flash flood in Switzerland 2005

4th World Water Forum Mexico

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flash flood 21\textsuperscript{th} – 23\textsuperscript{th} august 2005

precipitation:
up to 300 liters per sqm in 48 h
damage area august 2005

loss amount: 2 billions $ ≈ 5 % annual public spending
August 2005, impressions during the big flood

Bern, capital of Switzerland, 2005
static flooding
relevant damage
parameter: water depth

large areas affected
dynamic flooding

wood, sand and stones: transported by water
river bank erosion

high damage  leading to destruction

defence
- river training measures
- deep foundations
slides and mudflow

several cases with complete destruction of buildings
debris flow

Large mass movements with high velocities

Damage parameter: Height of deposition
Vulnerability: Danger for life

Flood Statistics of Switzerland 1972-2005

Out of 64 causalities
23 inside the house 41 outside
26 wrong behavior
13 in the car
9 camping

Aug. 2005 6 victims
Average. 2 Victims/year
all aspects of sustainable development must be taken into account

federal strategy

Social aspects

environmental aspects

economical aspects

www.bafu.admin.ch / www.planat.ch

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example: flood protection Engelberger Aa

hazard map
before measures

hazard map
after realisation of measures
example: flood protection Engelberger Aa

Emergency relief channel
(low vulnerable area)
Ennetbürgen / Buchs NW
Emergency overfall with inclined elements
integrated risk management

Preparation
- Organisation
- Resource planning
- Deployment planning
- Insurance

Prevention
- Land Use Planning
- Technical Measures
- Biological Measures

Assessing hazards and risks

Event
- Warning
- Information
- Alert
- Rescue
- Damage mitigation
- Information/Instructions

Intervention
- Definitive repair
- Reconstruction
- Strengthening of Resilience
- Financing

Response
- Provisional Repair
- Supply and disposal
- Communications
- Transport systems
- Financing
- Emergency legislation

Recovery
- Provisional Repair
- Supply and disposal
- Communications
- Transport systems
- Financing
- Emergency legislation

Event Analysis

Evaluation of the event

Reduction of vulnerability

Limitation of damages
Swiss strategy

1. Reducing damages

2. Maintenance
   of rivers and protection structures
   to keep present safety level

3. Spatial planning measures
   to avoid an increase of damage potential

   • keep free high endangered areas (red)
   • adapted construction and local protection (permanent or mobile) in medium and low endangered areas (blue and yellow areas)
   • restricted land use in areas necessary for retention and emergency measures
Swiss strategy

4. Emergency Planning
   Being prepared for worst case

5. Insurance
   To enable reconstruction after damages occur
conclusions

implementation of integral risk management

- be prepared know the dangers
- adapted landuse
- prepare for extreme events
- minimize vulnerability of infrastructure
- plan space for extreme events
- optimize warning
- prepare civil defence service (emergency)
- build robust and non-sensitive protection-systems
- Be aware of uncertainty in nature

- Swiss flood protection strategy is proved + tested
- applicable everywhere