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Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC

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University of
Zurich UZH



HAZARDS EXERCISES

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IHCAP – Indian Himalayas Climate Change Adaptation Programme
Capacity building programme Level-1 (September 11, 2014)

HAZARDS IN MOUNTAINS

The aim of the exercise is to define areas prone to multiple hazards in a region of the Swiss Alps.

Hazard (temporal condition): The probability of a potentially damaging event (a landslide) occurring in a unit of time.

Risk: Expected consequences emanating from a hazard, expressed as the probability and severity of loss to the elements at risk for a unit area, object, or activity, over a specified period of time.

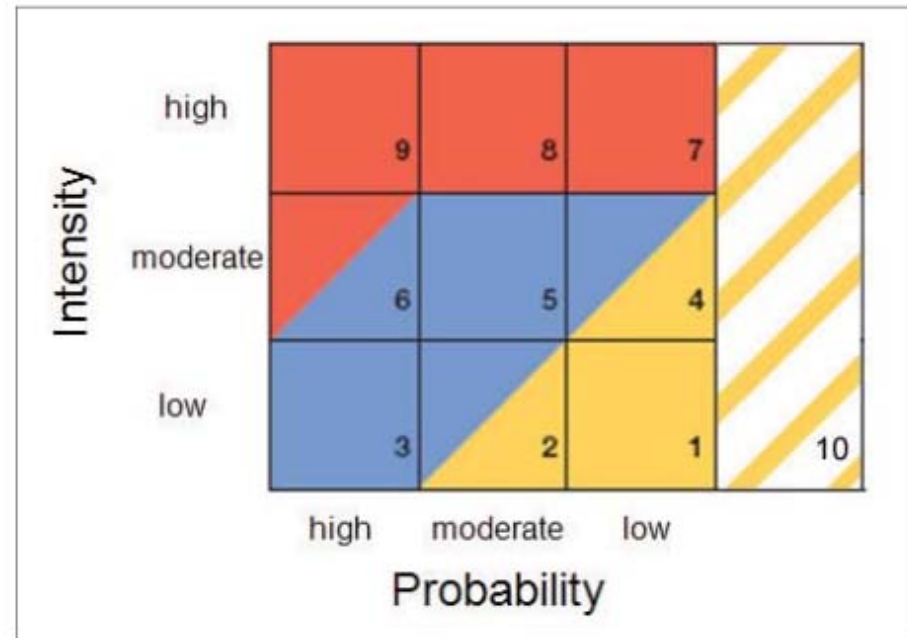
Susceptibility: The propensity of a designated area to experience a particular physical hazard.

Vulnerability: The degree of damage expected from given magnitude of hazard, usually expressed as a ratio of the existing value.

Swiss hazard maps legend

Magnitude-frequency diagram

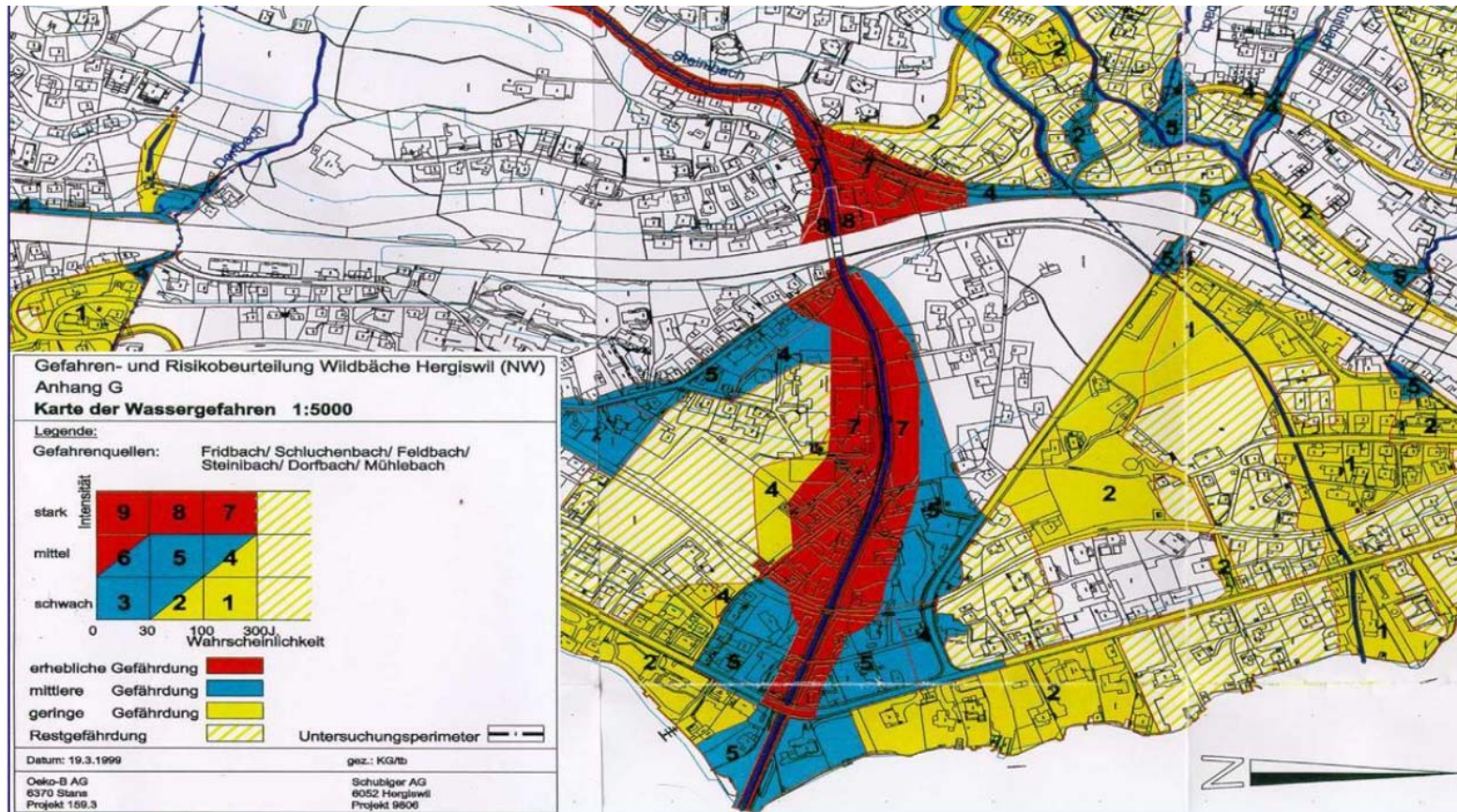
- Red (high hazard)
- Blue (moderate hazard)
- Yellow (low hazard)
- White/yellow-hatched (residual danger, high intensity but very unlikely)



http://www.mountaincartography.org/publications/papers/papers_lenk_08/kunz.pdf

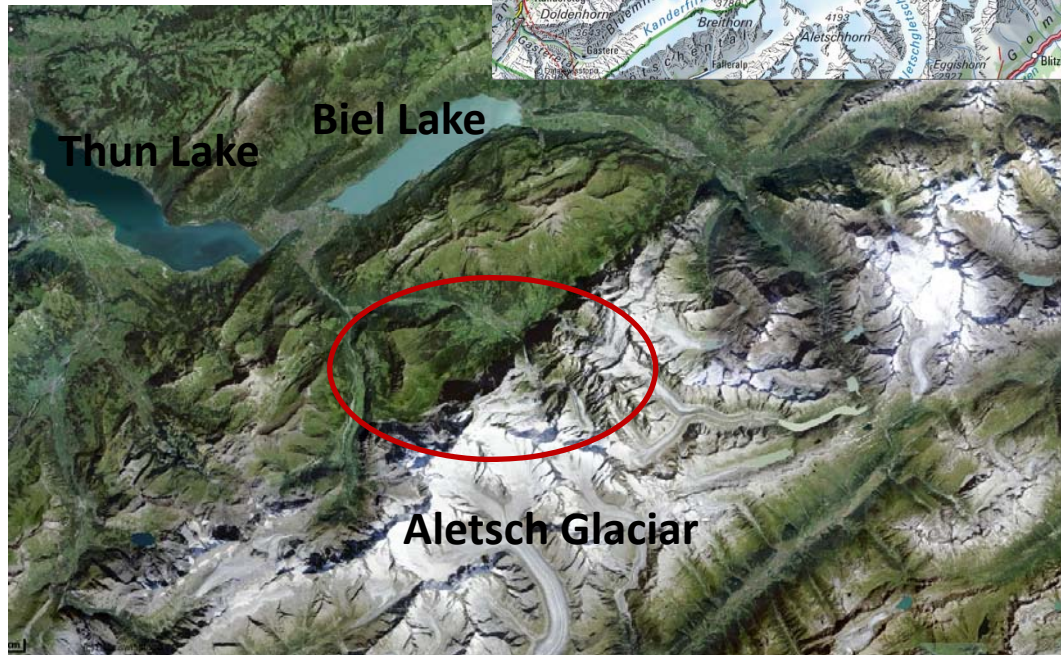
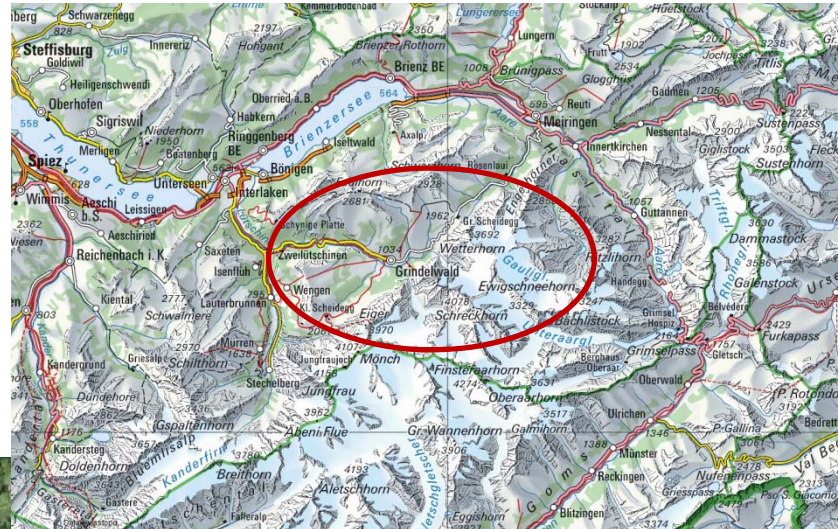
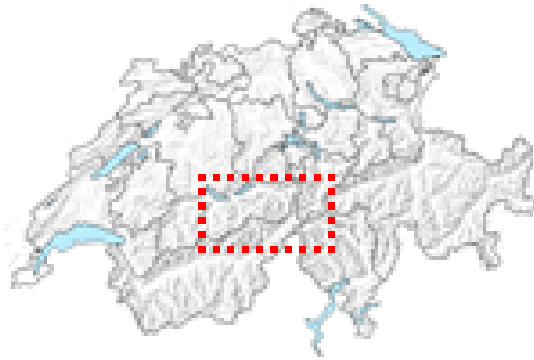
Swiss hazard maps

Example: Hazard map of Hergiswil

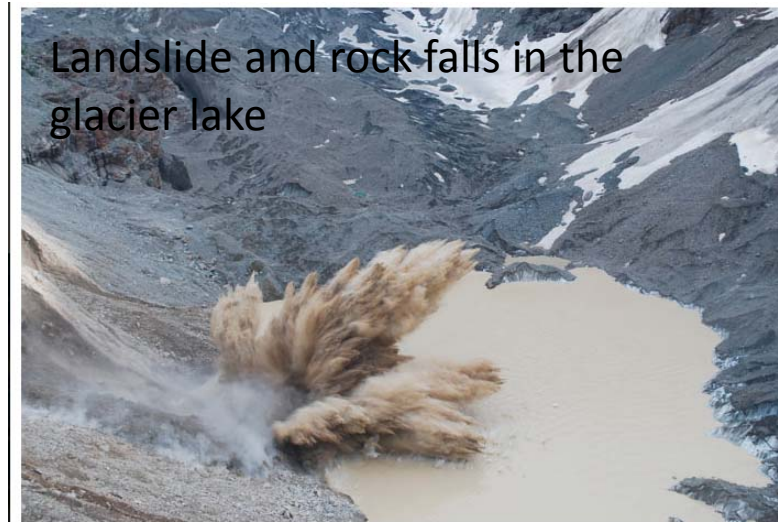


http://www.alpconv.org/en/organization/groups/WGHazards/Documents/PLANALP_Hotspot_Paper.pdf

Study site: Grindelwald (Canton Bern)



Study site: Grindelwald (Canton Bern)



<http://www.planat.ch/en/images-details/datum/2011/06/21/grindelwald/>

Study site: Grindelwald (Canton Bern)



Useful information

<http://map.geo.admin.ch/>

The screenshot displays the map.geo.admin.ch interface. At the top, there is a navigation bar with links for Home, Help, RSS, Twitter, Contact, and a search bar. The main content area shows a map of a mountainous region in Switzerland, overlaid with a grey hillshade (DEM). The left sidebar contains a 'Selection' panel with two layers: 'swissALTD3 Hillshade' (opacity 100%) and 'Simplified land occupancy' (opacity 75%). Below this is a 'Catalog [INSPIRE]' section with a search bar and a list of layers under 'Elevation', including 'Aeronautical Chart ICAO', 'Elevations VECTOR200', 'Geoid in CH1903', 'Geoid in ETRS89', 'Glider Chart', and 'swissALTD3 Hillshade'. The main map area includes a 20 km scale bar, a coordinate display (CH1903 / LV03, 546388, 229063), and a small inset map of Switzerland in the bottom right corner.

Useful information

http://map.geo.admin.ch/

The screenshot shows the web interface of the Swiss Federal Office of Topography (swisstopo) map service. The main map displays a geological map of Switzerland at a scale of 1:500,000. The interface includes a search bar at the top, a selection menu on the left, and a detailed information box for the selected dataset. The information box provides details about the 'Geologische Karte der Schweiz 1:500'000' dataset, including its description, legend, and metadata.

Geology

Catalog [INSPIRE] Search

- Infrastructure and communication
- Environment, biology and geology
- Protected sites
- Geology
 - Aeromagnetic
 - Aeromagnetic Plateau/Jura
 - Bouguer-Anomalies
 - Classification of rocks
 - Declination
 - Division GeoMaps 500
 - Geological Atlas 1:25'000
 - Geology 1:500'000**
 - Geotechnical and rocks
 - Geothermal energy
 - Gravimetrischer Atlas
 - Groundwater resources
 - Groundwater vulnerability
 - Inclination
 - Isostatic anomalies
 - Last glacial maximum
 - Magnetic field strength
 - Main lithological groups
 - Mineral resources
 - Rocks origin

Information

Basic geodata ID: 46.4
Valid scale range: 1:500'000
Metadata: [Link to geocat.ch](#)
Detail description: [Link to description](#)
Order data: [Link to portal](#)
Thematic geoportail: [Link to WMS](#)
WINS service: [Link to WMS](#)
Data status: 30.06.2008

CH1903 / LV03 Coordinates (m): 641875, 102450

Useful information

<http://map.geo.admin.ch/>

Erosion risk

infobox

Erosionsrisikokarte der Schweiz, qualitativ 1 (Talgebiet) (Federal Office for Agriculture)
Environment biology and geology > Soil

Erosionsrisikokarte der landwirtschaftlichen Nutzfläche der Schweiz im 2x2-Meter-Raster auf der Basis des DTM-AV. Die Karte umfasst nur die Tal- und Hügelizele. Gezeigt wird das potentielle, qualitative Erosionsrisiko bei permanenter Ackerbewirtschaftung. Die Gesamtwertung wird einer von drei Gefährdungsstufen (keine Gefährdung, Gefährdung, hohe Gefährdung) zugeordnet, ohne dabei die Nutzung oder die Bewirtschaftungsweise des Bodens zu berücksichtigen. Berechnet wird der langjährige mittlere Bodenabtrag mit der Software AVerosion 1.0 unter Verwendung von MUSLEB7 (Modified Universal Soil Loss Equation 1987).

Legend

- Keine Gefährdung
- Gefährdung
- Hohe Gefährdung

Information

Basic geodata ID	-
Valid scale range	-
Metadata	Link to geocat.ch
Detail description	Link to description
Order data	-
Thematic geoportals	Link to portal
WMS service	Link to WMS
Data status	03.01.2010

Catalog [INSPIRE]

Search	
Soils	
Aptitude: Crop types	i
Aptitude: Cropland	i
Erosion risk 1	i o
Erosion risk 2	i
Erosion risk quantitative	i
Feldblockkarte	i
Gewässeranschluss	i
Gewässeranschluss erweitert	i
Gründigkeit	i
Hillside and steep slopes situation	i
Nährstoffspeichervermögen	i
Polluted sites - pub. transp.	i
Skeletthalt	i
Vernässung	i
Viticulture in steep areas	i
Wasserdurchlässigkeit	i
Wasserspeichervermögen	i
Environmental monitoring facilities	
Natural risk zones	
Meteorological geographical features	
Habitats and biotopes	
Species distribution	
Mineral resources	
Energy and economy	

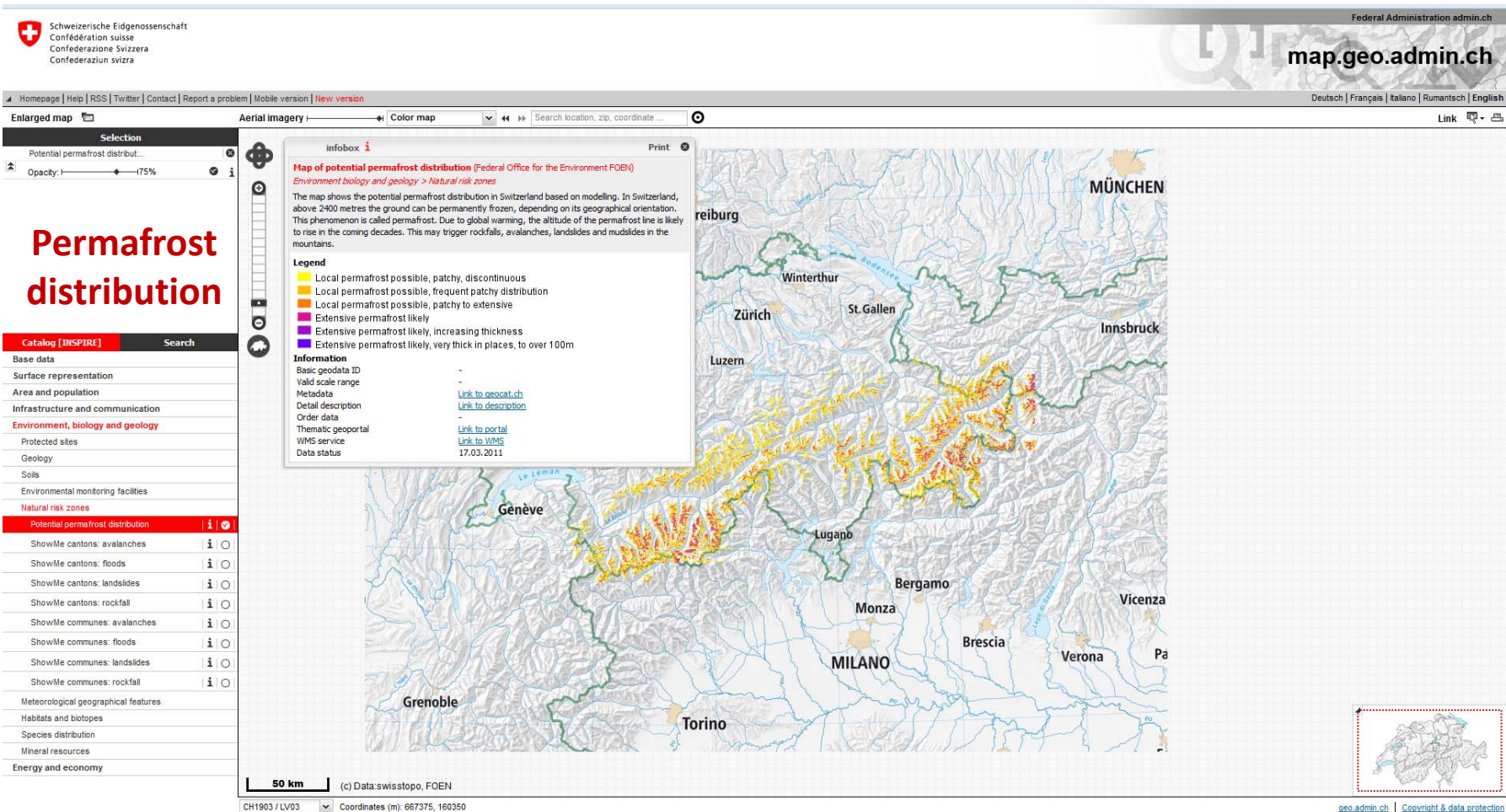
50 km (c) Data: swisstopo, FOAG

CH1903 / LV03 Coordinates (m): 341375, 135850

geo.admin.ch | Copyright & data protection

Useful information

http://map.geo.admin.ch/



Useful information

<http://map.bafu.admin.ch>

Bundesamt für Umwelt **BAFU**
Federal Office for the Environment **FOEN**

The screenshot displays the web-GIS interface for the Office for the Environment. The top navigation bar includes the Swiss flag and the text 'Schweizerische Eidgenossenschaft', 'Confédération suisse', 'Confederazione Svizzera', and 'Confederaziun svizra'. The right side of the header shows 'Federal Administration admin.ch', 'Department of the Environment, Transport, Energy and Communications', and 'Web-GIS of the Office for the Environment'. Below the header, there are links for 'Homepage | Contact' and language options: 'Deutsch | Français | Italiano | English'. The main interface features a search bar with the placeholder 'Search location, zip, coordinate ...' and a 'Link' button. The map is titled 'Enlarged map' and shows 'Aerial imagery' and 'Grey map' options. The map itself displays the Muri region, including areas like Wabern, Muri b.B., Kehrsatz, and Allmendingen. A legend on the left side lists various layers, with 'Floods' highlighted in red. The 'Floods' section includes 'Areas of flooding Aquaprotect 50', 'Areas of flooding Aquaprotect 100', 'Areas of flooding Aquaprotect 250', and 'Areas of flooding Aquaprotect 500'. The 'Floods' section is also highlighted in red. The map shows a scale bar for 1000m and coordinates (m): 607683, 197074. The bottom right corner contains the website URL 'www.bafu.admin.ch' and 'Copyright & Terms of Use'.

Swiss flag
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Federal Administration admin.ch
Department of the Environment, Transport, Energy and Communications
Web-GIS of the Office for the Environment

Homepage | Contact
Deutsch | Français | Italiano | English

Enlarged map
Aerial imagery | Grey map
Search location, zip, coordinate ...
Link

Layers

- Show/Me cantons: landslides
- Show/Me cantons: rockfall
- Communes**
- Show/Me communes: floods
- Show/Me communes: avalanches
- Show/Me communes: landslides
- Show/Me communes: rockfall
- Earthquakes**
- Past earthquakes
- Seismic risk zones
- Micro-zoning
- Subsoil classes
- Spectral micro-zoning
- Permafrost**
- Potential permafrost distribution
- Floods**
- Areas of flooding Aquaprotect 50
- Areas of flooding Aquaprotect 100
- Areas of flooding Aquaprotect 250
- Areas of flooding Aquaprotect 500
- Noise**
- Railway noise (Lr_night)
- Railway noise (Lr_day)
- Road traffic noise (Lr_night)
- Road traffic noise (Lr_day)

1000m
Coordinates (m): 607683, 197074
www.bafu.admin.ch | Copyright & Terms of Use

Useful information

<http://map.bafu.admin.ch>

Bundesamt für Umwelt **BAFU**

Federal Office for the Environment **FOEN**

The screenshot shows the web-GIS interface for the Swiss Federal Office for the Environment (FOEN). The interface includes a search bar, a scale bar, and a coordinate display. The 'Earthquakes' layer is highlighted in red, and the 'Past earthquakes' sub-layer is checked. The map displays several earthquake epicenters as red and yellow dots across the country.

Swiss Federal Office for the Environment (FOEN) logo and navigation options are visible at the top. The map shows various layers including Earthquakes, Seismic risk zones, Micro-zoning, Subsoil classes, Spectral micro-zoning, Permafrost, Floods, Noise, and Air. The 'Earthquakes' layer is highlighted in red, and the 'Past earthquakes' sub-layer is checked. The map displays several earthquake epicenters as red and yellow dots across the country.

HAZARDS IN MOUNTAINS

QUESTIONS:

1. Useful information will be provided based on the maps available on ***map.geo.admin.ch*** and ***map.bafu.admin.ch***. As a basis the orthophoto and topography are also provided.
2. Define those areas potentially prone to **rockfalls**
3. Define those areas potentially prone to **avalanches**
4. Define those areas potentially prone to **landslides**
5. Define those areas potentially prone to **floods**
6. Identify the **elements at risk**
7. Identify most **vulnerable areas**

For all cases explain the main disposition and potential triggering factors

HAZARDS IN MOUNTAINS

