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Secretariat

Is Switzerland prepared for natural catastrophes?

or how to optimally deliver multi-hazard information and warning services

23.11.2023, Rüschlikon, SRILIM Investor Event

Author: Dr. Christophe Lienert

Managing Director, Swiss Steering Committee on Intervention in Natural Hazards LAINAT

Natural hazards in Switzerland

Earthquakes

Dynamic flooding

Static flooding

Drainage

Erosion

Debris flows

Hail

Storms

Landslides

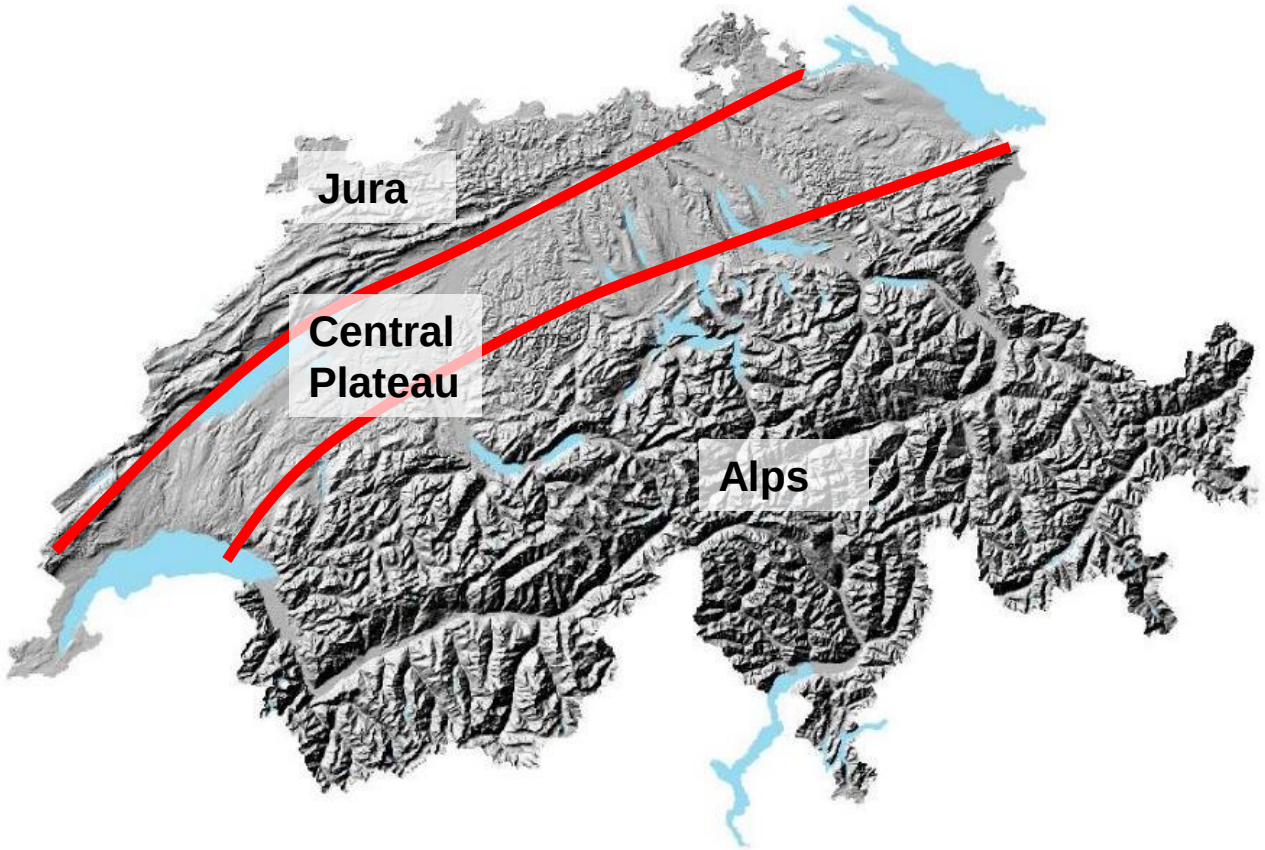
Rockfalls

Avalanches

Forest fires

Geographical overview of Switzerland

Jura:
Earthquakes, floods, rockfalls, landslides



Alps:
Earthquakes, avalanches, rockfalls, landslides, debris flows, floods, storms, fire

Central Plateau:
Earthquakes, floods, landslides, storms

Area: 41,000 km^2,
Inhabitants: 9 Million, 219 inhabitants per km^2
Geomorphology: 60% Alps, 30% Plateau, 10% Jura

Source: BAFU

Natural hazards and socio-economics in Switzerland

- past 50 years: population almost doubled
- housing, transport **infrastructure grew** rapidly, so did the **damage potential**
- Industries and work places are affected, thus the country's value creation
- Natural hazard mgmt, preparedness is linked with our country's prosperity

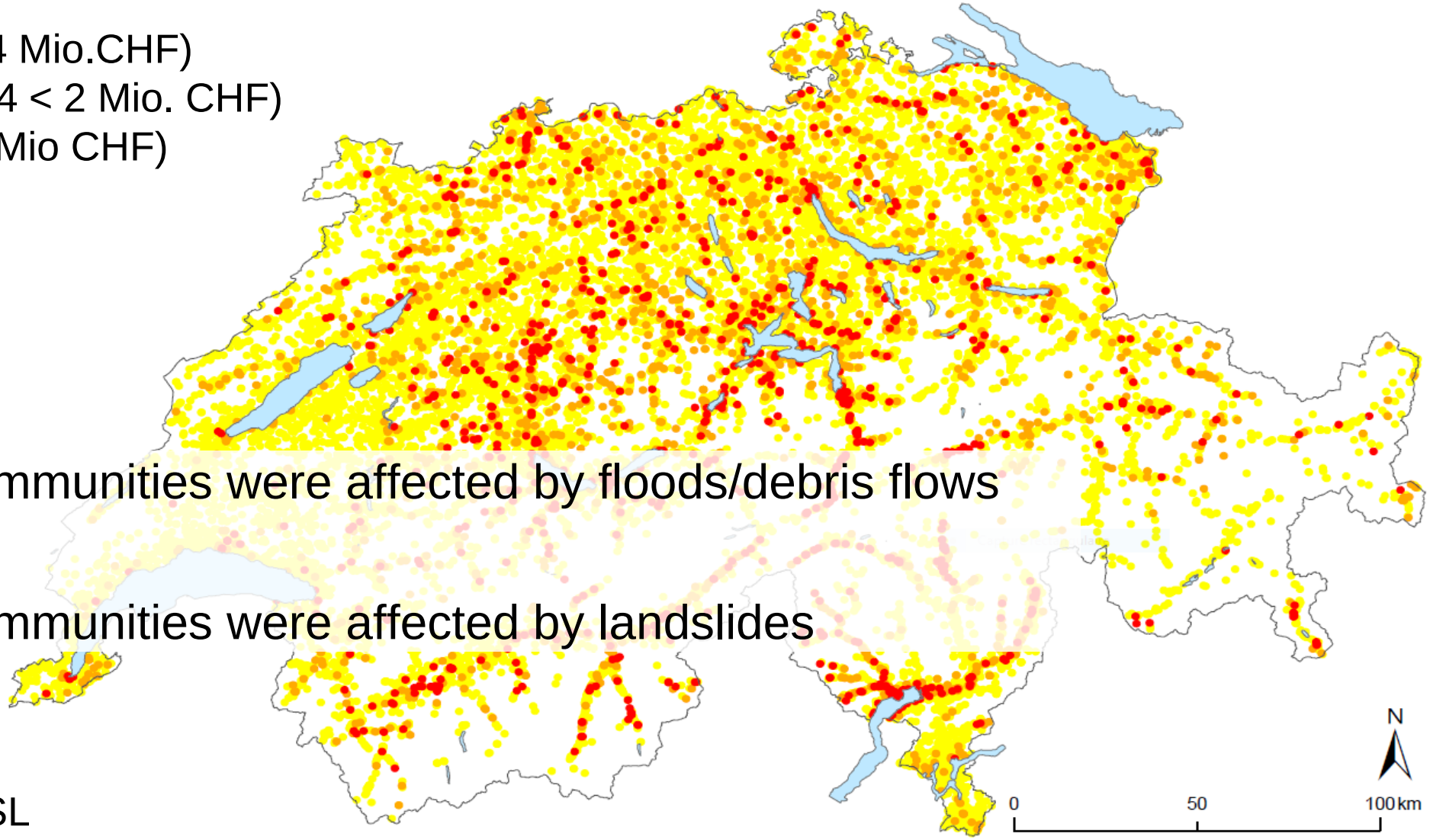



#DYK

Potentially, 22% of Swiss population lives, and 32% of workplaces are located, in flood-prone areas

Damage events 1972 – 2021 (inflation-adjusted)

- Low (< 0.4 Mio.CHF)
- Middle (0.4 < 2 Mio. CHF)
- High (> 2 Mio CHF)

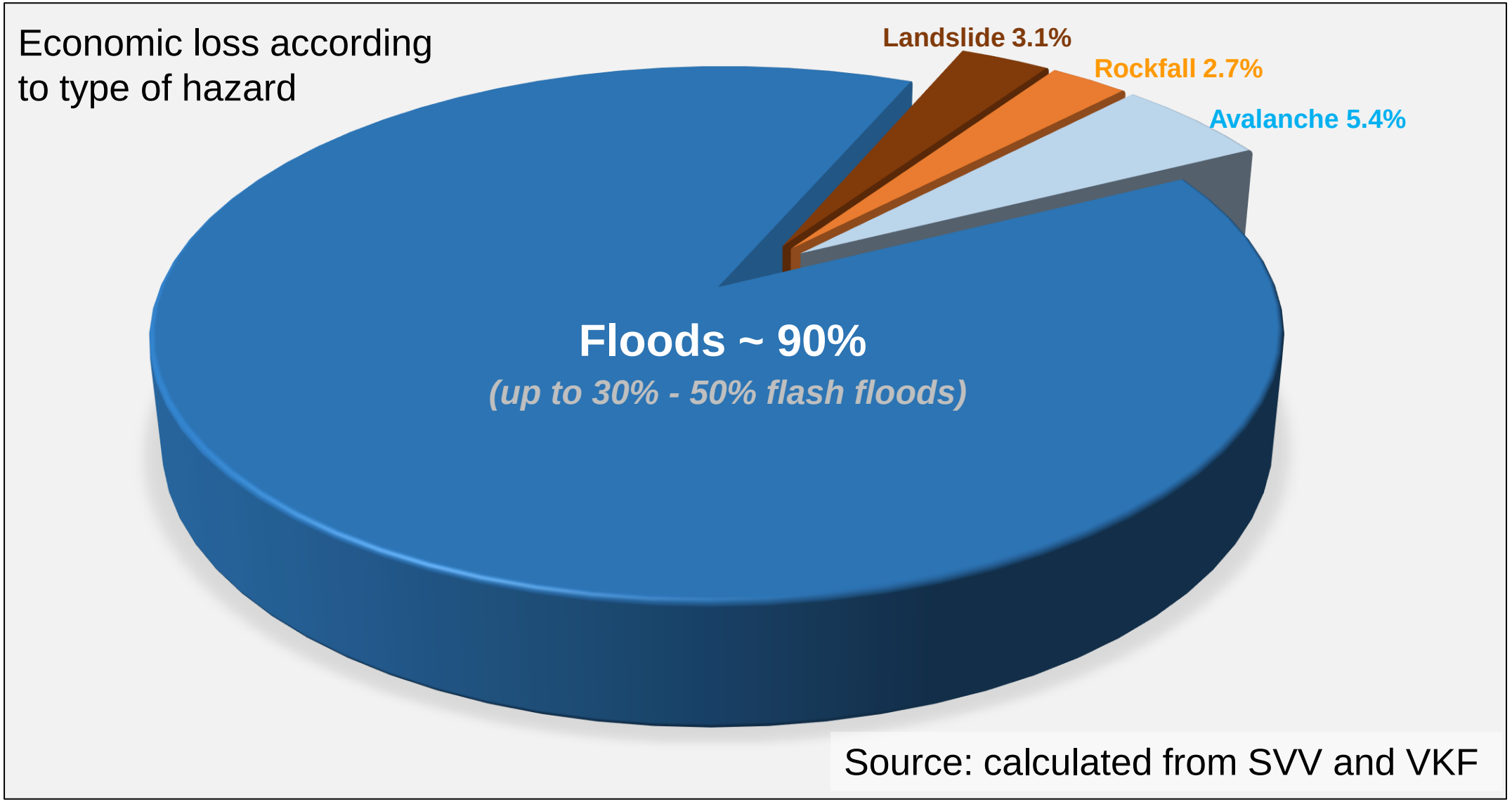


4 out 5 communities were affected by floods/debris flows

2 out 5 communities were affected by landslides

Source: WSL

Swiss loss statistics: gravitational natural hazards



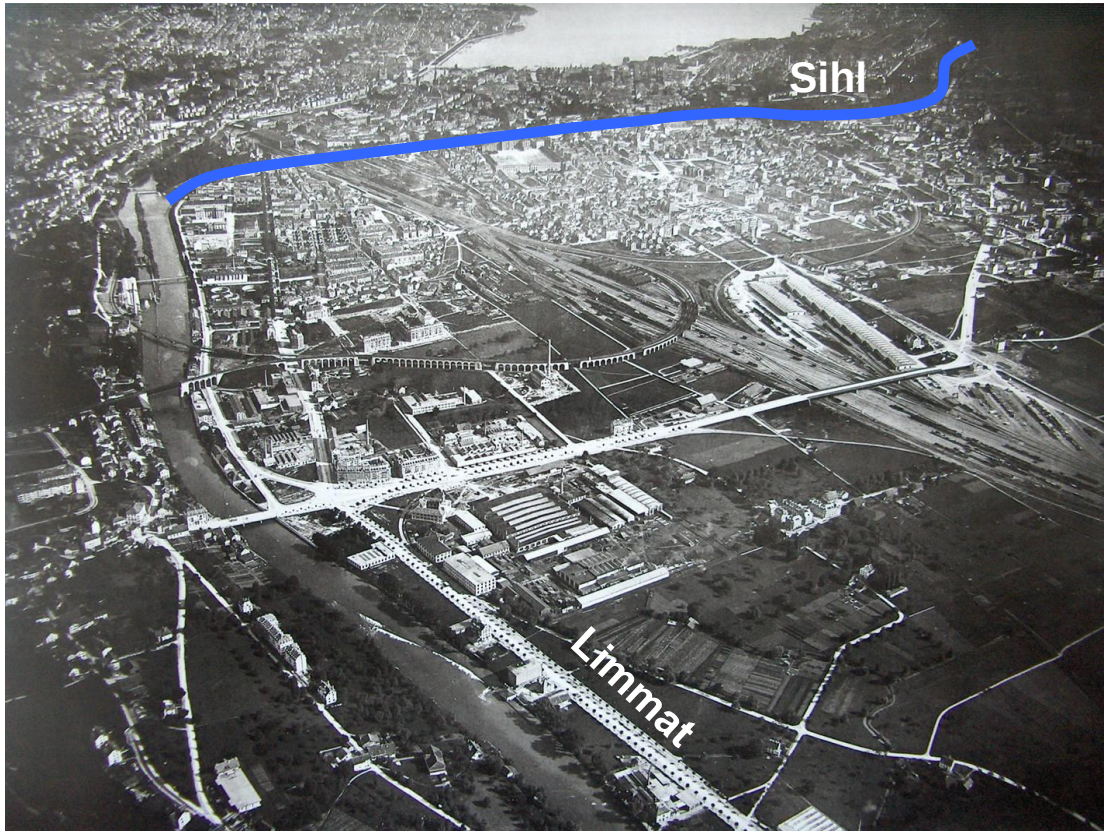
Challenges: Increasing damage potential by urbanisation

1910: CHF 300‘000.-

Today: CHF 100 Mio → factor 300

Source: BAFU

Challenges: Increasing damage potential by urbanisation



Source: Spelterini 1906, AWEL Kt. ZH

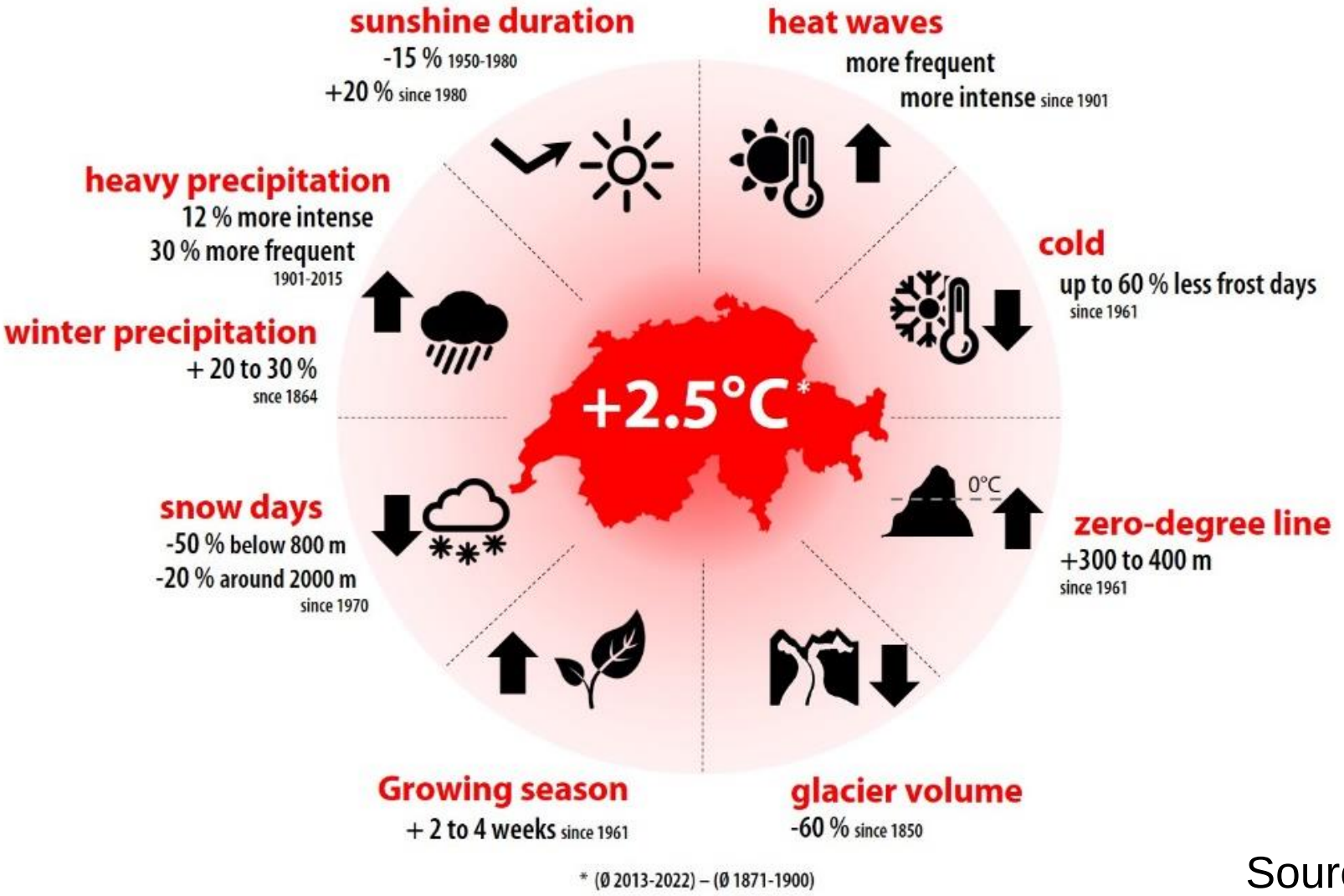
#DYK

The city of Zurich holds a damage potential of CHF 6.7 billion

Challenges: climate change and the climate signal

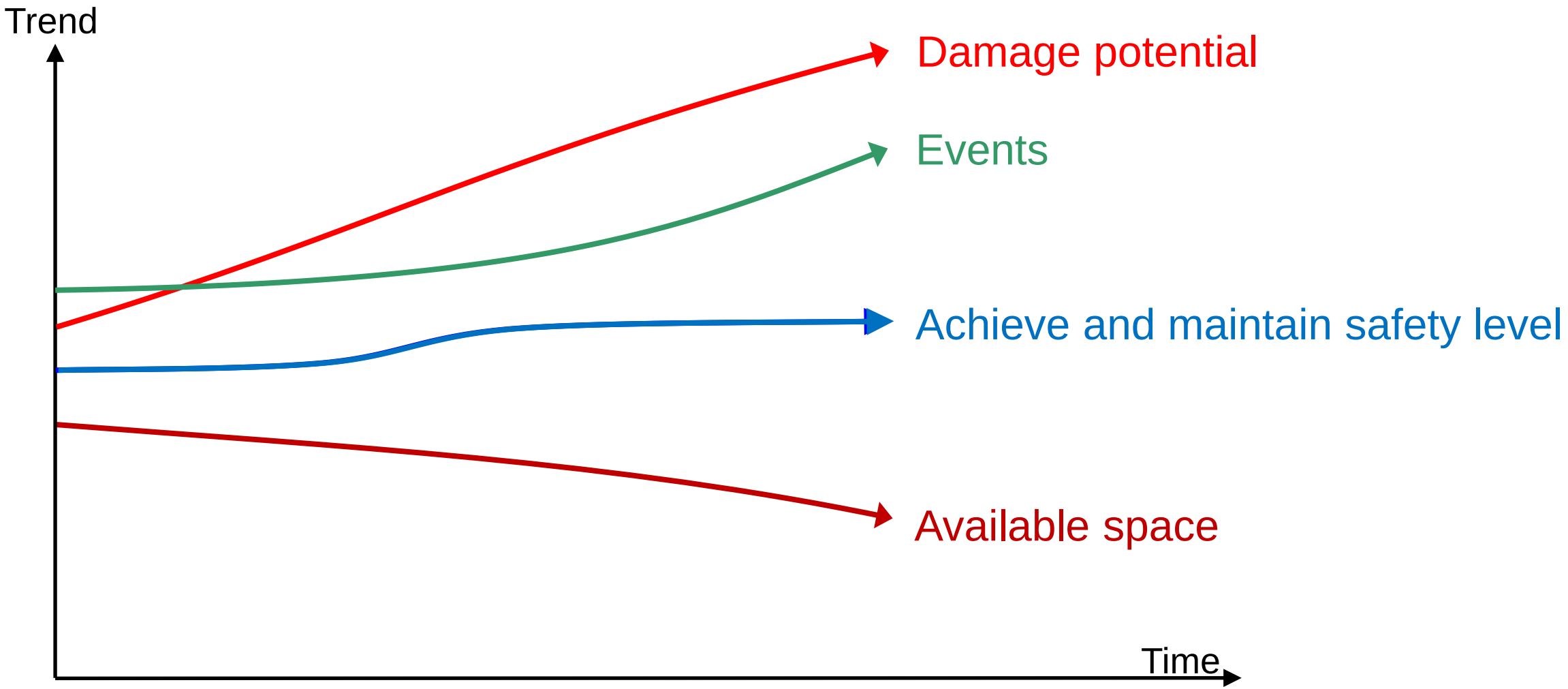
- Higher frequencies: not just value concentration, but visible climate signals
- while summers become drier, precipitation to become stronger, more intense
- More surface runoff, more droughts, less snow days, thawing of permafrost
- Apparent trend to increased variability

Challenges: climate change



Source: BAFU, MeteoSwiss

General trends



Source: BAFU

Current example: Spitze Stei in Kandersteg BE

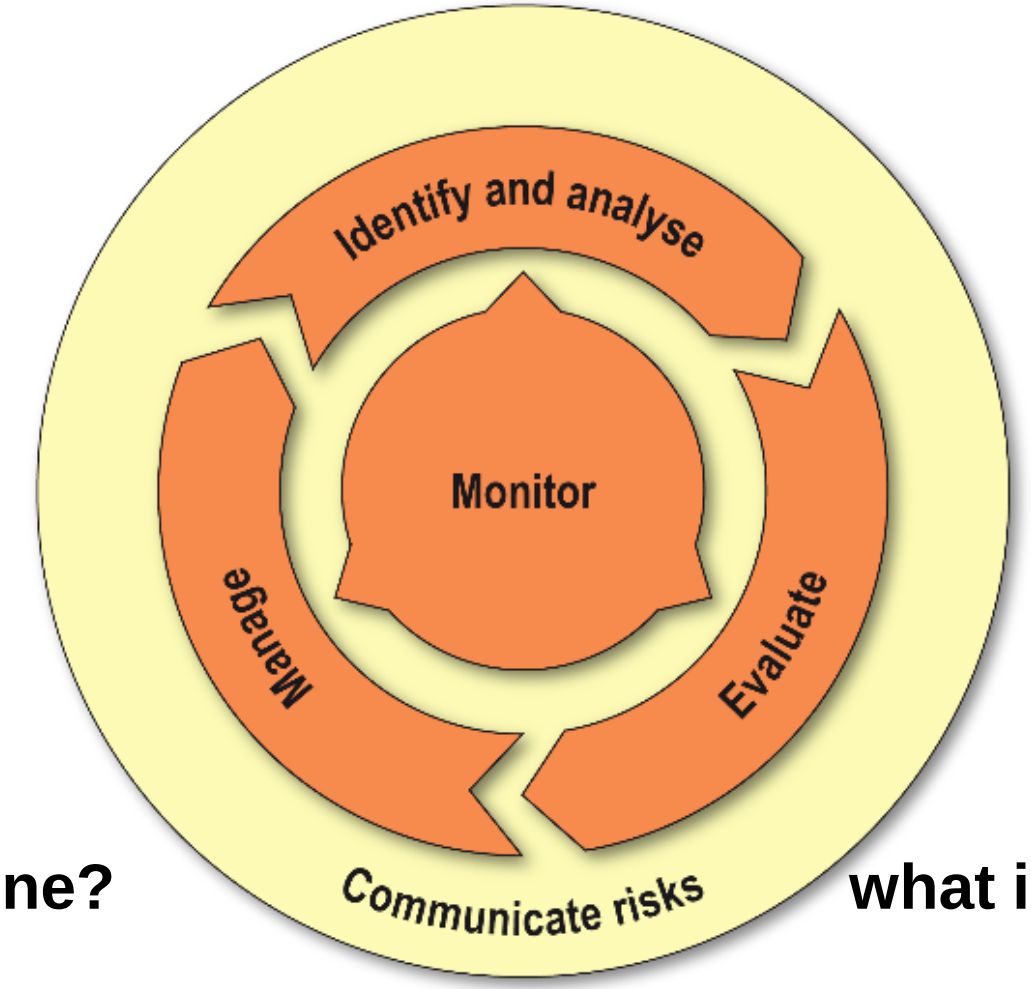
Current example: rockslide of Brienz GR

#DYK

The rockslide of Brienz GR is *not* caused by climate change

Integral Risk Management IRM

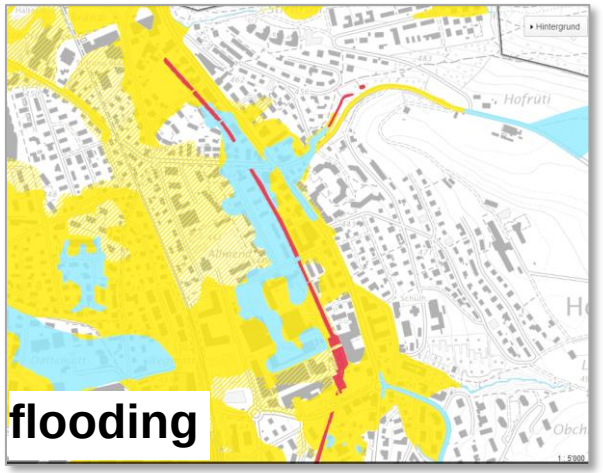
what can happen?

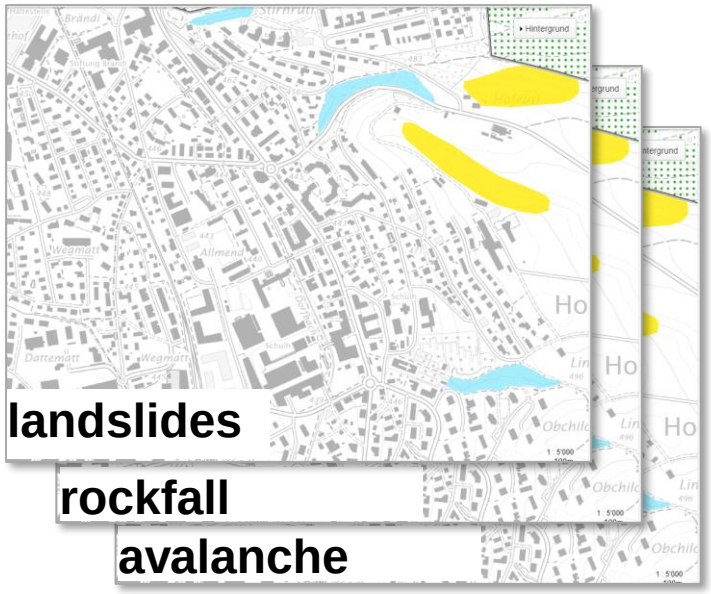


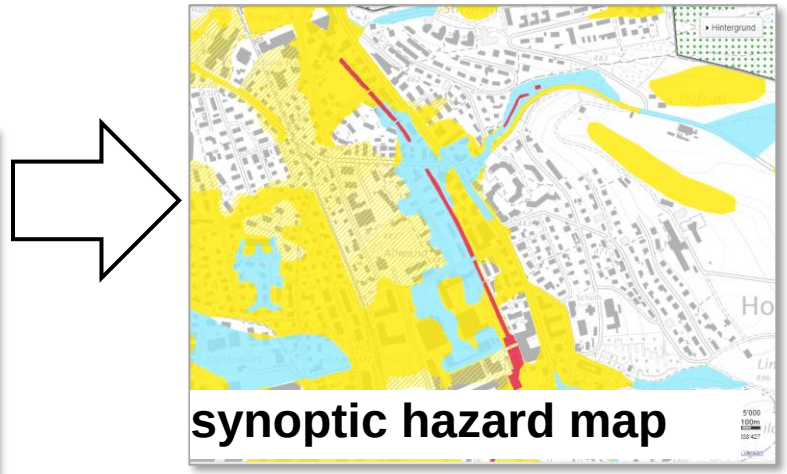
what has to be done?

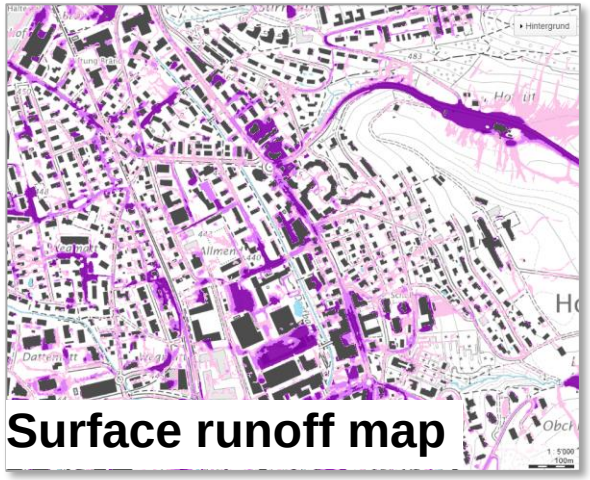
what is allowed to happen?

hazard maps: an instrument for “what can happen”









What has to be done? Four types of measures

Planning

- land use planning
- land use restrictions
- object protection

Organizational

- forecasts
- early warning
- preparedness, emerg. planning

Techn./structural

- avalanche barriers
- flood prot. dams
- rockfall prot. nets

Bio-engineering

- bank protection
- protection forests

#DYK

Almost 50% of Swiss forest is protection forest

What has to be done? Four types of measures

Planning

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Organizational

- forecasts
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Techn./structural

- avalanche barriers
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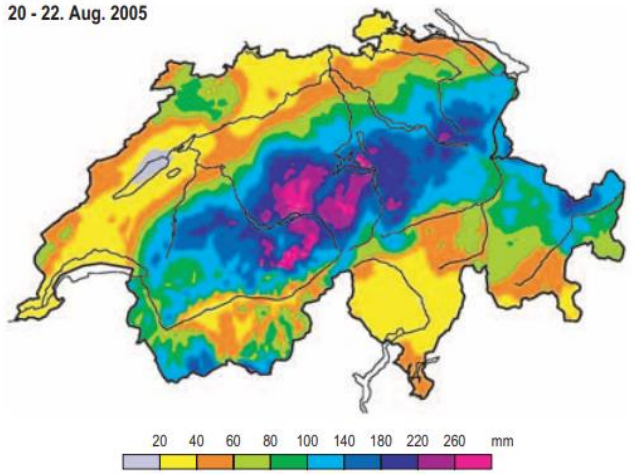
Bio-engineering

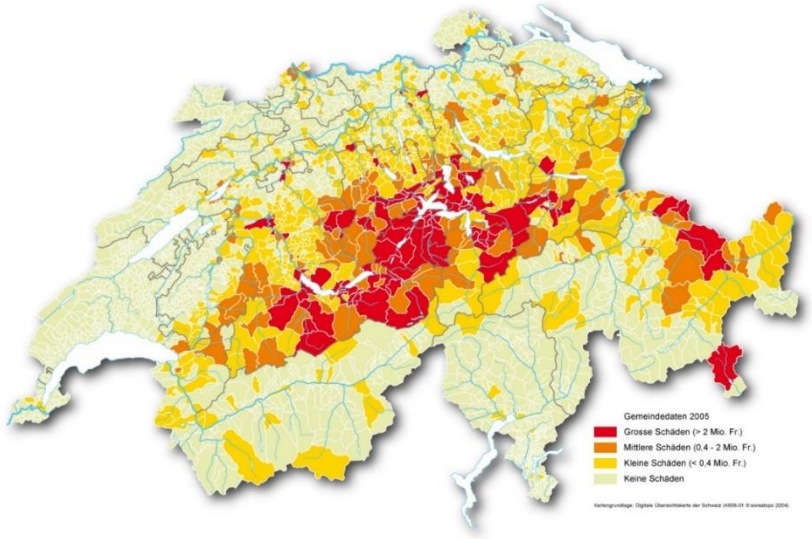
- protection forests
- bank protection

Various disasters in recent times (e.g. 1987, 1999)

Sources:
BAFU, WSL

Turning point: national floods of 2005





Sources: BAFU, swissinfo

#DYK

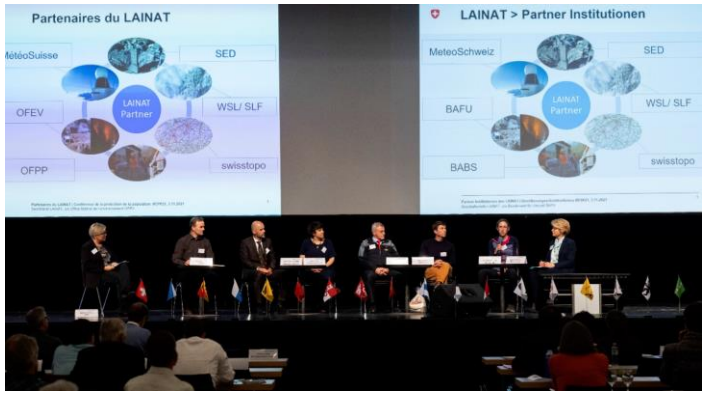
The 2005 event led to 6 fatalities and damages > CHF 3 billion. Analysis showed that proper warning systems could have saved ~20% of the costs

OWARNA «Optimization of Warnings and Alerting»

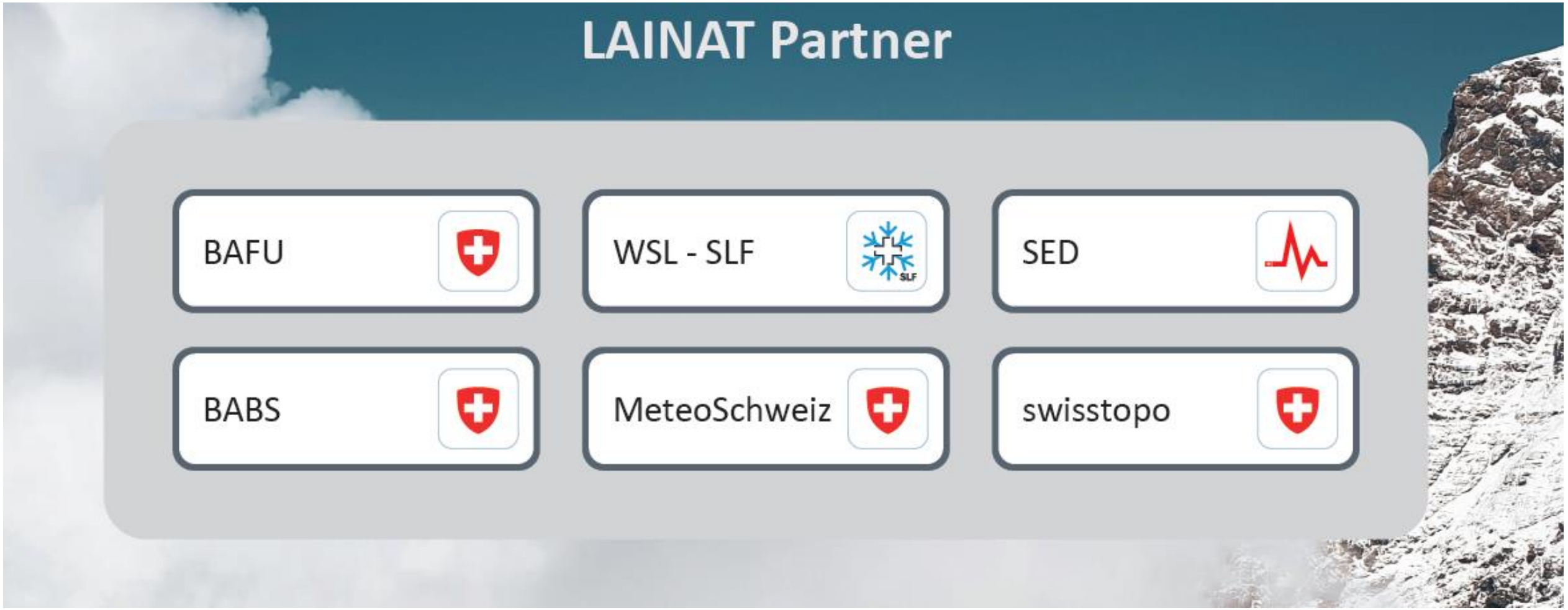
- Federal Council adopts resolution **OWARNA** 2007 → **strong political basis**
- **fostering cooperation** among Swiss Federal Dept., joint Crisis Committee
- **increased investments** in forecasting, transfer knowledge to the local level
- starting point for developments of **operational data** and **warning platforms**
- founding of Steering Committee on Intervention in Natural Hazards **LAINAT**

LAINAT: Steering Committee on Intervention in Natural Hazards

- **coordination body** for natural hazard warnings on the **Swiss Federal level**
- **streamlines warning activities** and **warning product development**
- strong **political linkage** to ministries; legal basis **Civil protection Act**, Art.3



LAINAT: Steering Committee on Intervention in Natural Hazards



Today: existing warnings for natural hazard processes

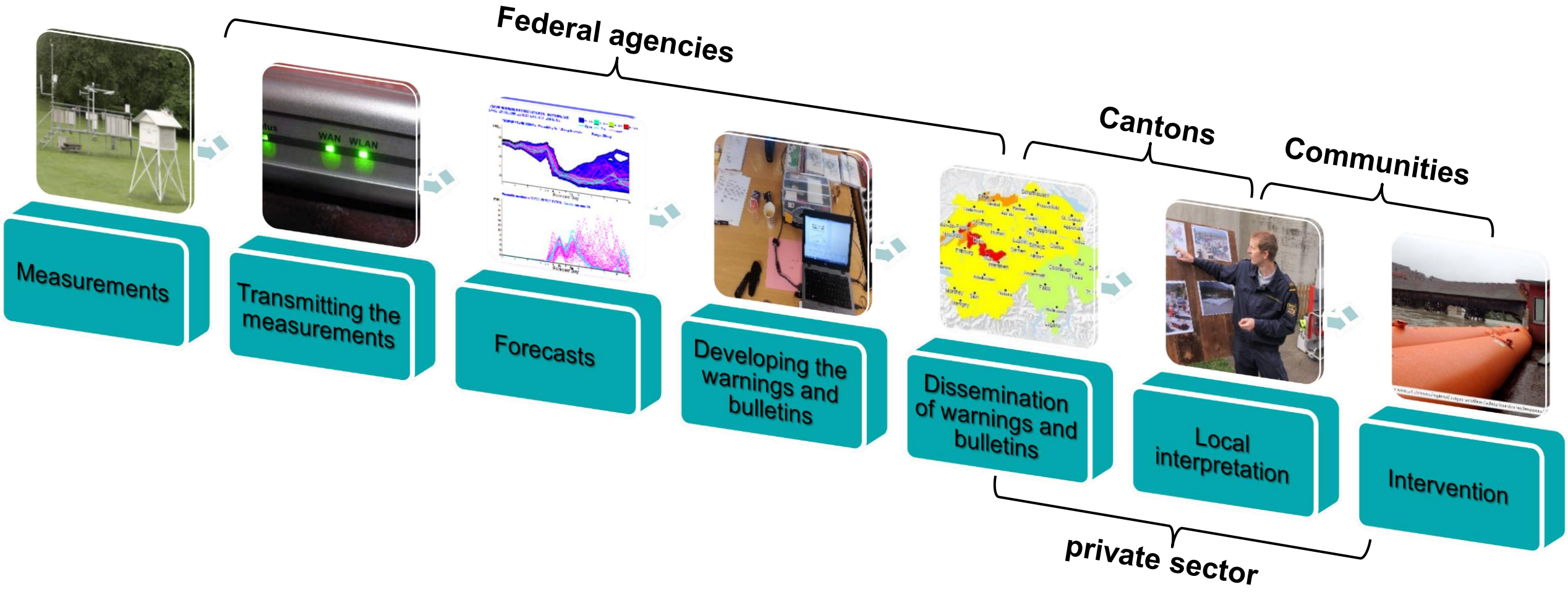
- **floods** (rivers, ~~surface runoff~~)
- **severe weather** (wind, storms, rain, snow, slippery roads, frost, heat)
- **snow avalanches**
- **forest fire**
- **earthquakes** (only ex post information)
- In progress: **drought, mass movements**

#DYK

The faster the onset of a natural hazard process, the less effective are warnings. Lead time is too short.

Implementation of well-practiced emergency planning may then be much more effective

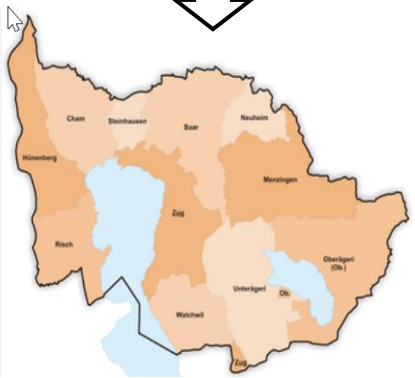
The warning chain in the Swiss Federal system



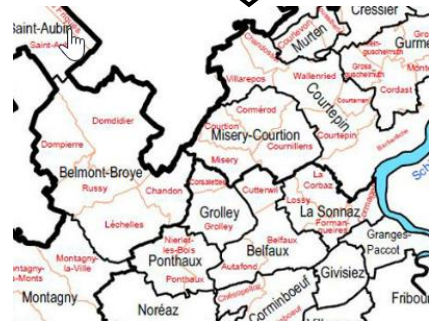
The warning chain and responsibilities

- **Federation:** issues nationwide information and warnings

- **Cantons:** (re-)issue, enrich warnings, take counter-measures



- **Communes**: receive warnings, take counter-measures

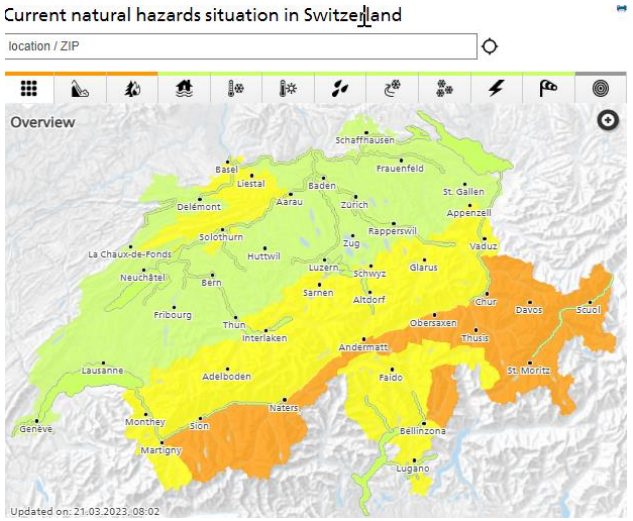


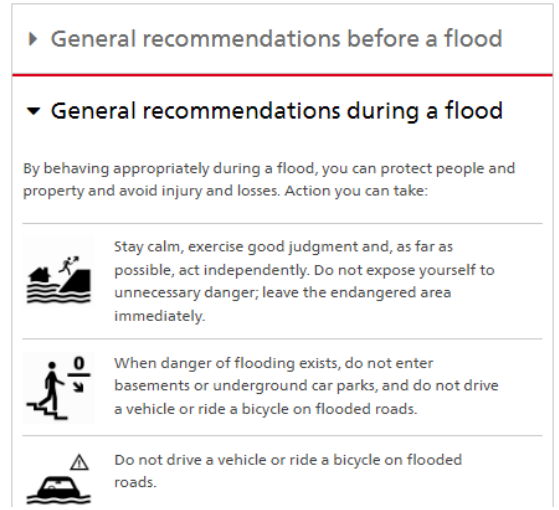
Public Natural Hazard Portal NHP

www.natural-hazards.ch

A public platform for **natural hazard warnings for the Swiss population**

- Information and warnings, real-time, 24/7, multi-lingual, embeddability
- Multi-hazard warning maps and single-hazard warning maps
- Behavioural recommendations, bulletins, press releases



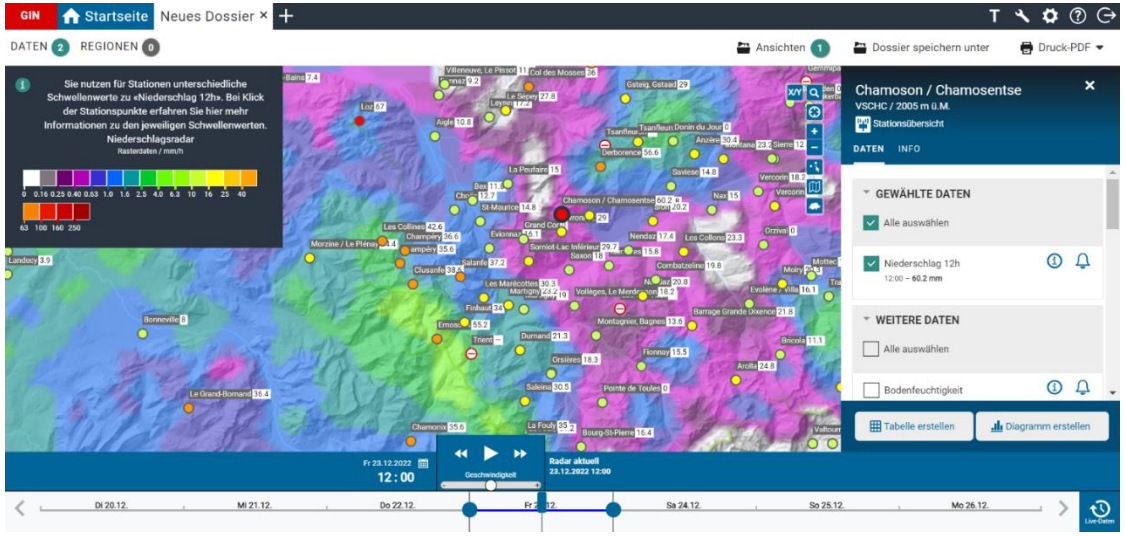


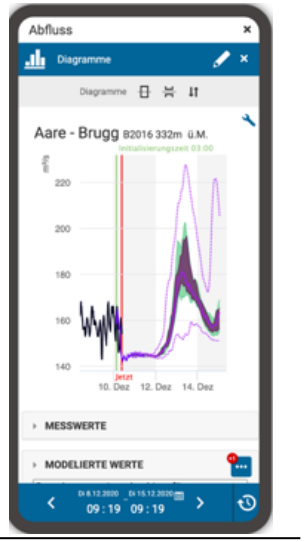
Joint Information Platform Natural Hazard GIN

www.gin.admin.ch

A data and **information distribution channel for authorities**

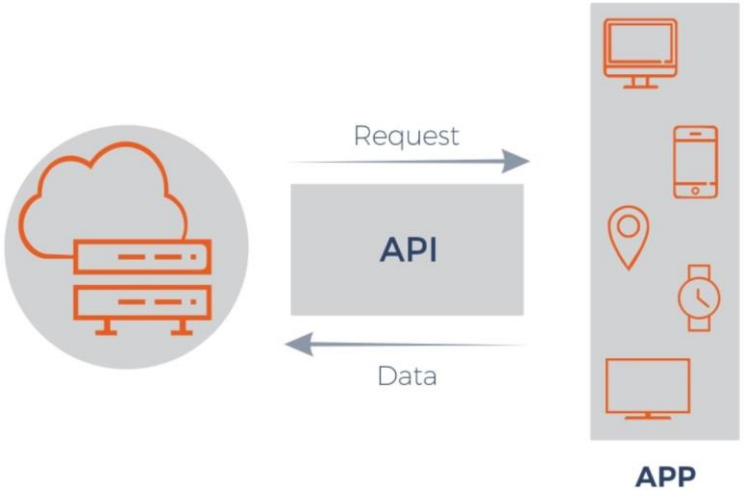
- data provided by LAINAT-partners; real-time sensor-/model data
- users from Federation, Cantons, municipalities; password-protected
- desktop and mobile access, customizable warning push notifications

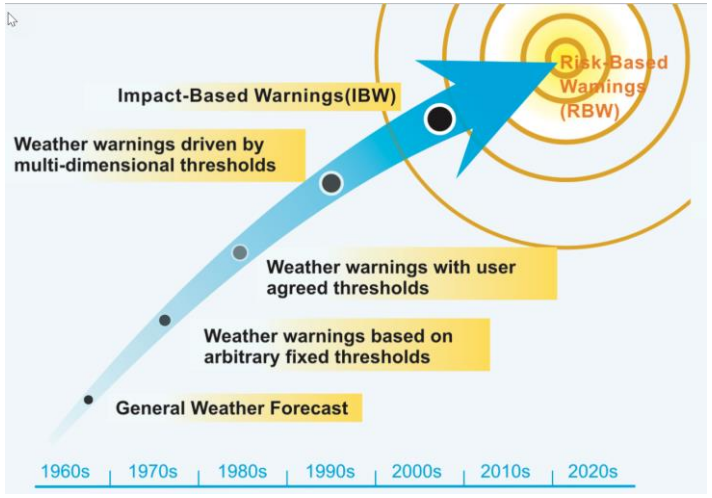




Challenges in the Swiss warning context

- Communication: penetration of warnings and Cell Broadcasting
- Standardization: Use of Common Alerting Protocol (CAP)
- Dissemination: delivery and visualization of warnings via central APIs
- Impact: impact-bases warnings (considering exposure and vulnerability)





#DYK

In May 2022, the federal Council adopted the financing for drought warnings, to be delivered operationally by 2025

International roles

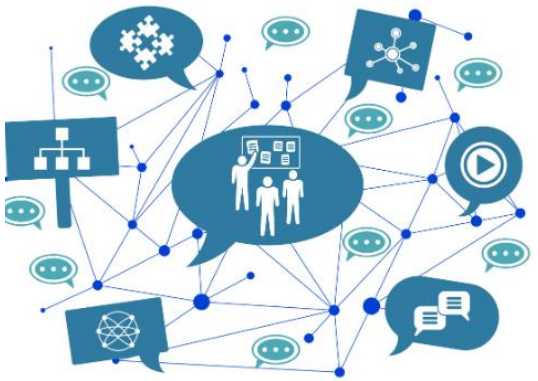
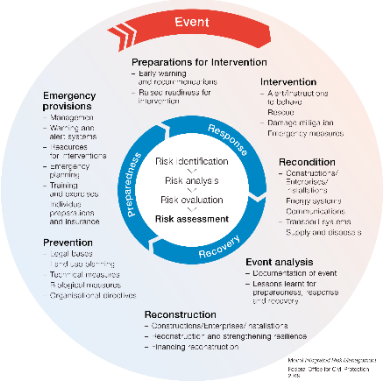
- Swiss Consultative Group Disaster Risk Reduction DRR (DEZA/SDC)
- WMO Standing Committee DRR, Early Warning for All initiative
- UNDRR and UN Sendai Framework, Swiss Reporting of Target G
- **Switzerland is well-aligned with its warning systems and concepts**

Conclusions: is Switzerland prepared?

YES

- we deliver effective **multi-hazard, cross-sectoral** warnings
- we foster organizational **frameworks for collaboration** among stakeholders
- we ensure involvement of all actors in **data collection, forecasting** and **early warning,** speak as **one single voice** («whole-of-government service»)
- we are **proactive** and refine warning **products, optimized** for different users



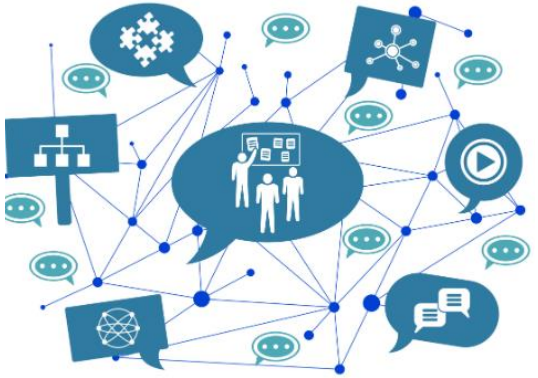
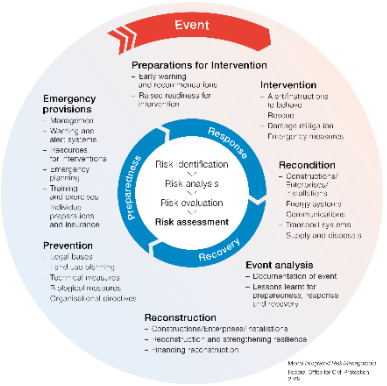



Conclusions: is Switzerland prepared?

BUT

- we have to **avoid new risks** and deal with **residual risks**
- we have to acknowledge intertwined, compound, cascading multi-hazards that may intensify with **climate change**
- we must keep pace with **new technologies,** increasing **societal demands**
- we have to ensure (existing) **business continuity**



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Thank you for your attention

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References, further reading (selection)

- Websites Federal Offices: Mit Warnungen vor Überschwemmungen schützen (admin.ch); Gefahren - MeteoSchweiz (admin.ch); Warnung bei Naturgefahren (admin.ch); SED | Earthquake Early Warning (ethz.ch); White Risk

- Swiss Agency for Development and Cooperation SDC. Newsletter N°1/2023 – Digitalization in CC, DRR and Environment Interview_LAINAT.pdf (weaver.ch), accessed November 2023.

- Lienert C., Angly F., Neversil B., Meier D. (2021). The public Swiss natural hazard portal for warnings and recommended behaviour. In: Proceedings of the 30th Intl. Cartographic Conference, Florence, Italy (https://doi.org/10.5194/ica-abs-3-180-2021)

- Switzerland: Voluntary National Report of the MTR SF | Midterm Review of the Sendai Framework (undrr.org), accessed November 2023.

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