



# Gebäudebeurteilung nach einem Ereignis

Fabrizio D'Urso, Ausbilder Kanton Wallis



CANTON DU VALAIS  
KANTON WALLIS



Schweizerischer Erdbebedienst  
Service Sismologique Suisse  
Servizio Sismico Svizzero  
Swiss Seismological Service

**ETH**

Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich



Schweizerische Eidgenossenschaft  
Confédération suisse  
Confederazione Svizzera  
Confederaziun svizra

Bundesamt für Umwelt BAFU  
Office fédéral de l'environnement OFEV  
Uffiz federal d'ambient UFAM



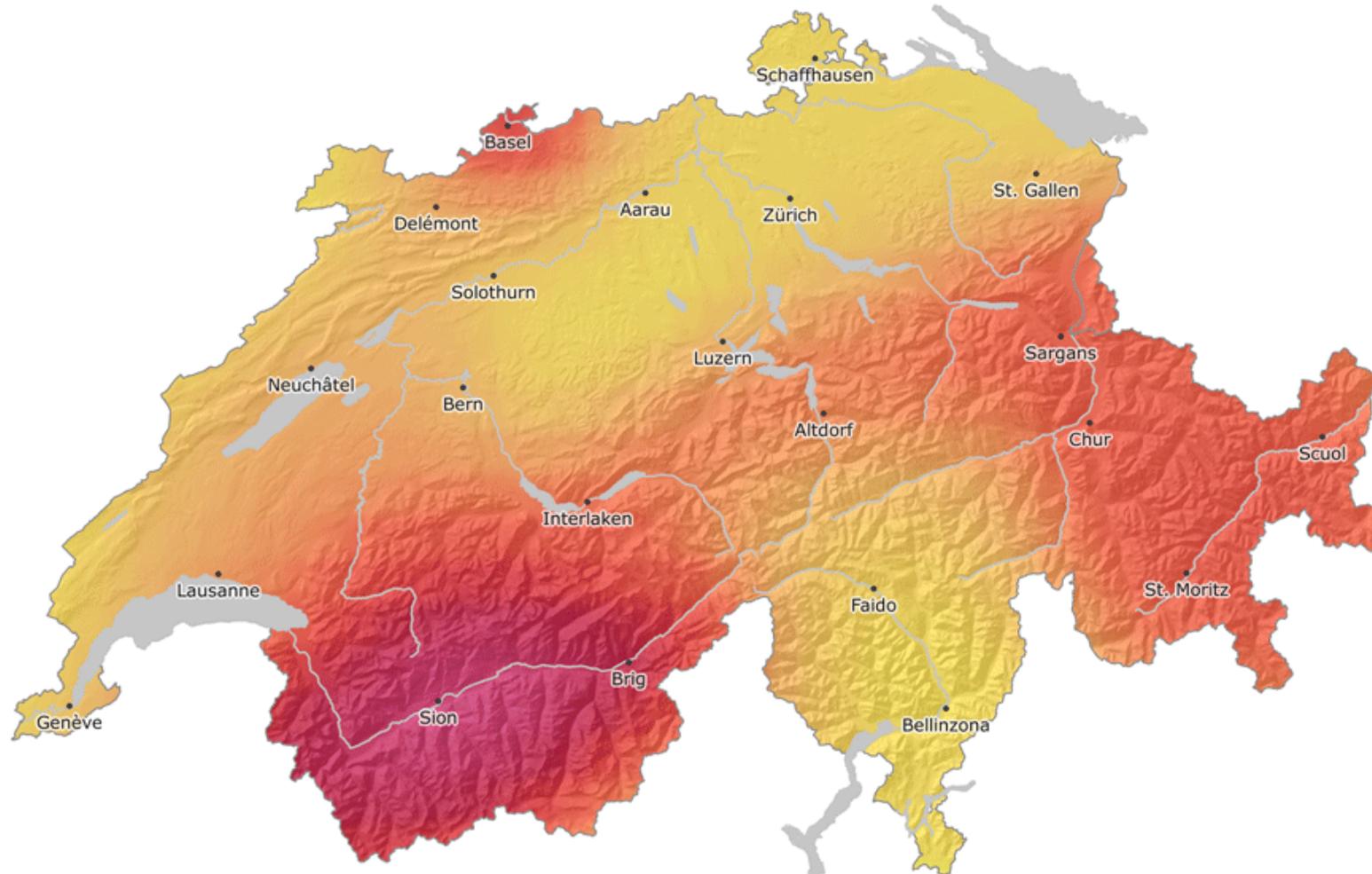
Erdbebenland Schweiz: Informationsanlass für Gemeinde und Kanton | Zürich | 23.08.2019

# INHALT

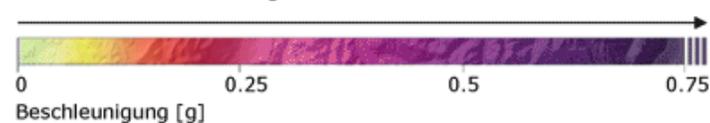
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1. Erdbebengefahr im Wallis
2. Wie bereitet sich der Kanton vor ?
3. Gebäudebeurteilung
  - a) Aufgaben / Zielsetzung
  - b) Methodik
  - c) Ausbildung der Spezialisten
  - d) Einsatz

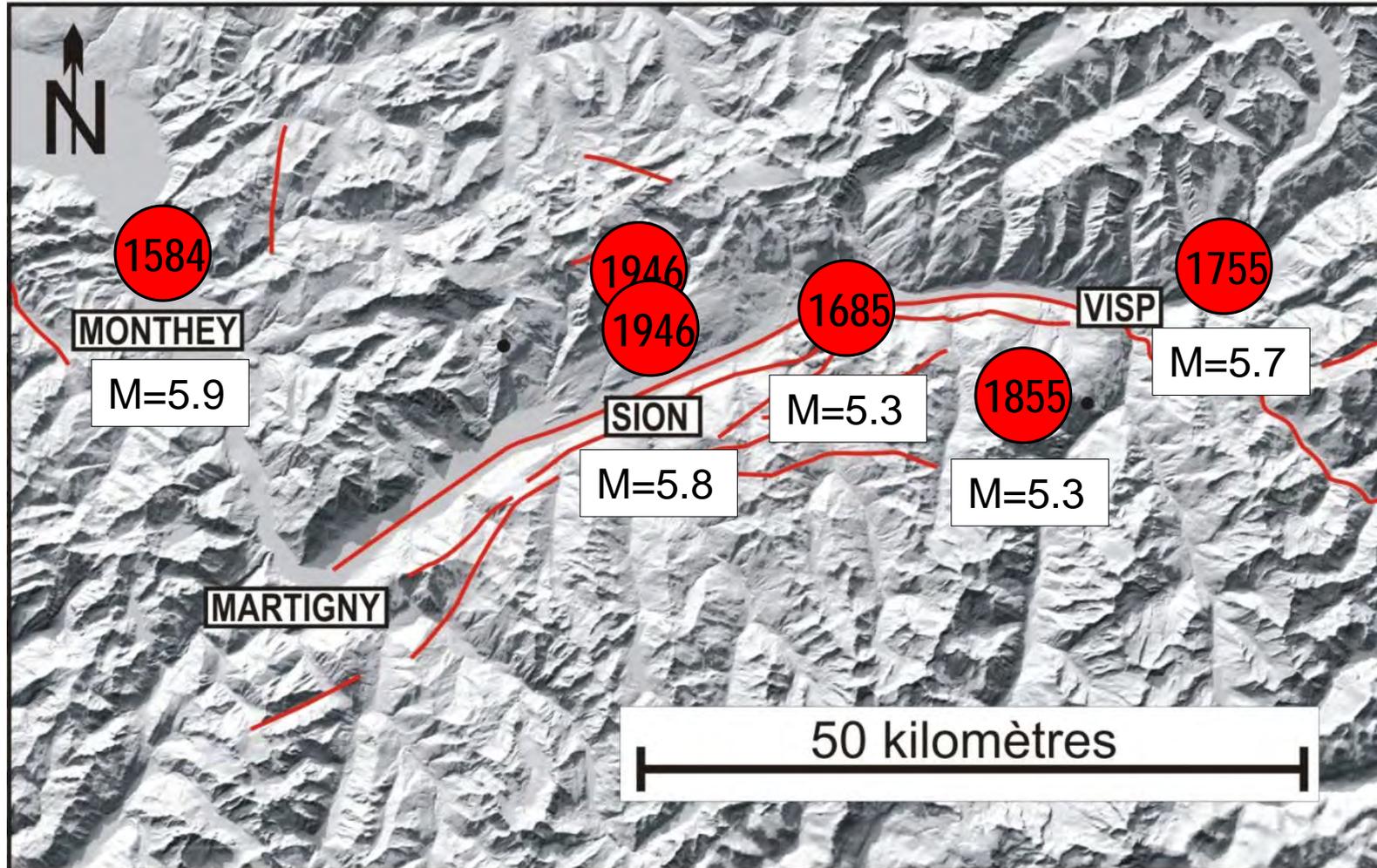
# 1. Erdbebengefährdung



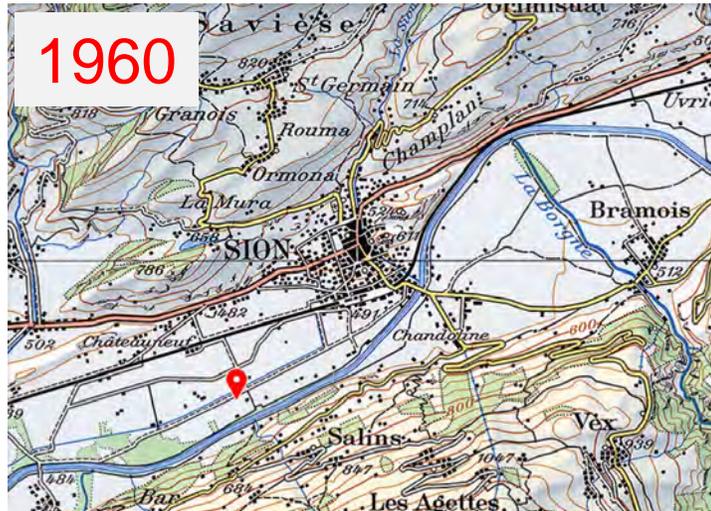
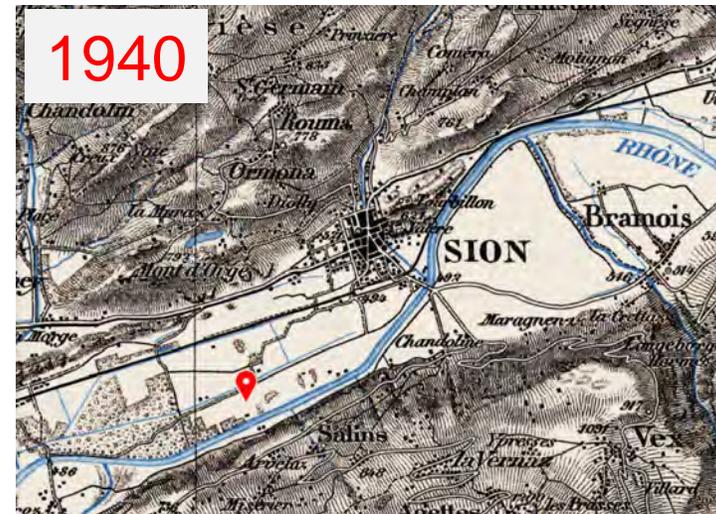
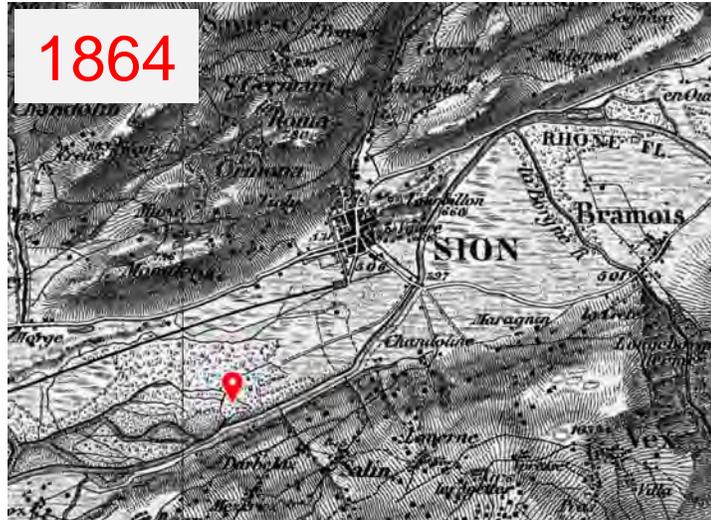
**Erdbebengefährdung**  
horizontale Beschleunigung bei 5 Hertz  
10 % innerhalb von fünfzig Jahren



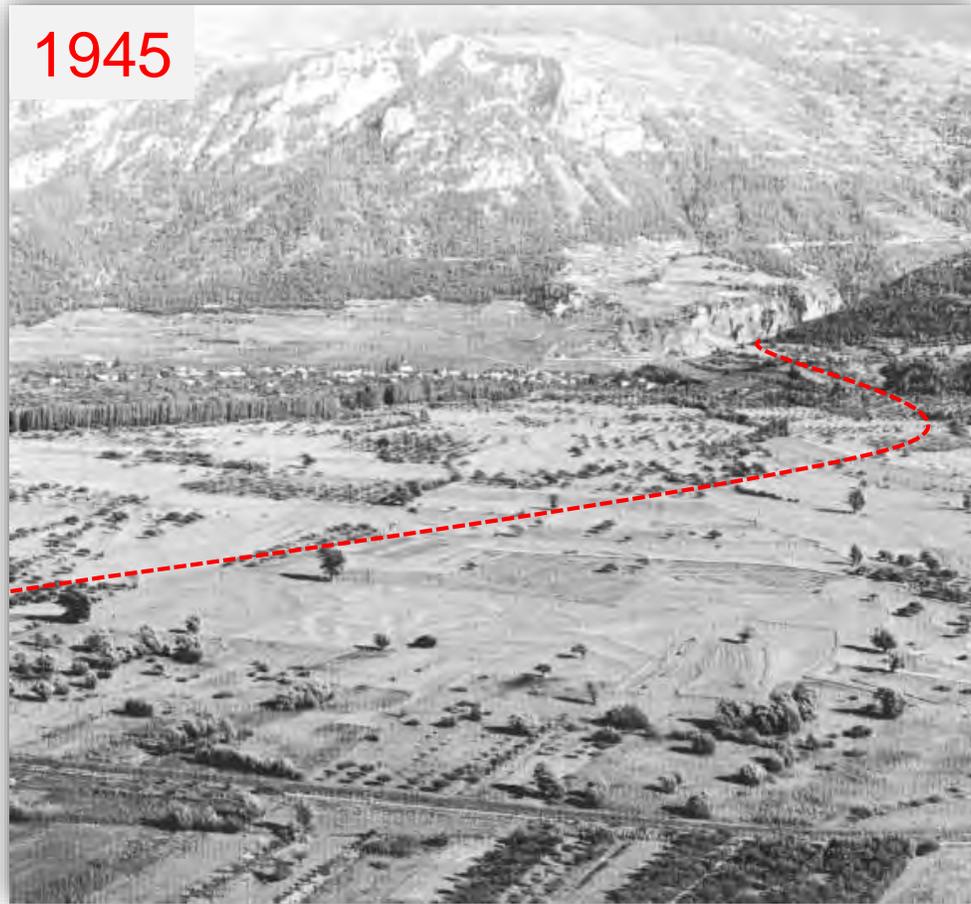
# Historische Beben im Wallis



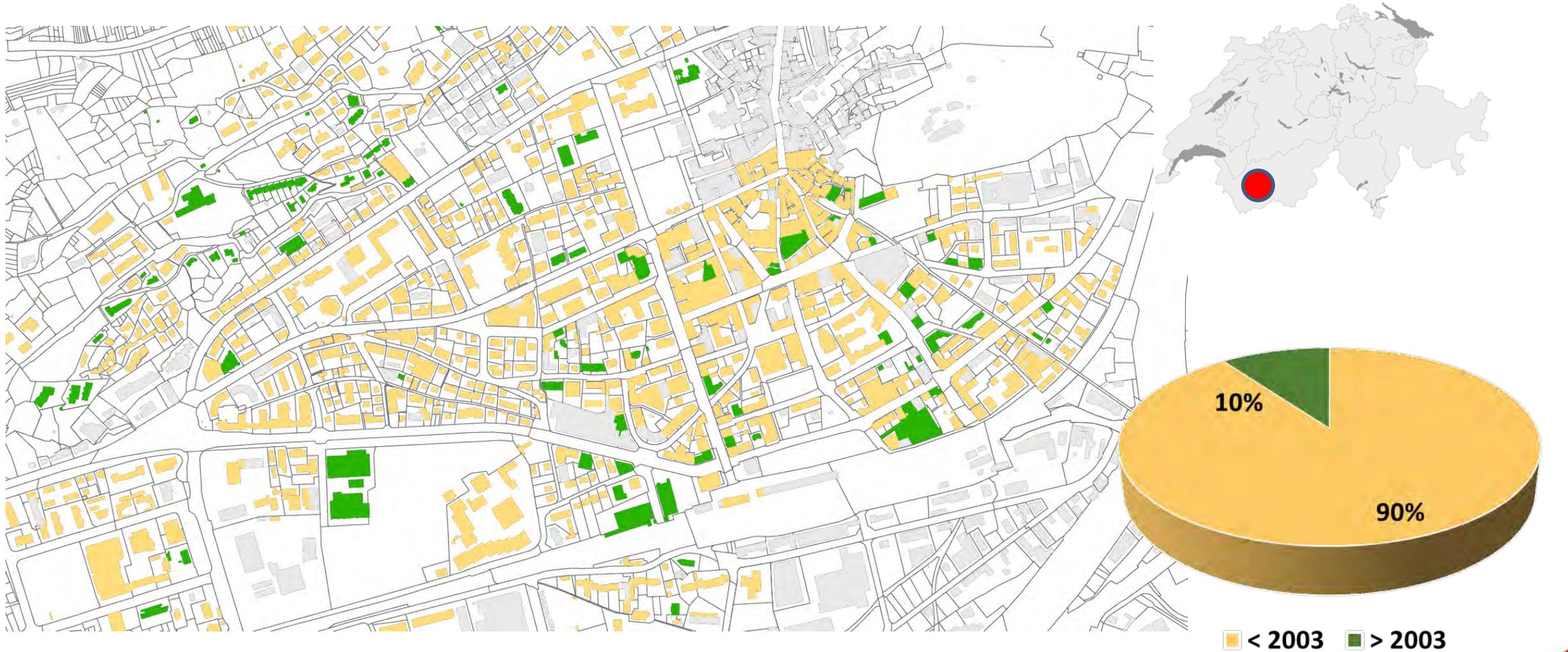
# Entwicklung Stadt Sitten



# Entwicklung Stadt Sitten

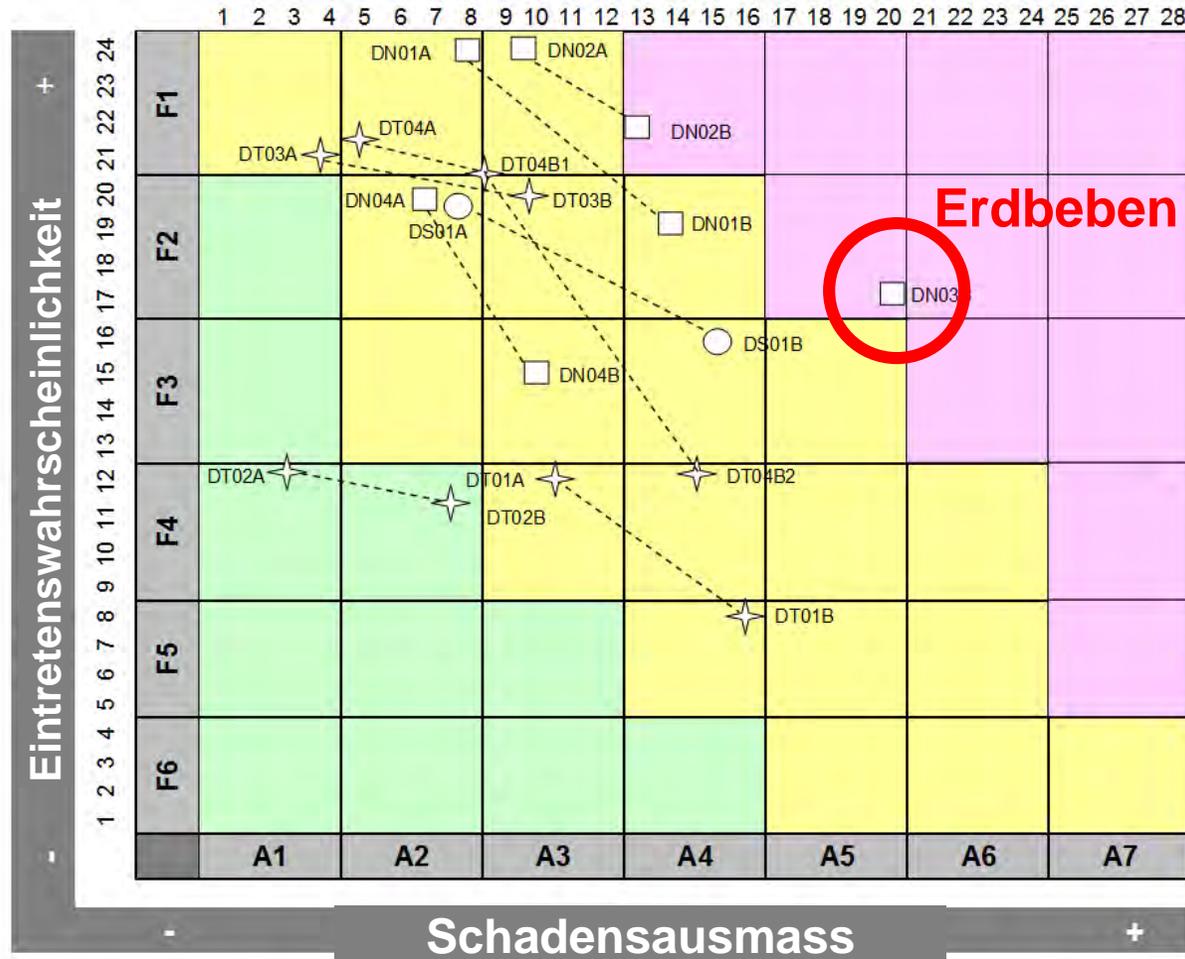


# Portfolio Gebäude (Stadt Sitten)



# 2. Wie bereitet sich der Kanton vor?

## Risikomatrix



# Rechtsgrundlagen

- 2005: Bauverordnung
- 2013: Gesetz  
über den Bevölkerungsschutz und die Bewältigung von besonderen und ausserordentlichen Lagen (GBBAL)
- 2013: Verordnung über den Bevölkerungsschutz und die Bewältigung von besonderen und ausserordentlichen Lagen (VBBAL)
- 2013: COCPITT Kantonales Konzept  
Vorbereitung und Einsatz bei einem Erdbeben



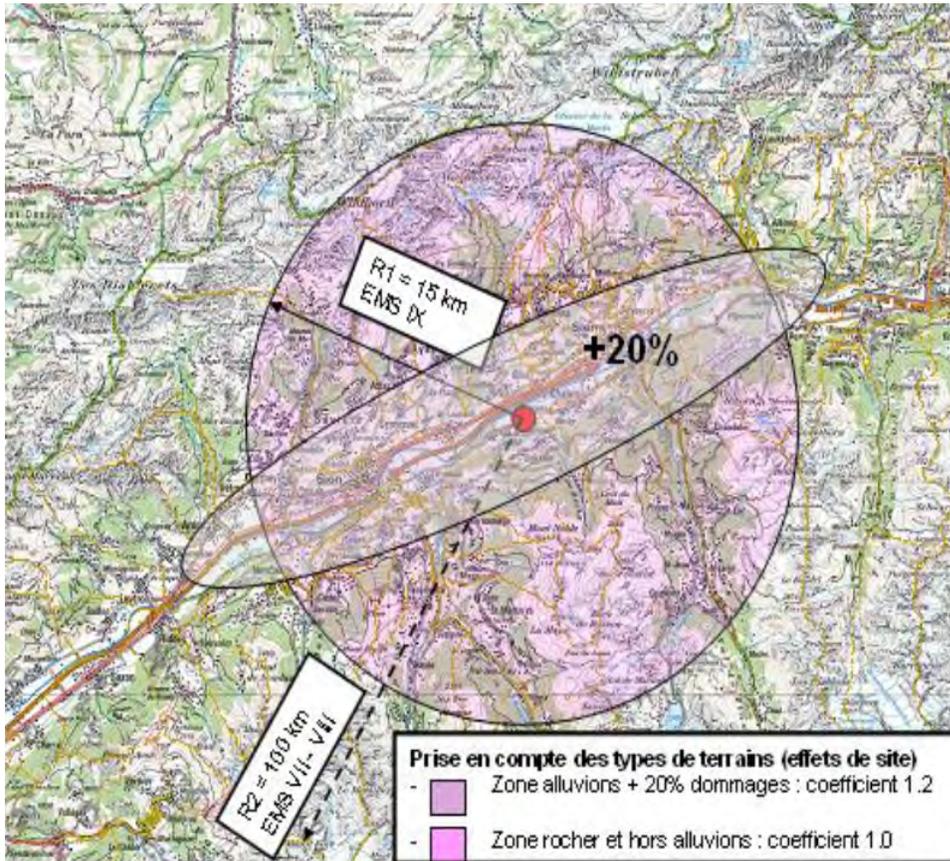
# Planung und Vorbereitung

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- ✓ Erstellen von potenziellen Schadenskarten
- ✓ **Ausbildung von Spezialisten für die Gebäudebeurteilung**
- ✓ Einsatzmittel planen
- ✓ Ausgangslagen nach einem Erdbeben erstellen
  - Sicherer Zugang zu den betroffenen Bereichen
  - Sichere Unterkünfte zur Verfügung stellen
  - Grundversorgung sicherstellen (Energie, Verpflegung, Medikamente)
  - Kompetenzen regeln

# Szenario

- Magnitude = 6.5 (Richter)
- Intensität = IX



		
Zerstörte Gebäude	Stark beschädigte Gebäude	Leicht beschädigte Gebäude
1609	2245	8457

# 3a) Gebäudebeurteilung

## i) Aufgaben:

- Nach einem Erdbeben:  
Begrenzung der **Anzahl Obdachlosen**  
(alternative Unterkünfte / Betreuungsplätze)
- Freigabe der Bewohnbarkeit:  
Sicherstellung eines angemessenen Schutzes  
von Menschenleben, unter Berücksichtigung  
**möglicher Nachbeben**
- Gebäude **BWK I / II**  
Priorität: Wohngebäude

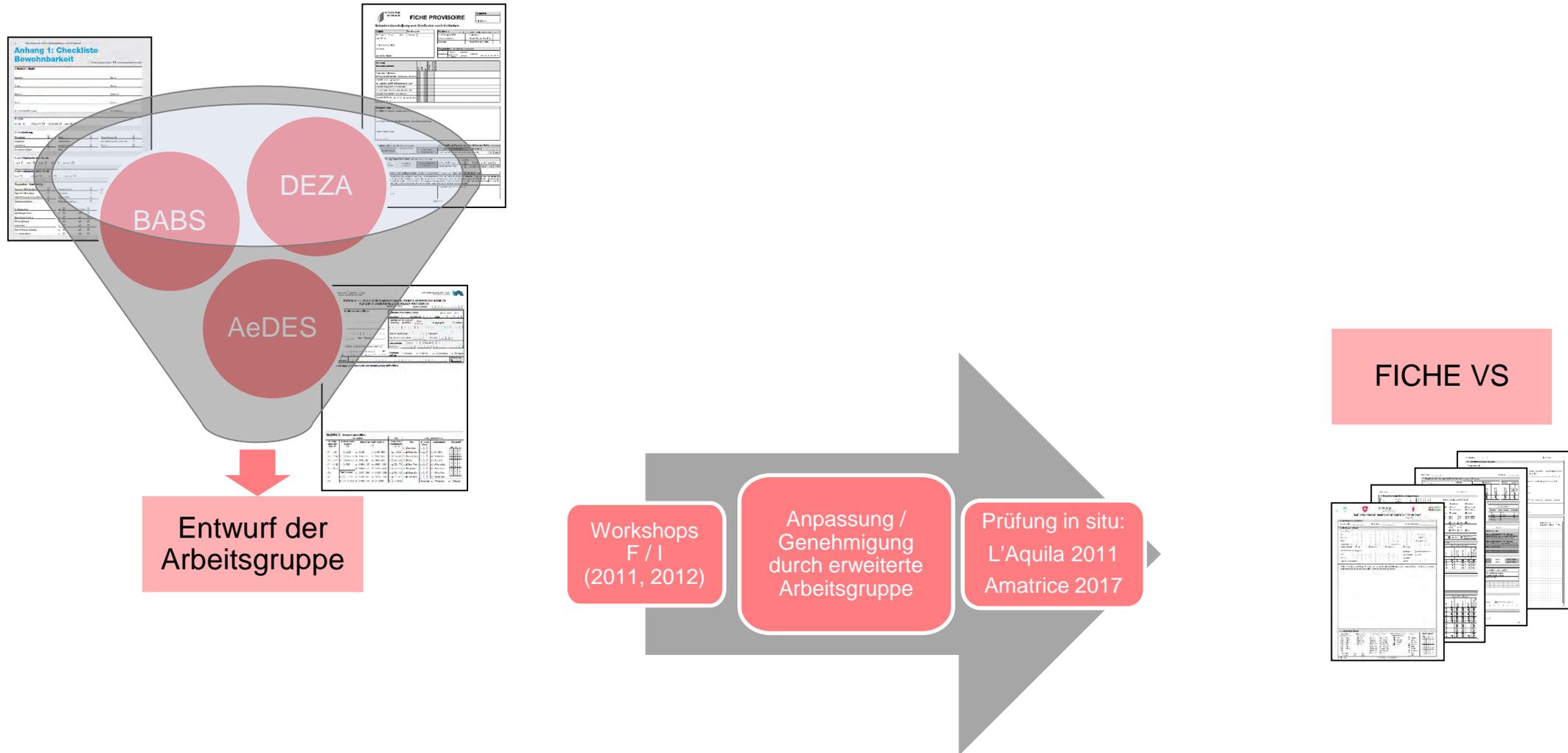
# 3a) Gebäudebeurteilung

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## ii) Zielsetzung:

- **Homogene** Bewertung der Bewohnbarkeit
- **Zügige** Methode
- **Anpassungsfähig** (allround - Bauweise)
- Durch Drittperson **nachvollziehbare** Beurteilung (controlling)
- Basierend auf einer **bewährten Methode**

# 3b) Methodik VS



# Philosophie

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- **BESCHREIBEND**

qualitative und quantitative Angaben der Schäden,  
für **tragende** und **sekundäre** Bauteile

- **PRÄDIKTIV**

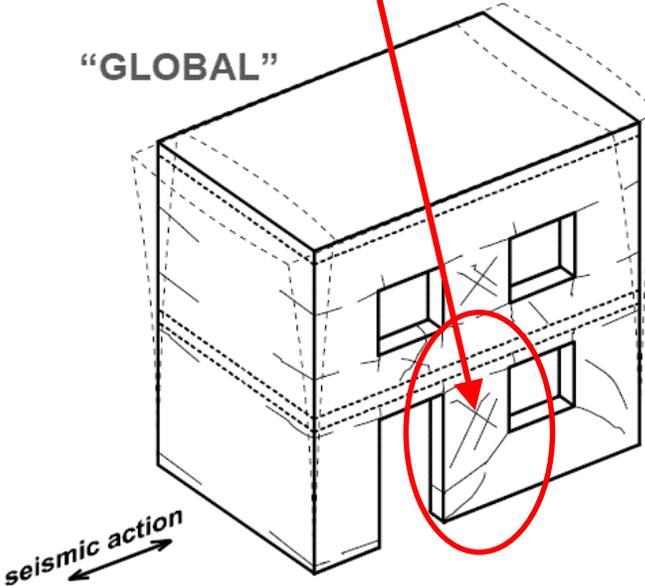
Beurteilung der **Restkapazität** für mögliche **Nachbeben**,  
basierend auf:

- das identifizierte Tragsystem
- die beobachteten Schäden
- das Ausmass des Hauptereignis

# Philosophie



“GLOBAL”



## BESCHREIBEND

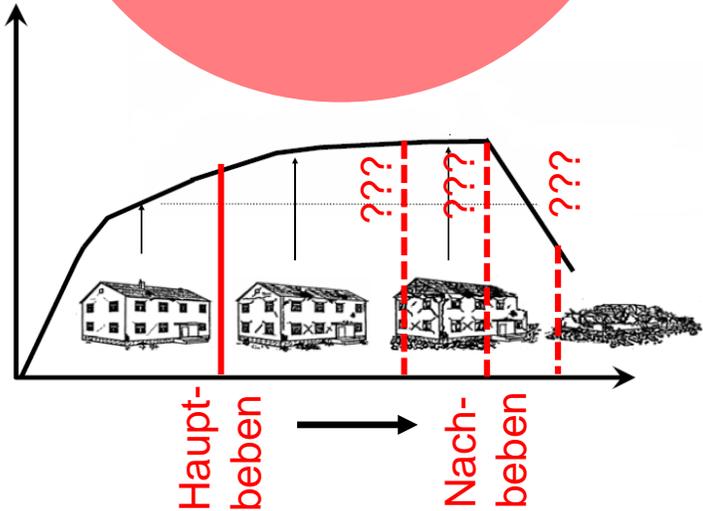
Beurteilung der Schäden



Beurteilung Tragverhalten (Restkapazität)

## PRÄDIKTIV

Sicherstellung des Schutzes von Menschenleben (Nachbeben)



# Fiche VS

**FICHE D'ÉVALUATION DE L'HABITABILITÉ DE BÂTIMENTS APRÈS UN SEISME**

Ref. évènement : \_\_\_\_\_

**0 - Identification de l'inspection**

Code de l'équipe : \_\_\_\_\_ N° de la fiche : \_\_\_\_\_ Date relevé (jour, mois, année) : \_\_\_\_\_

**1 - Identification de l'objet**

Nom du bâtiment : \_\_\_\_\_ N° EGID : \_\_\_\_\_ - indice ( / ) \_\_\_\_\_

Rue : \_\_\_\_\_ N° de rue : \_\_\_\_\_

Commune : \_\_\_\_\_ CP : \_\_\_\_\_

Localité : \_\_\_\_\_ Folio : \_\_\_\_\_ N° de parcelle : \_\_\_\_\_

Coordonnées CH : E \_\_\_\_\_ N \_\_\_\_\_ GPS (WGS 84) : \_\_\_\_\_

Position du bâtiment :  isolé  à l'intérieur  à l'extérieur  à l'angle

**Identification de l'accompagnant**

Nom : \_\_\_\_\_  Propriétaire  Délégué avec procuration

Prénoms : \_\_\_\_\_  Adjointe/bureau  Autre

Localité : \_\_\_\_\_

Journalet au (n° de téléphone) : \_\_\_\_\_  Autre

**2 - Description du bâtiment**

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# Vorgehensweise

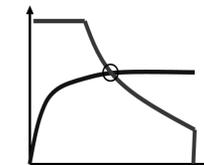
1. Analyse der sichtbaren Schäden



2. Änderungen am Tragsystem



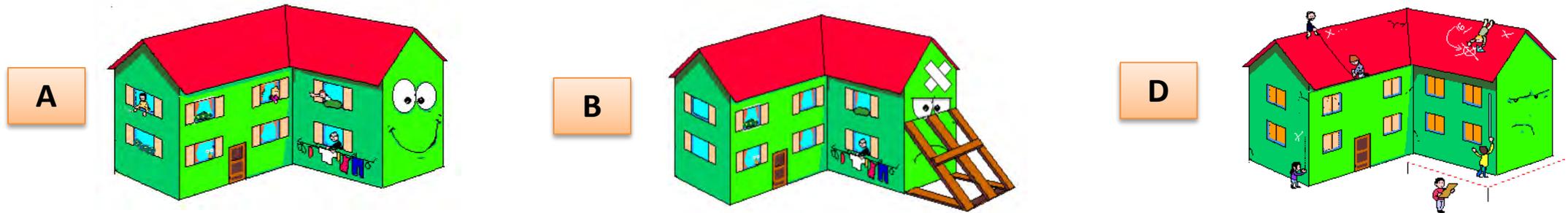
3. Einfluss auf das globale Tragverhalten  
(=> Restkapazität)



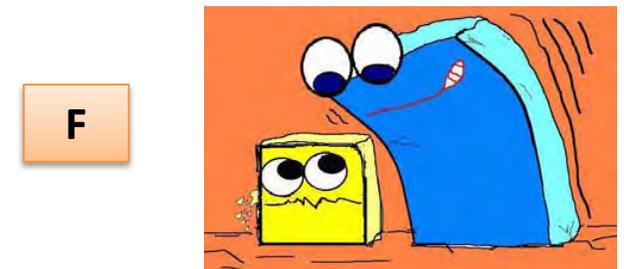
**BEURTEILUNG DER BEWOHNBARKEIT**



# Ergebnis der Bewertung



A	<input type="radio"/>	Gebäude BEWOHNBAR
B	<input type="radio"/>	Gebäude VORÜBERGEHEND NICHT BEWOHNBAR (ganz oder teilweise), jedoch BEWOHNBAR nach Ausführung der Sofortmassnahmen (siehe Abschnitt 9c)
D	<input type="radio"/>	Gebäude VORÜBERGEHEND NICHT BEWOHNBAR bis nach Zusatzuntersuchung (siehe Abschnitt 9d)
E	<input type="radio"/>	Gebäude UNBEWOHNBAR
F	<input type="checkbox"/>	Gebäude UNBEWOHNBAR wegen äusseren Umständen



# Merkmale Gebäudebeurteilung

- **Beurteilung der Bewohnbarkeit:**  
dient als Stellungnahme für  
die zuständige Behörde



- **Schlussentscheidung + Markierung:**  
Zuständigkeit der Behörde



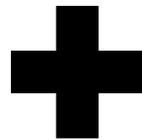
# Neue Methodik CH

 **Handbuch BABS**

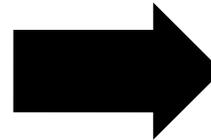
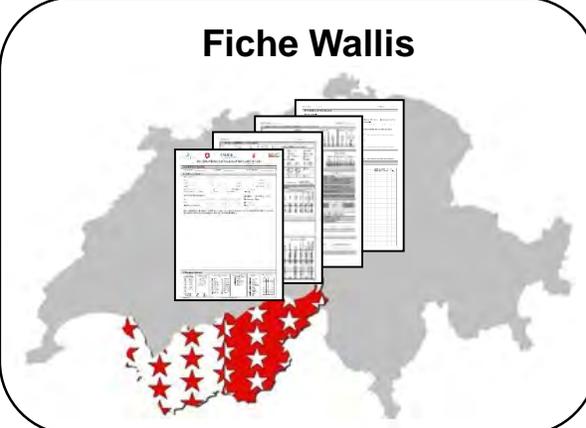
Handbuch  
BABS, VKF, SVV



Handbuch zur Gebäudebeurteilung nach Erdbeben



**Fiche Wallis**

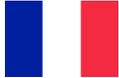


 **BABS Bundesamt für Bevölkerungsschutz**

**Fiche Schweiz**



# 3 c) Ausbildung

- 3 - tägiger Kurs (inkl. Klausur)
- Vorkenntnisse:
  - Bauingenieur
  - Fundierte Kenntnisse im Erdbebeningenieurwesen oder Nachdiplom CAS
- Angebot Ausbildung:
  - seit 2014 (französisch) 
  - seit 2018 (deutsch) 



# Ausbildung



Haute école d'ingénierie et d'architecture Fribourg  
Hochschule für Technik und Architektur Freiburg



CANTON DU VALAIS  
KANTON WALLIS

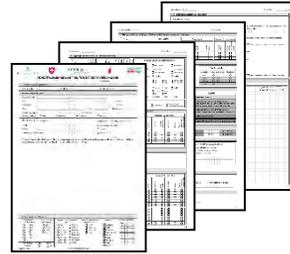
Hes·SO VALAIS  
WALLIS

Haute Ecole d'Ingénierie  $\pi$   
Hochschule für Ingenieurwissenschaften



# Grundlagen für Spezialisten

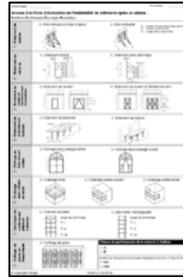
**Bewertungsbogen**  
**4 A4-Seiten**



**Ausführliches**  
**Benutzerhandbuch**



**Anhang SoMa**  
**1 A4-Seite**



**Ausführliches**  
**Handbuch SoMa**

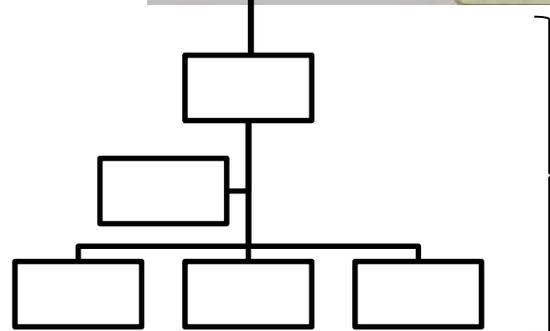
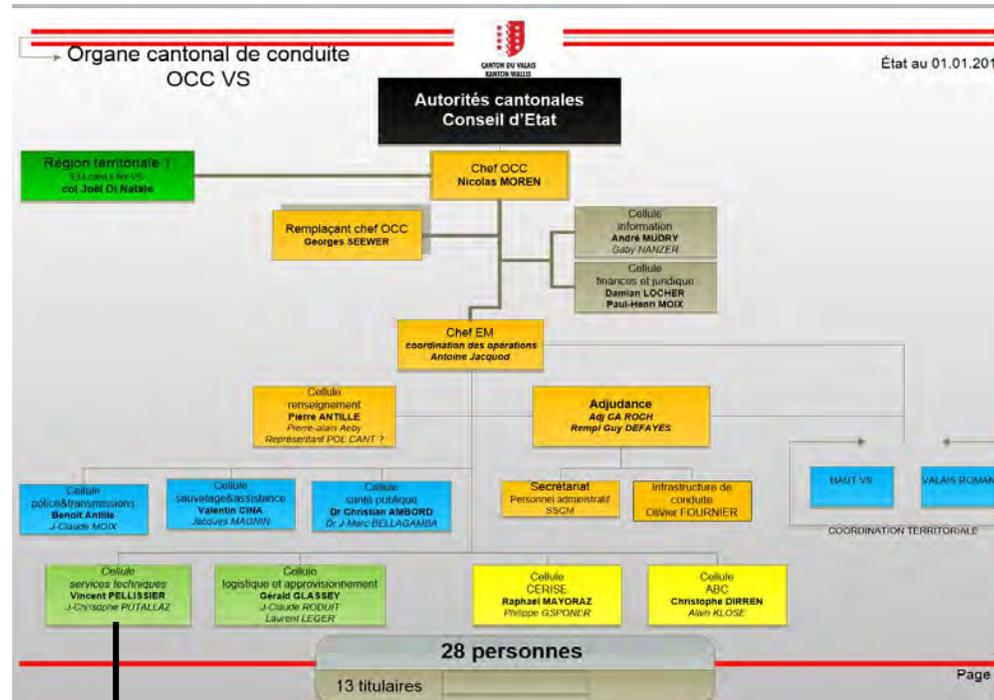


**Virtual Tour**  
**Übungstool im virtuellen**  
**Raum**



# 3d) Einsatz

## Kantonales Führungsorgan KFO



Gebäude-  
beurteilung

# Einsatz



# Einsatz

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- Zu untersuchende Gebäude in der Notfallphase: **> 10'000**
- Zeitbedarf für eine Gebäudebeurteilung: **1.5 – 2h**
- Kapazität pro Team / Tag: **5 - 6 Gebäude**
- Nötige Ressourcen:  
**60 Teams: 150 ausgebildete Spezialisten**

# Danke für Ihre Aufmerksamkeit



# Gebäudebeurteilung nach einem Ereignis

Fabrizio D'Urso, Ausbilder Kanton Wallis

