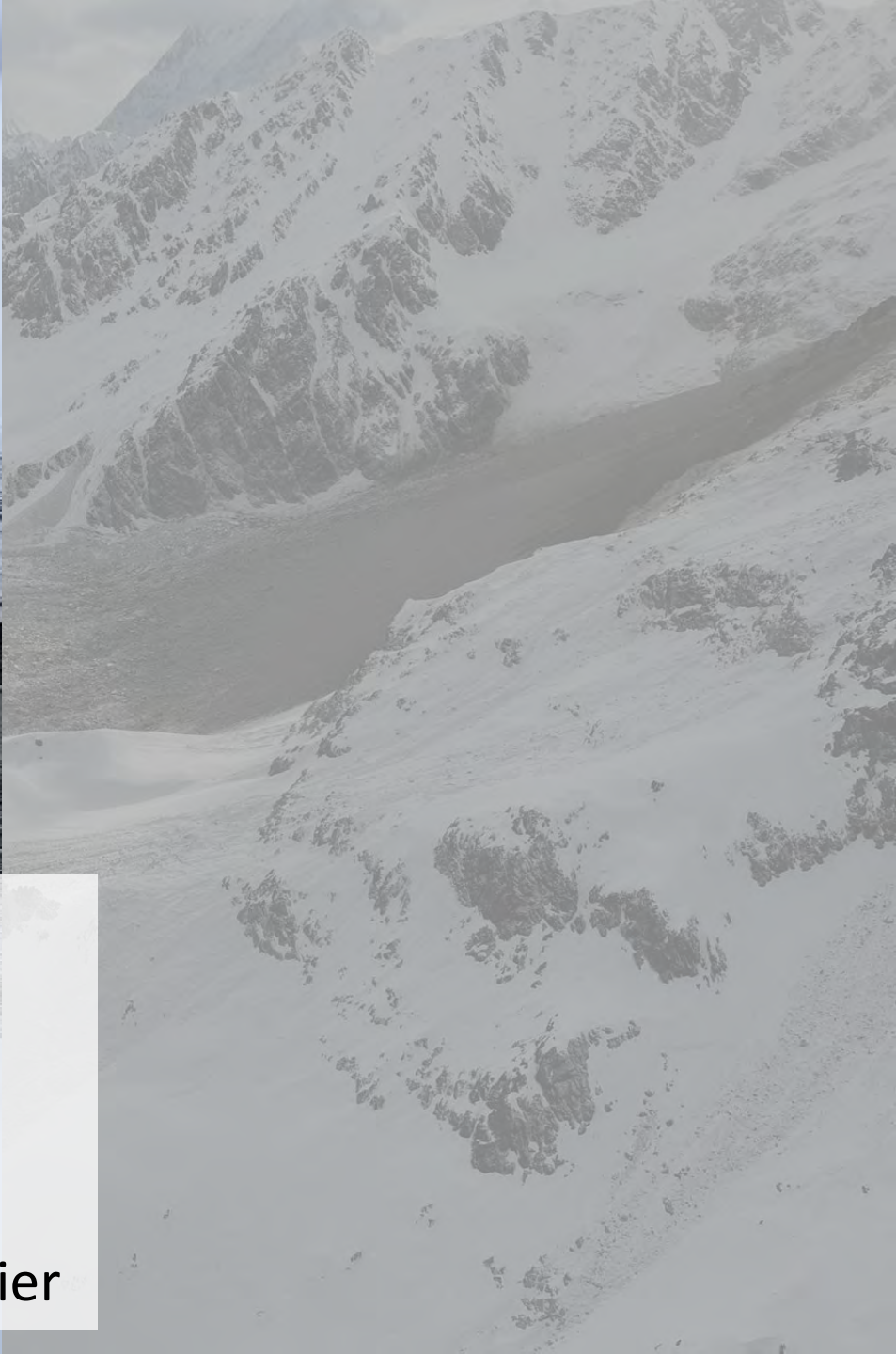
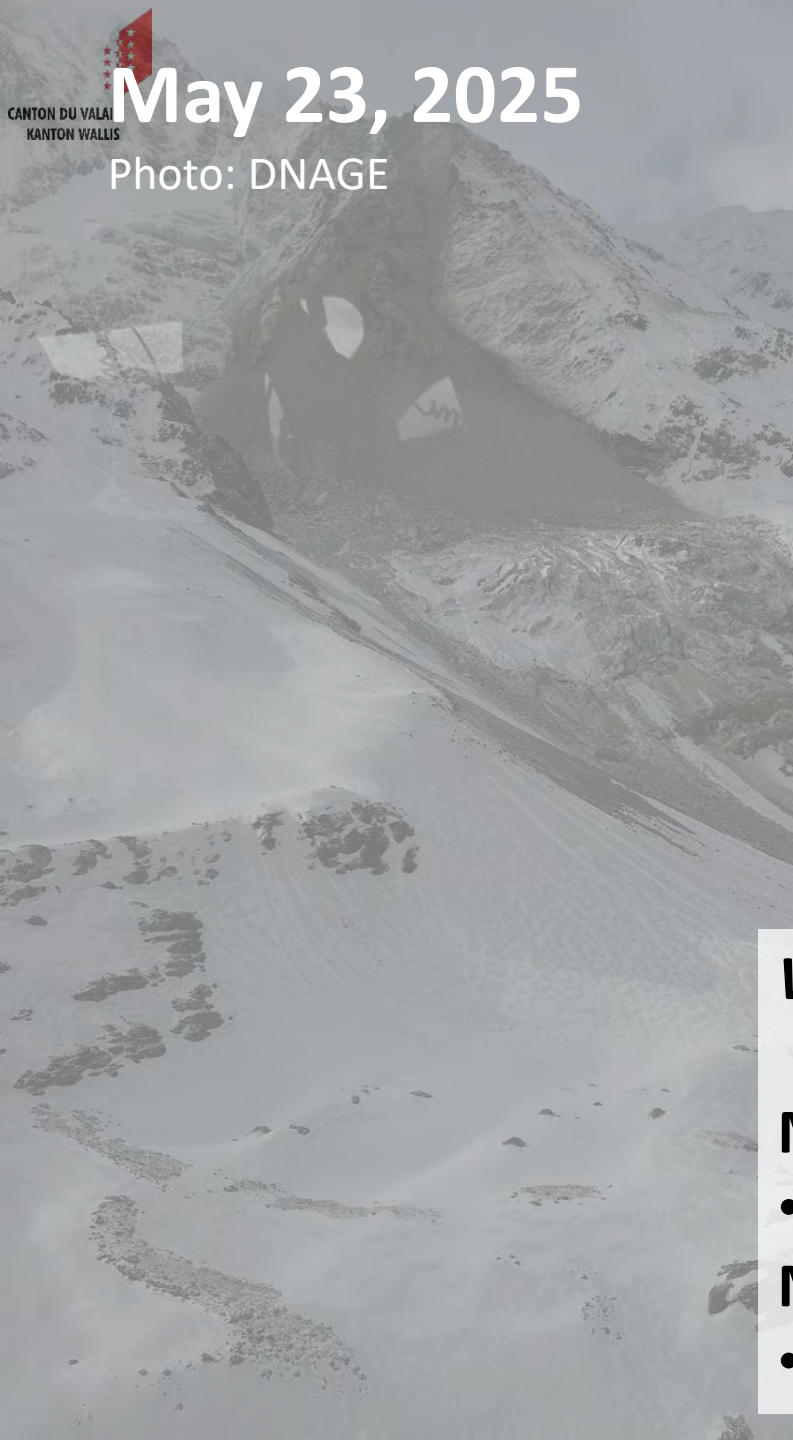
Permanent: Scenario development

- Volume of debris flow, influence of glaciers, lake formation...
- Probabilities?
- For a process that is currently unknown!

May 23, 2025

Photo: DNAGE





Where is the IRM?

May 23, 2025

- **Glaciologists** on site

May 26, 2025

- Installation of **camera on** glacier

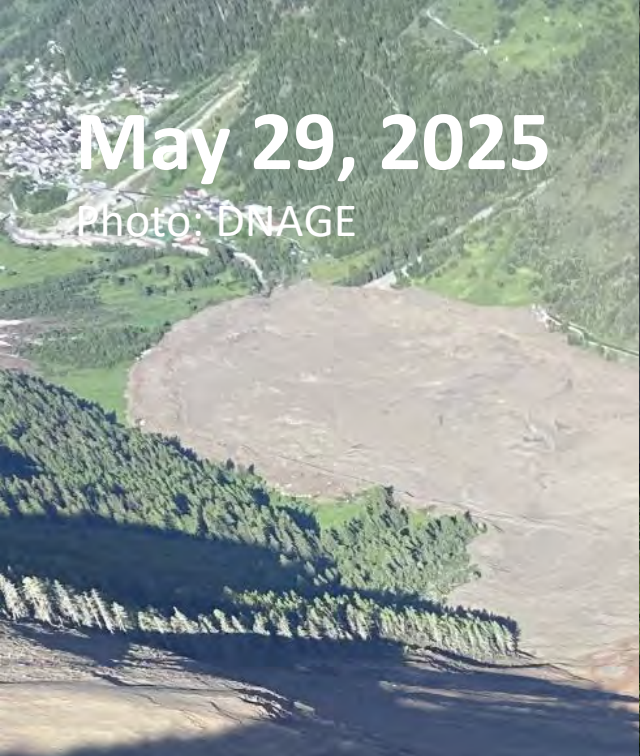
May 28, 2025

Geoprävent webcam

11:30 a.m. – 2:45 p.m. (6:45 p.m.)

GEO PRÄVENT
Birchgletscher 28.05.2025 09:30





May 29, 2025

Photo: DNAGE

Where is the IRM?

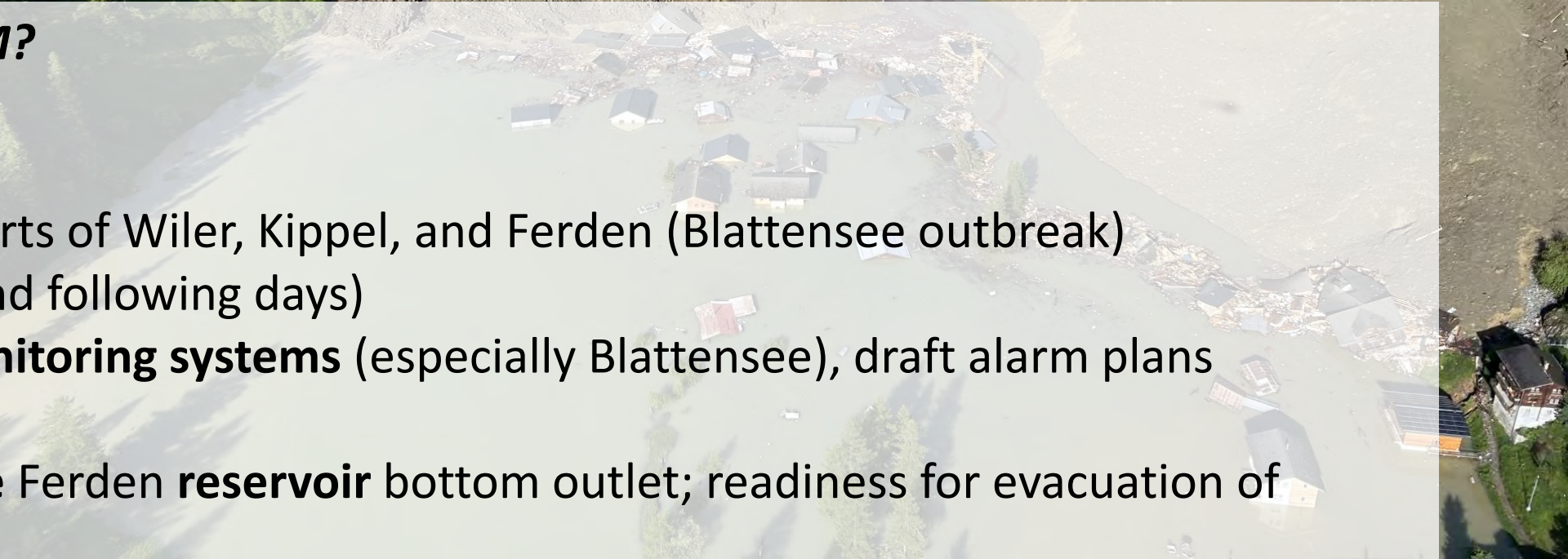
May 28

- **Evacuation:** Parts of Wiler, Kippel, and Ferden (Blattensee outbreak)

May 29, 2025 (and following days)

- Additional **monitoring systems** (especially Blattensee), draft alarm plans

May 30

- Opening of **the Ferden reservoir** bottom outlet; readiness for evacuation of Gampel
- 

June 25, 2025

Photo: DNAGE



June 25, 2025

Photo: DNAGE



Where is the IRM?

Since then:

- **Permanent monitoring**
- **Analysis**, documentation, processing, also with scientific community
- **Repair** and considerations for reconstruction

Where is the IRM?

May 14, 2025

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May 19, 2025

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May 23

- **Glaciologists on site**

May 26, 2025

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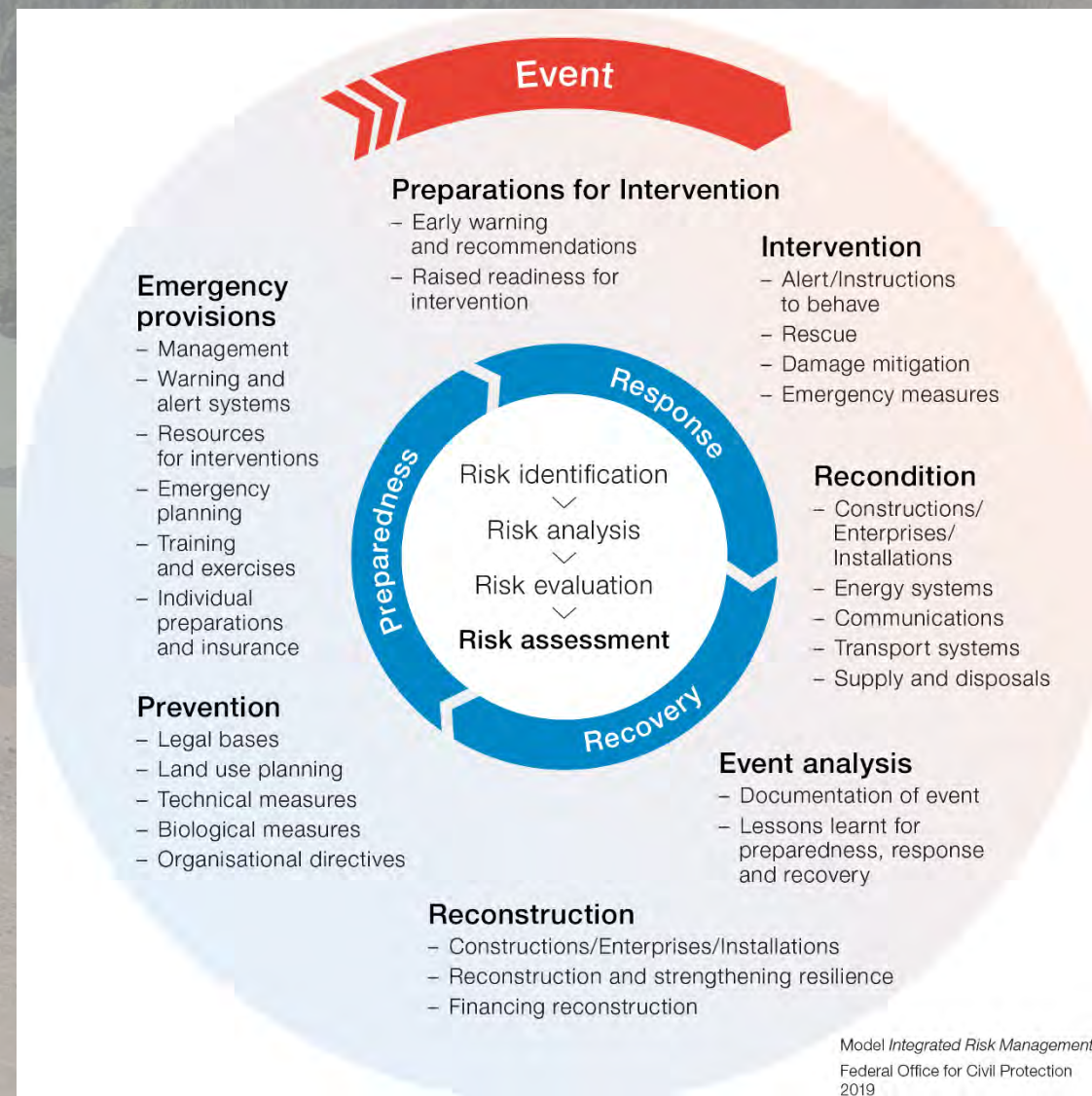
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May 30

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- Preparedness for evacuation of Gampel

Since then:

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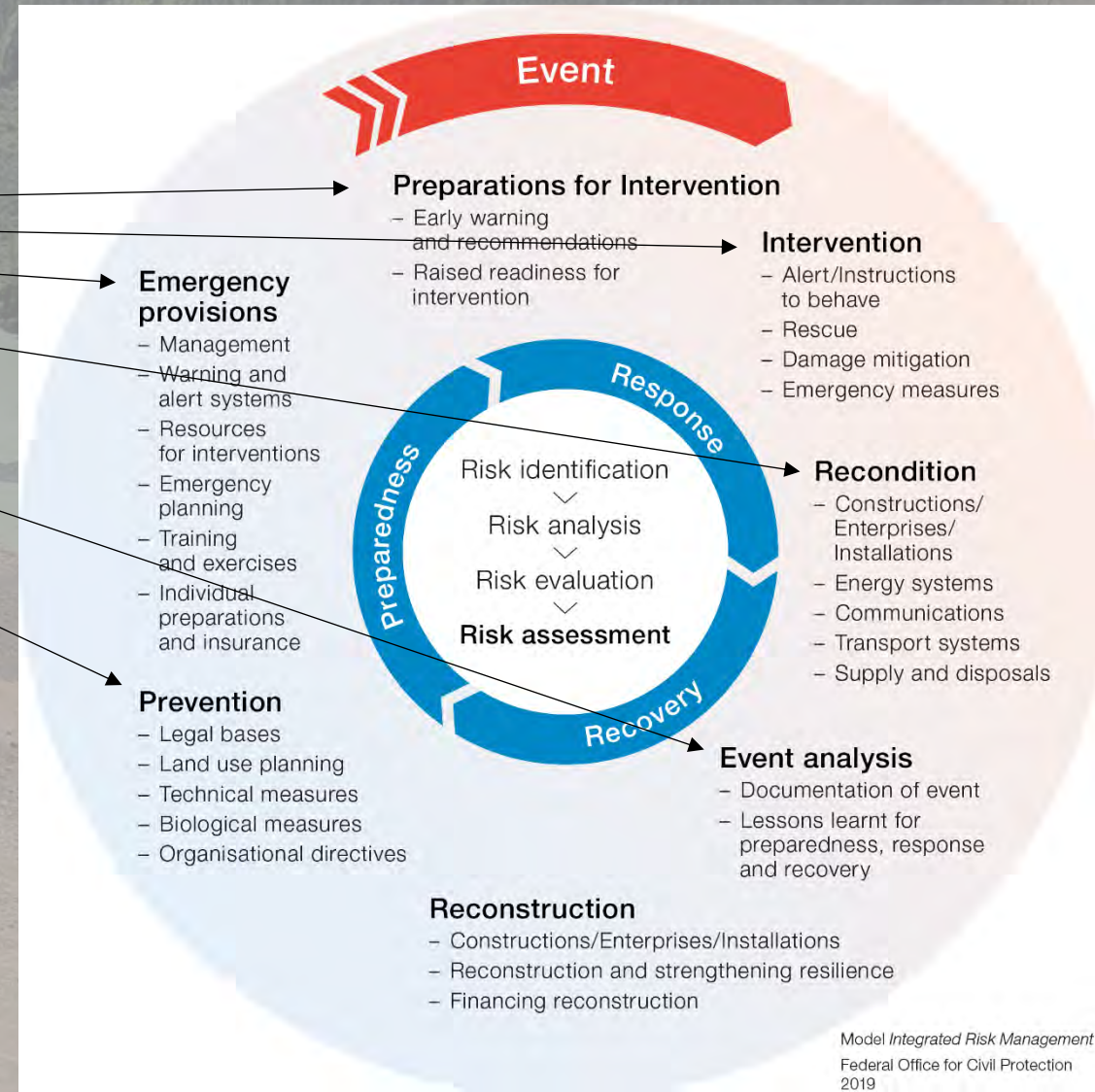
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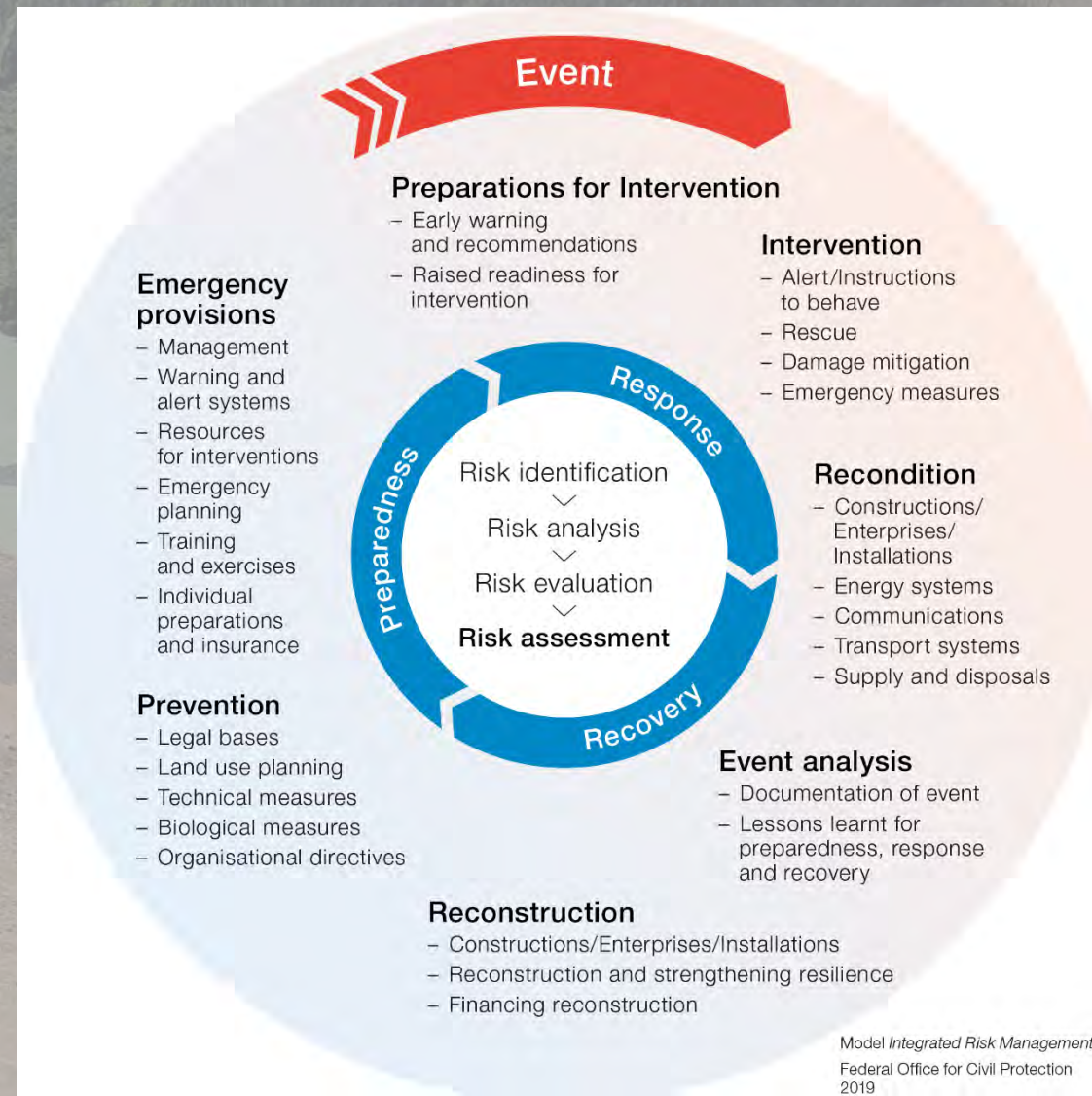
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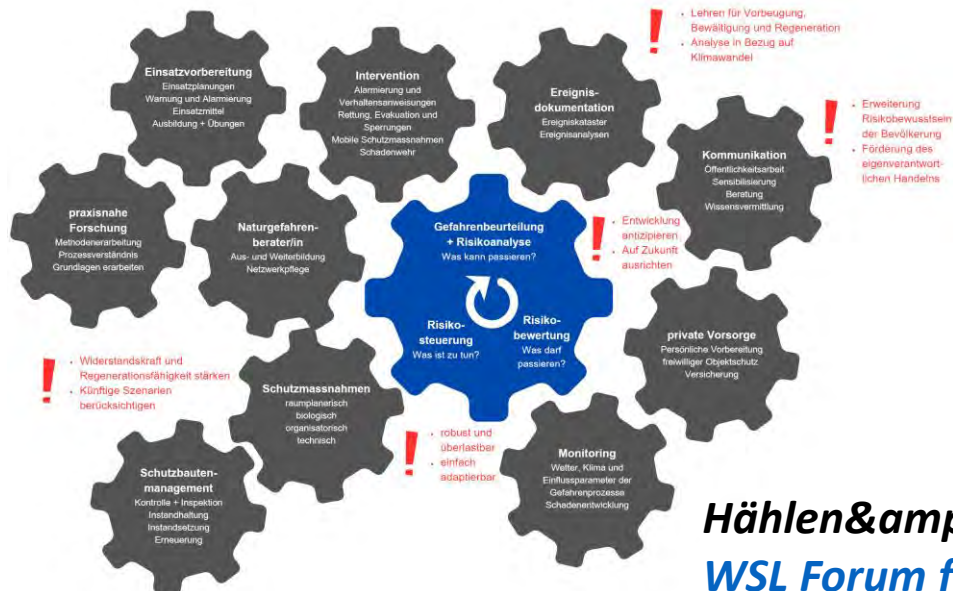
Since then:

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- **Repairs** and considerations for reconstruction



Concluding remarks

- **The IRM has proven its worth.**
- **The IRM needs an update** (observers, episodic events, climate change, etc.).
- In addition: not all municipalities are able to implement the IRM consistently



Hählen&Proksch

WSL Forum for Knowledge 2024

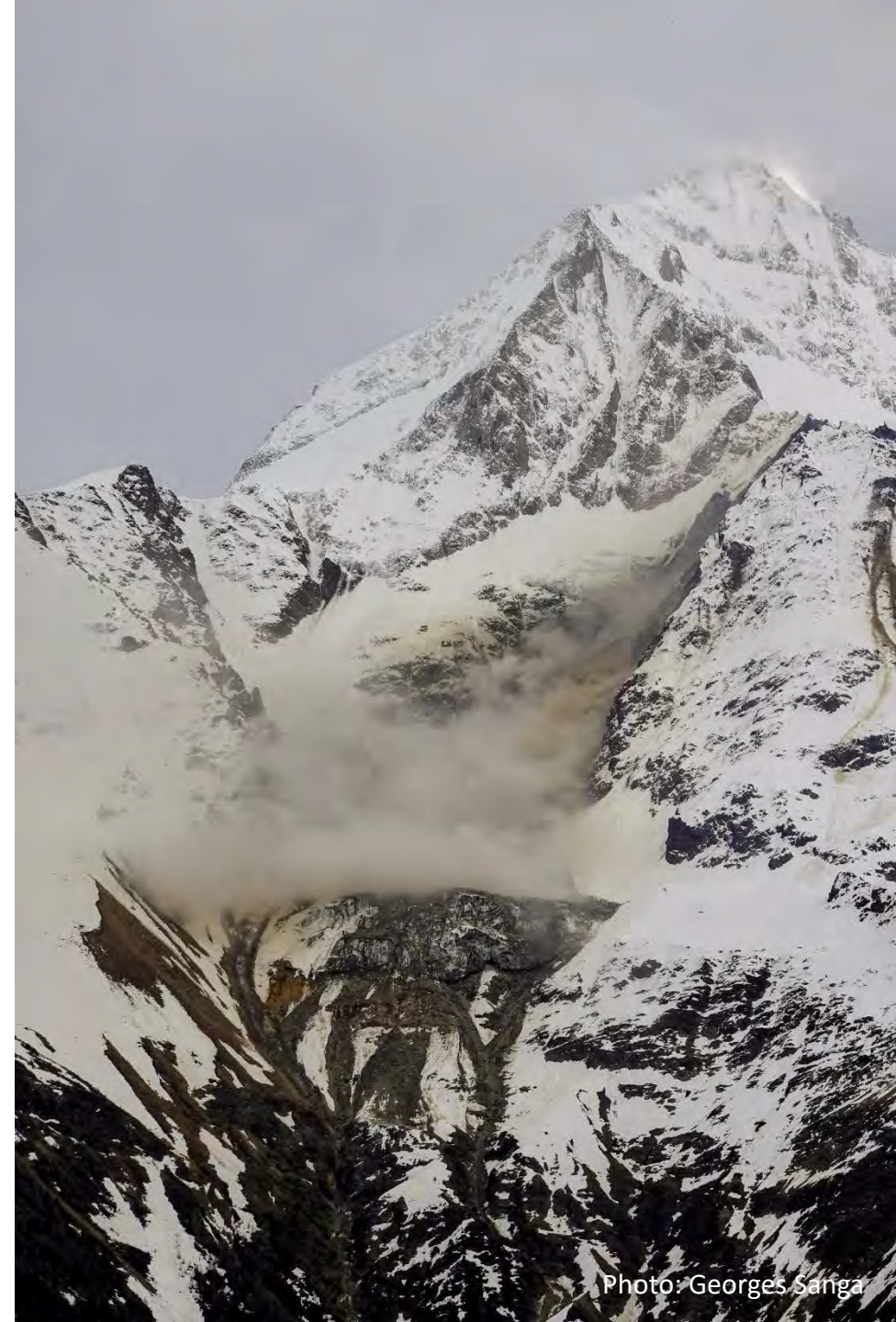


Photo: Georges Sanga

Thank you very much!

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Guillaume Favre-Bulle, Head of Service

Raphaël Mayoraz, former Head of Service
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Questions of understanding about Blatten



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Challenges From High Mountains Hazards in India

Clean Air, Climate and Health
Learning Journey

25 September 2025

Prabhakar Rai

Director, Sikkim State Disaster
Management Authority (SSDMA)

Intro by

Pierre-Yves Pitteloud

Regional DRR Advisor, SDC, Delhi



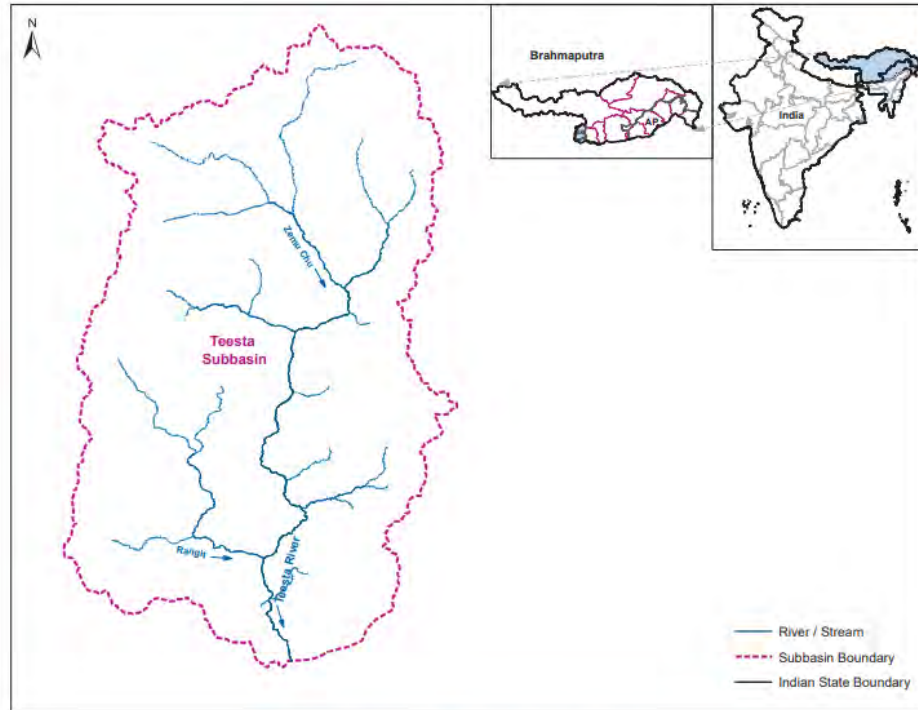
GLOF PREPAREDNESS IN SIKKIM



Source: NRSC, 2022

PRABHAKAR RAI, DIRECTOR-CUM-SPECIAL SECRETARY, SSDMA

GLACIAL LAKES IN SIKKIM- TEESTA SUB BASIN



Source: NRSC, 2022

Table 76: Area range-wise vs. Elevation range-wise distribution of GL in Teesta subbasin

S. No.	Lake Area Range (ha)	Elevation Range (m)								Total	
		up to 3,000		3,001 - 4,000		4,001 - 5,000		> 5,000			
		No. of lakes	Total Lake Area (ha)	No. of lakes	Total Lake Area (ha)	No. of lakes	Total Lake Area (ha)	No. of lakes	Total Lake Area (ha)	No. of lakes	Lake Area (ha)
1	0.25 - 0.5	0	0.00	7	2.47	109	37.00	80	27.14	196	66.61
2	0.5 - 1	0	0.00	2	1.58	90	65.00	61	44.15	153	111.22
3	1 - 5	0	0.00	7	12.04	127	288.00	92	223.48	226	523.58
4	5 - 10	0	0.00	2	15.83	23	164.00	22	173.62	47	353.24
5	10 - 50	0	0.00	4	77.23	25	445.00	21	460.33	50	982.43
6	> 50	0	0.00	0	0.00	1	58.00	10	1,025.81	11	1,083.68
Total		0	0.00	22	109.14	375	1,057.08	286	1,954.54	683	3,120.76

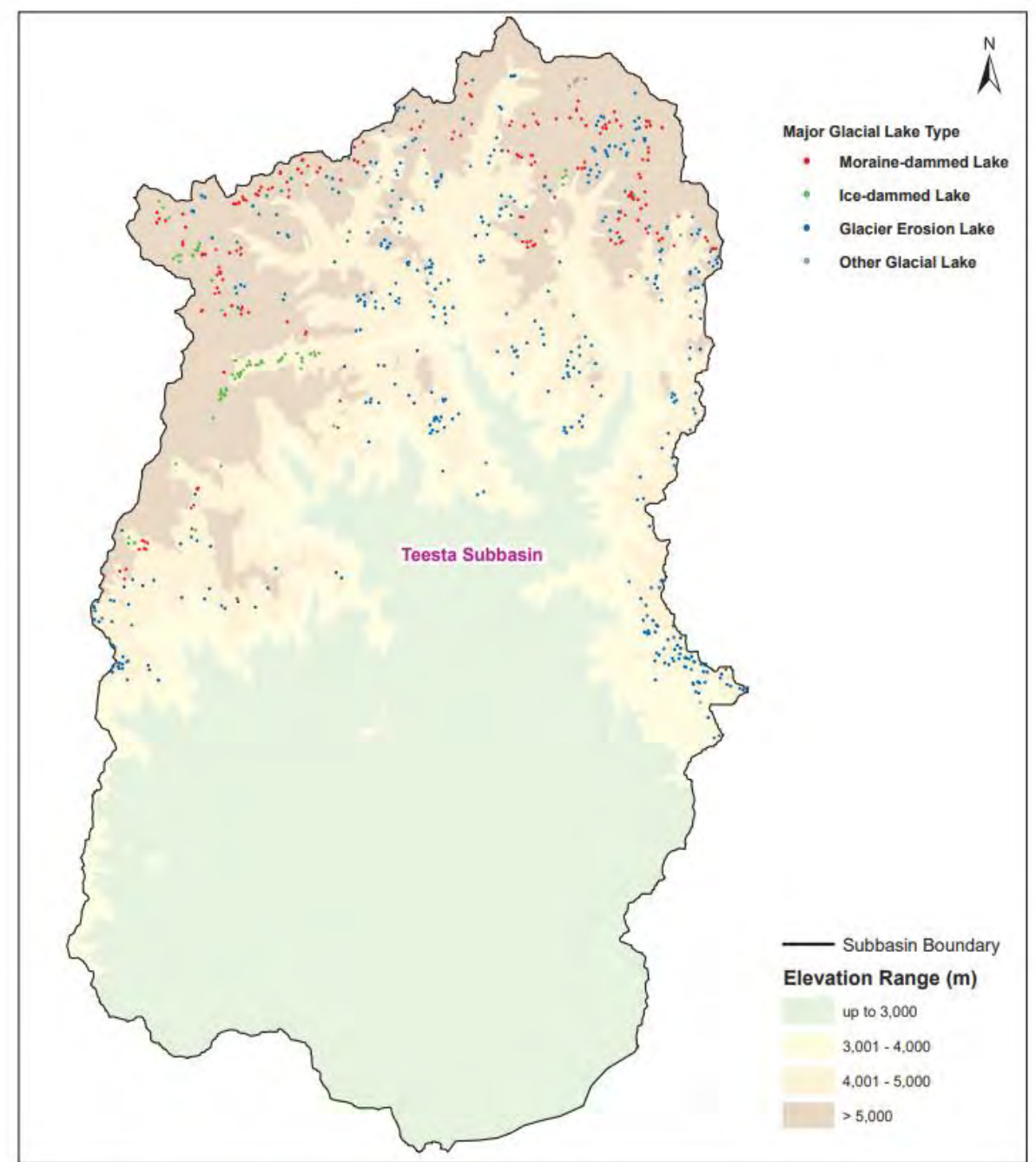
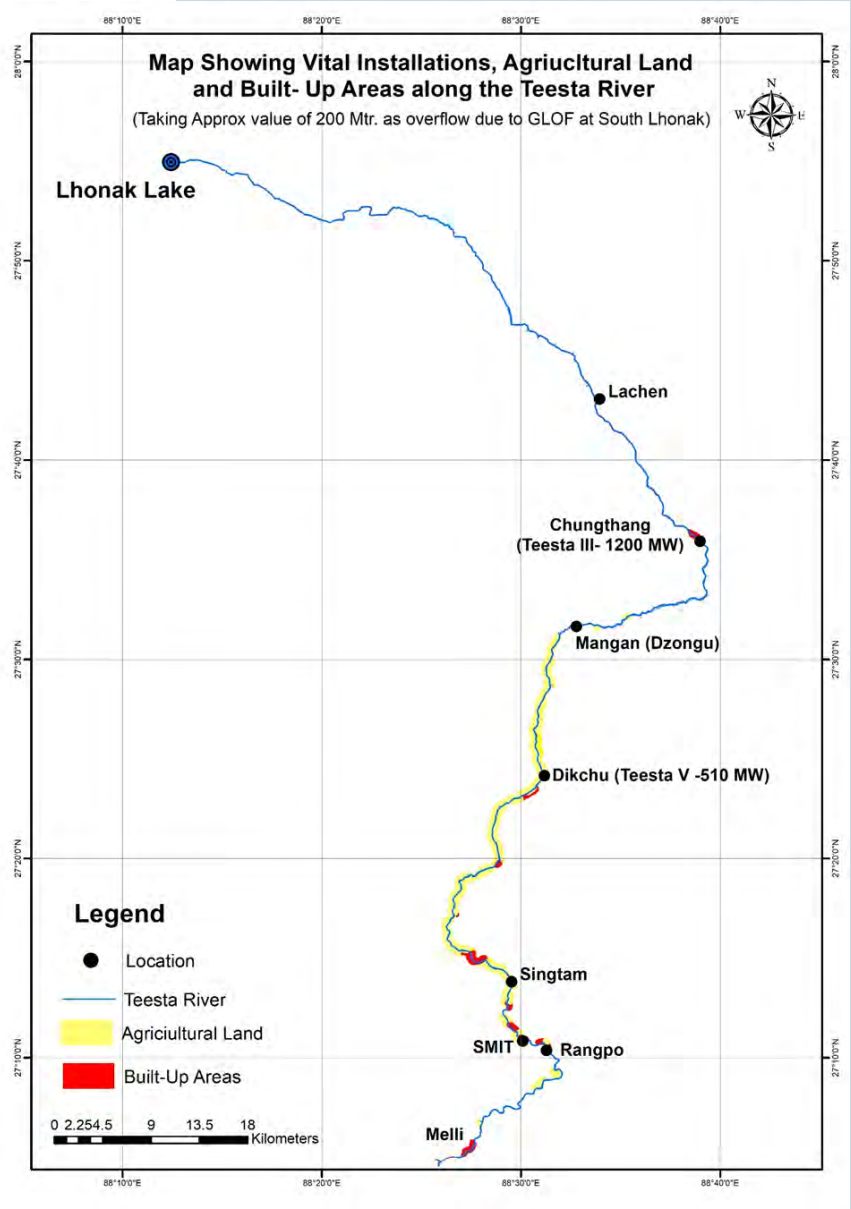


Figure 101: Elevation range-Type-wise spatial distribution of GL in Teesta subbasin

POPULATION AT RISK

Details from Census report of 2011			
Name of Place	Total Area (Ha)	No. of Households	Total population
Lachen	3635.75	338	1328
Chungthang	2676.93	839	3974
Mangan	97515.28	5893	29027
Singtam	18	1144	5868
Rangpo	179	2505	10450
Muguthang, Teesta, Melli			5000*
Migration Labour, Army, Paramilitary, Tourists, etc.			5000*
Total			60647



GOVERNMENT INTERVENTIONS

August, 2014 – Working Group formed with experts from Government of Sikkim and Government of India to study South Lhonak Glacial Lake.

September, 2016 – Government of Sikkim team with Consultants from Ice Stupa Project, SECMOL Ladakh, carried out Siphoning as recommended by Working Group and Installed water level sensors.

August, 2018 – Government of Sikkim organized Recce expedition with geologists, scientists, surveyors, doctors, and consultants, supported by SDC-UNDP 3SCA Project.

September, 2018 – Government of Sikkim completed final debris clearance mission at South Lhonak Lake mouth and installed additional pipelines, supported by SDC-UNDP 3SCA Project.

September, 2019 – Government of Sikkim commissioned Lachung team to reinforce lake mouth areas with gabion walls

2024 Onwards – Scientific study for hazard assessment for 16 vulnerable lakes are being been conducted



Water level monitoring sensor being installed at South Lhonak Glacial Lake

GLIMPSES OF SOUTH LHONAK EXPEDITION

SSDMA



Yaks being deployed to carry HDPI pipes



Installation of instruments



Innovative measurement technique being applied



Damage to pipes



OBSERVATIONS FROM THE INTERVENTIONS

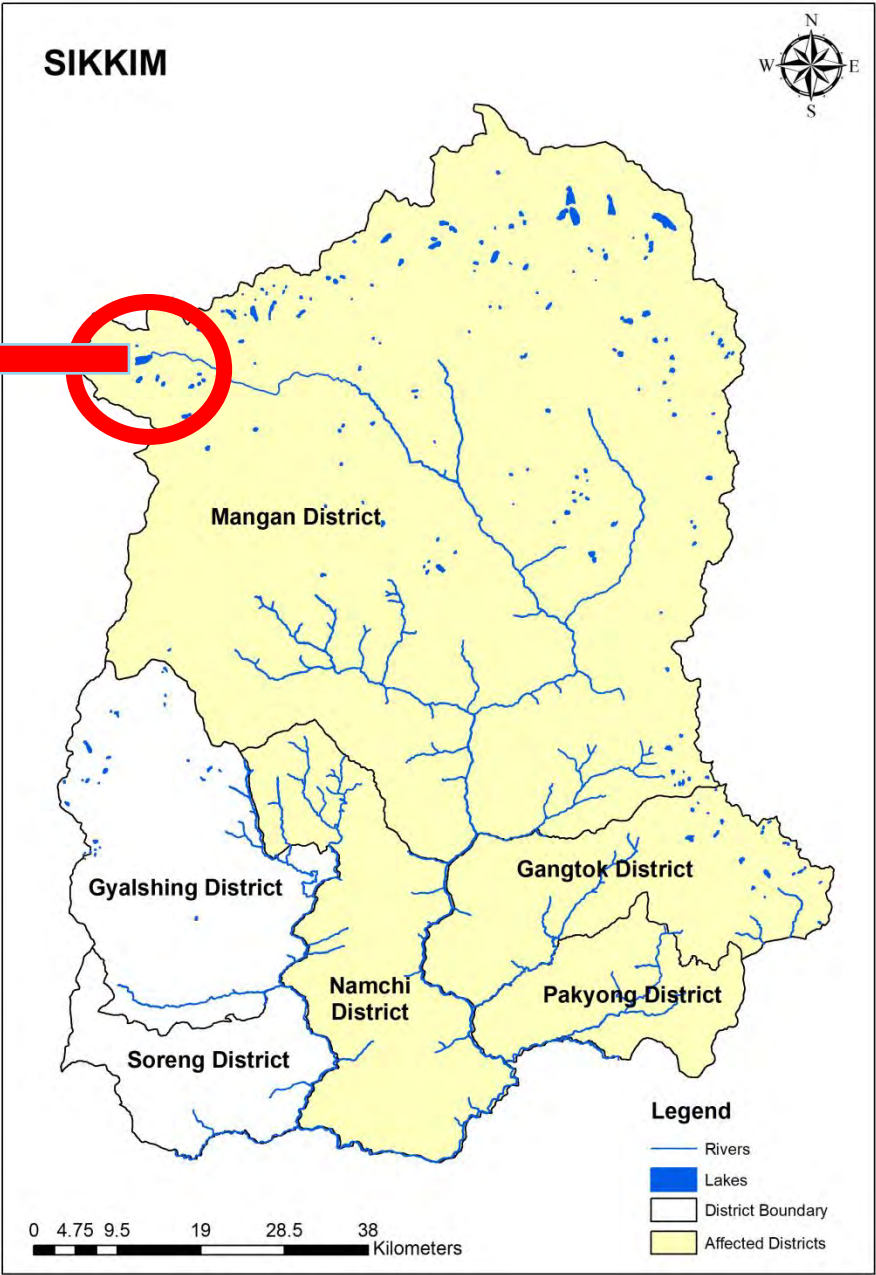
SSDMA



- Siphoning via pipelines was one of the safest mitigation measures, as it effectively drains water without disturbing the fragile moraine structure, despite being expensive.
- Siphoning is optimal for glacial lakes without natural outlets, though it also works effectively for lakes with existing outlets when additional drainage is needed.
- Debris removal was necessary — stone boulders, gravel, and soil found in the outlet area (marked in red circle) were cleared to improve drainage.
- Robust EWS with sensors with AWS is needed for long term monitoring of lake.
- Dedicated task force on GLOF risks to be formed with coordination amongst related partners in the government.
- GLOF specific Evacuation & Response Plans with Mock Drills for vulnerable communities needed to be undertaken
- Learning can be upscaled and replicated for other vulnerable lakes

GLOF AT SOUTH LHONAK-¾ OCT, 2023

LOCATED AT NORTH WEST OF SIKKIM



IMMEDIATE ACTIONS - SSDMA

EARLY WARNING & EVACUATION: DISTRICT AUTHORITIES WERE ALERTED IMMEDIATELY; SIRENS AND PUBLIC ANNOUNCEMENTS WERE ISSUED ALONG THE TEESTA BASIN, AND RESIDENTS FROM VULNERABLE AREAS WERE EVACUATED TO HIGHER GROUND.

EMERGENCY ACTIVATION: SSDMA AND DDMA OFFICIALS ACTIVATED PROTOCOLS FROM THEIR EOCS; STATE POLICE, SDRF, NDRF, FOREST GUARDS, QRTS, AND COMMUNITY VOLUNTEERS WERE MOBILIZED FOR COORDINATED SEARCH AND RESCUE OPERATIONS.

SITUATION REPORTING: THE FIRST INCIDENT REPORT WAS ISSUED FROM THE STATE EOC, FOLLOWED BY HOURLY UPDATES TO MHA, NDMA, AND OTHER AGENCIES; REPORTS CONFIRMED LOSS OF LIVES, PROPERTY DAMAGE, AND DESTRUCTION OF MAJOR BRIDGES AND INSTALLATIONS.

RESPONSE & RELIEF: THE STATE AND DISTRICT INCIDENT RESPONSE SYSTEMS WERE ACTIVATED WITH ICPS ESTABLISHED AT TEESTA LOUNGE (STATE), RANGPO, SINGTAM, AND CHUNGTHANG; 30 RELIEF CAMPS WERE SET UP TO PROVIDE SHELTER, FOOD, AND MEDICAL AID TO AFFECTED FAMILIES.

MAJOR DAMAGES



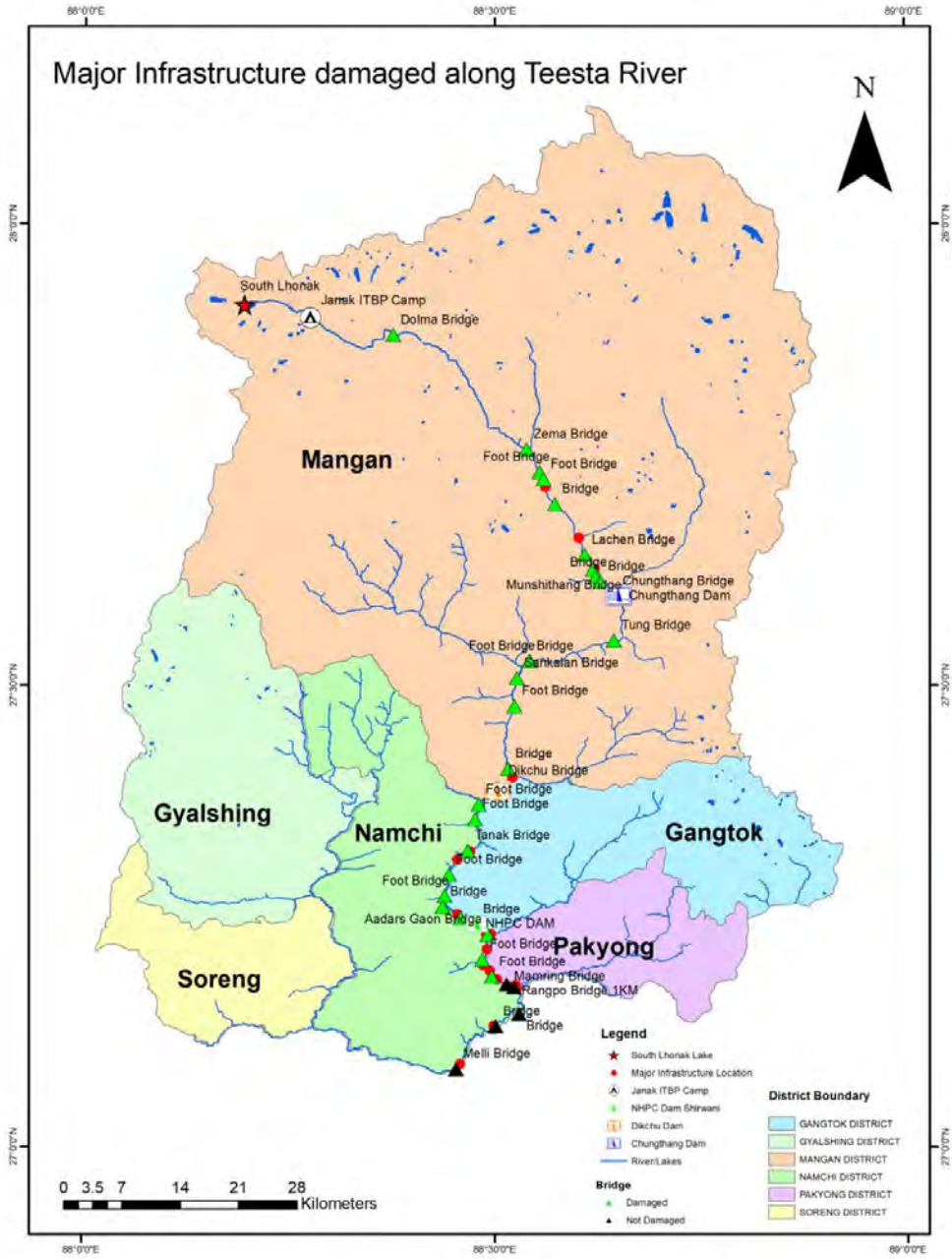
Before & After images of Chungthang Dam



Singtam Area, Gangtok & Namchi Districts



IBM Area, Rangpo, Pakyong District

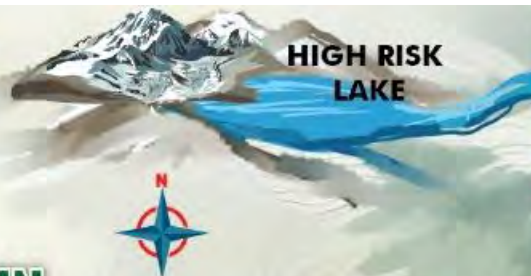




**Sikkim State Disaster Management Authority (SSDMA),
Land Revenue and Disaster Management Department,
Government of Sikkim**



ENHANCING RESILIENCE OF THE VULNERABLE COMMUNITIES ALONG TEESTA BASIN



CHUNGTHANG

LACHUNG



SANGKALANG



PHIDANG

DIKCHU



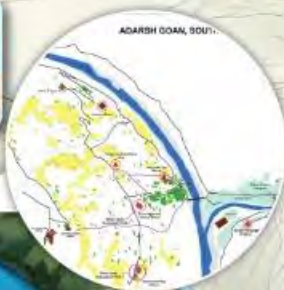
SIRWANI



SINGTAM



ADARSHGOAN



GOLITAR



MAJITAR



MAMRING



RANGPO



MELLI

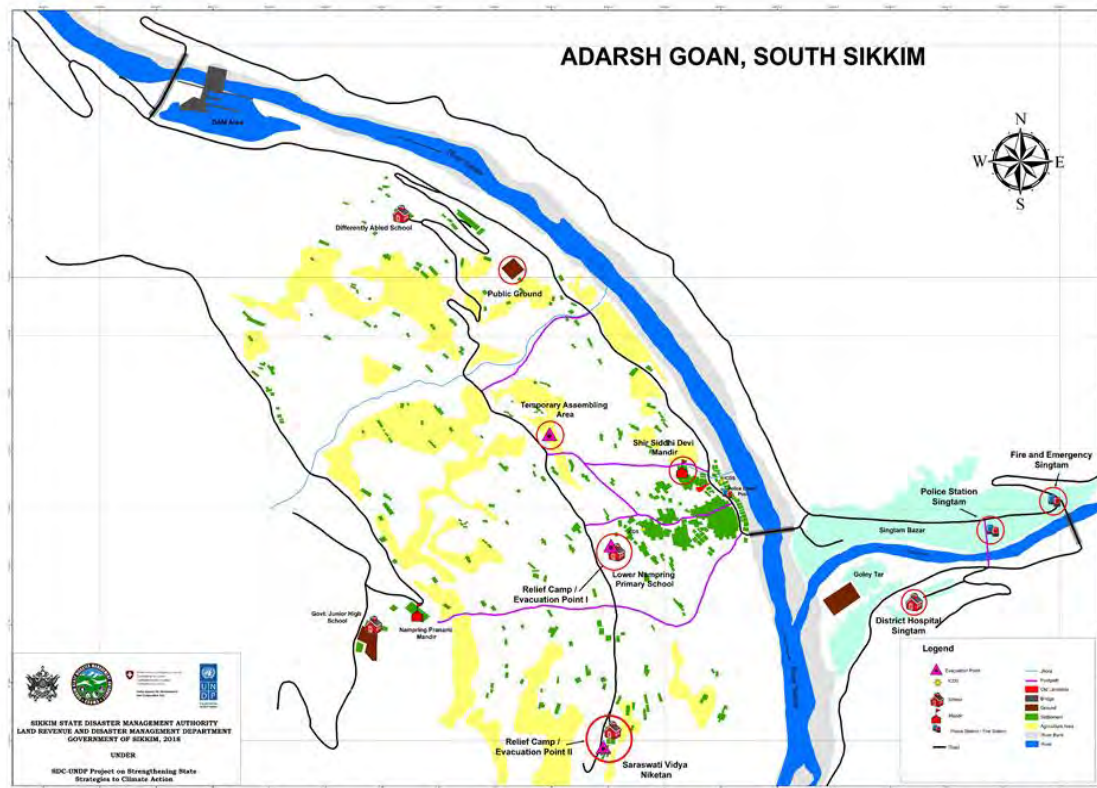


Design: Peter S. Lepcha



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BUILDING ADAPTIVE CAPACITIES OF VULNERABLE COMMUNITIES



Activities

- Awareness and Sensitisation Programmes held at different locations through technical presentations, community workshops, skit shows, radio spots and video screenings
- Basic Search-Rescue and First Aid training being imparted to Disaster Management Teams
- WhatsApp Group for daily monitoring of river water level formed amongst administrators, community members, hydel dam monitors, responders
- Evacuation plan for vulnerable locations being mapped
- EWS (Automatic + Community) being developed

BUILDING ADAPTIVE CAPACITIES OF VULNERABLE COMMUNITIES



Meeting community members at Singtam



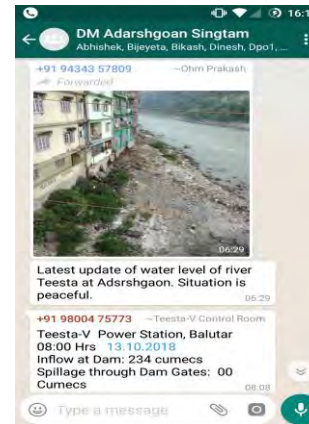
Video Screening of GLOF hazard at Rangpo



Skit show on Safe Evacuation at Dikchu



Technical presentation with Hydel Power Developers in Chungthang



Screenshot of WhatsApp communication



Basic S&R and FA training imparted to DMTs by NDRF

POLICY INTERVENTIONS



GOVERNMENT OF SIKKIM
HOME DEPARTMENT
GANGTOK

No. 38 /Home/2024

Dated: 20/04/2024

NOTIFICATION

Whereas, Sikkim witnessed a massive flood on 3rd - 4th October, 2023 which had caused widespread damages along the river Teesta in Sikkim. The accelerated rate of melting of glacier under the influence of Climate change has resulted in the formation of large number of glacial lakes and many are in the process of its formation which has created immense threat of glacial hazards in the State in terms of glacial lake outburst floods, and associated hazards;

Now therefore, in order to address and to mitigate future glacial threat in the State, the Government of Sikkim is hereby pleased to constitute a Technical Committee comprising of the following members, namely :-

SL. NO.	NAME AND DESIGNATION	PROPOSED AS
(1)	Dr. Akhilesh Gupta, Senior Advisor and Head, Policy Coordination and Programme Management, Department of Science and Technology, Government of India.	Chairman
(2)	Professor (Dr.) Mahendra P. Lama, Former Economic Advisor to the Government of Sikkim.	Member
(3)	Prof A. Ramsoo, Vice Chancellor, Islamic University of Science and Technology, Awantipore, Jammu and Kashmir.	Member
(4)	Dr. Rajesh Kumar, Professor and Dean, School of Earth Science, Department of Environmental Science, Central University of Rajasthan.	Member
(5)	Dr. Piyush Gautam, Senior Consultant, National Disaster Management Authority.	Member
(6)	Dr. Ashim Santar, Assistant Professor, School of Earth, Ocean and Climate Science, IIT, Bhubaneswar, Orissa.	Member
(7)	Dr. Kalachand Saari, Director, Wadia Institute of Himalayan Geology, Dehradun.	Member
(8)	Dr. Anil Kumar Gupta, Associate Professor and Head Policy Planning Division, National Institute of Disaster Management.	Member
(9)	PCCF-cum-Secretary, Forest and Environment Department, Sikkim.	Member
(10)	Secretary, Land Revenue and Disaster Management Department, Government of Sikkim.	Member
(11)	Secretary, Mines and Geology Department, Government of Sikkim.	Member
(12)	Secretary, Science and Technology Department, Government of Sikkim.	Member Secretary



NATIONAL DISASTER MANAGEMENT AUTHORITY GUIDELINES
MANAGEMENT OF GLACIAL LAKE OUTBURST FLOODS (GLOFs)





October 2020



NATIONAL DISASTER MANAGEMENT AUTHORITY
MINISTRY OF HOME AFFAIRS
GOVERNMENT OF INDIA



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC

- 70 Committee for Study and Evaluation of Vulnerable Glacial Lakes in the State for suitable mitigation strategies to reduce the risk of GLOFs & NDMA has issued Guidelines on GLOF



THANK YOU

SIKKIM STATE DISASTER MANAGEMENT AUTHORITY, LAND REVENUE & DISASTER MANAGEMENT
DEPARTMENT, GOVERNMENT OF SIKKIM
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Challenges From High Mountains Hazards in India

Clean Air, Climate and Health
Learning Journey

25 September 2025

Rabhakar Rai

Director, Sikkim State Disaster
Management Authority (SSDMA)

Intro by

Pierre-Yves Pitteloud

Regional DRR Advisor, SDC, Delhi



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Embassy of Switzerland in India and Bhutan

Integrated Disaster Risk Management (IRM)

Reflections on similarities and contrasts between the Swiss and Himalayan contexts

Pierre-Yves Pitteloud

Senior Regional Advisor on DRR, CCA and Rapid Response
Embassy of Switzerland in India and Bhutan



Shared Vulnerability to Glacial Hazards

Similarity: Both mountain regions face accelerating glacier retreat and permafrost thaw.

Contrast: Switzerland experiences localized Alpine hazards, while the Himalayas face large-scale glacial-lake outburst floods (GLOFs) affecting multiple countries.





Early-Warning Systems and Preparedness

Similarity: Timely alerts save lives — but both contexts see the limits of warnings alone.

Contrast: Switzerland pairs mature, automated systems with mitigation measures; Himalayan SOPs and response frameworks are still developing.





Integration of Technology and Local Knowledge

Similarity: Both contexts combine scientific tools with community insight.

Contrast: Switzerland's precision systems contrast with Himalayan hybrid networks linking digital monitoring and local observation.





International Mechanisms and Shared Expertise

Similarity: Both recognize that effective mountain IRM requires international mechanisms and specialized knowledge.

Contrast: Switzerland engages through established frameworks; Himalayan participation is still developing amid regional complexities.





Infrastructure Planning and Economic Resilience

Similarity: Both view resilient infrastructure as central to preparedness.

Contrast: Switzerland invests in proactive, risk-informed design; Himalayan planning often follows post-disaster reconstruction and gradual adaptation.





Scale and Accessibility Challenges

Similarity: Both mountain regions present difficult terrain for monitoring and response.

Contrast: Switzerland's compact, connected Alps enable rapid intervention; the Himalayas' vast, remote terrain slows coordination and communication.





Questions of understanding on

Challenges from High Mountains Hazards in India

Please write your
questions in the chat



**What can we learn
from the IRM in Blatten
for development
contexts?**

See questions
Post questions
Vote for questions



Scan the code, or go to
[menti.com](https://menti.com/73596852) with code 7359 6852



**What's your own
experience?**

Please take a minute
and write your own
experiences in the chat





Take-aways and Evaluation



Scan the code, or go to
[menti.com](https://menti.com/68777775) with code 6877 7775

WRAP UP



THANK YOU

To all participants,
speakers and co-
organizers for making this
event happen!



STAY TUNED

Find related resources and more
details at
www.sdc-cde.ch

Or contact
cde-network@eda.admin.ch



Organisers & speakers: please remain online

