Natural hazard fatalities in Switzerland from 1946 to 2015 [1]

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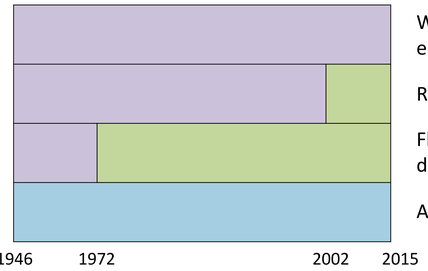
INTRODUCTION

- Natural hazard events caused worldwide 68'000 deaths/year over the last 10 years [2]
- Switzerland is prone to natural hazards which regularly cause fatalities
- No complete Swiss database

METHODS

- Creation of a new database with all natural hazard processes causing **fatalities** for **1946-2015** in Switzerland
- Using two **existing databases** and **newspaper search**

Source and used years:



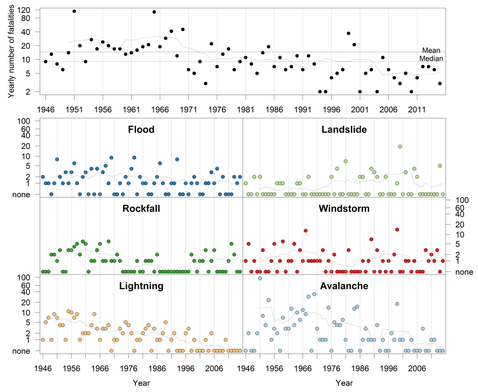
Swiss destructive avalanche database [3]	Swiss flood and landslide damage database[4]	Newspaper search "Neue Zürcher Zeitung"

- Selection of keywords and validation with the years 1986-1995

⇨ Our aim: Creation of a data basis for analysis (i) to help authorities to **better identify higher risk demographic groups and regions** and (ii) to **reduce the number of victims**

- **Not included**: victims which exposed themselves to an important danger on purpose (e.g. **high risk sports**) or leisure time activities, which take place in potential **dangerous environment** (e.g. canyoning, mountaineering, Alpine touring etc.)

RESULTS

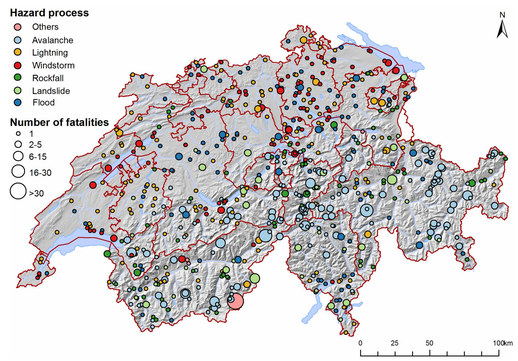


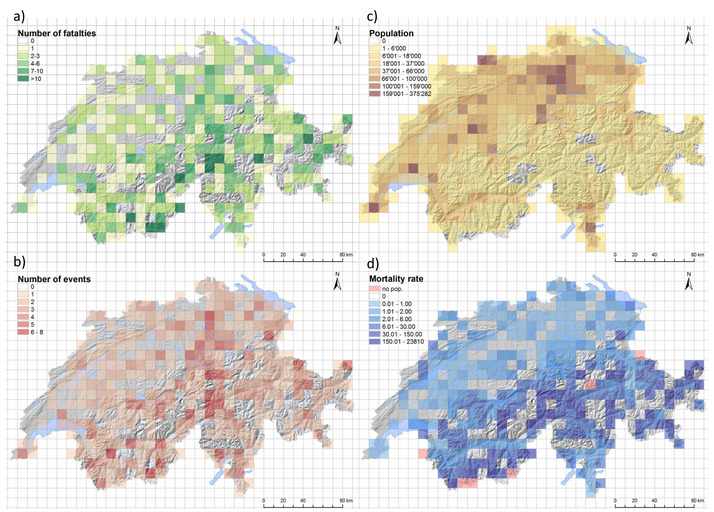
- 635 natural hazard events causing **1023 fatalities**
- Avalanches 37%, lightning 16%, flood 12%, windstorm 10%, rockfall 8%, landslide 7%, other processes (ice avalanche, etc.) 9%
- **Distinct decrease** of natural hazard fatalities over the last 70 years
- Annual mean: 14.6 fatalities, median: 9 fatalities

Figure: Annual frequency of fatalities. Grey lines: 10-year running mean

- Homogeneous distribution
- More fatalities in the **Alps** compared to the flat Swiss Plateau (northern part of Switzerland)
- More multi-fatality events in the Alps

Figure: Spatial distribution of fatalities





- Highest natural hazard mortality rate in the high alpine parts

Figure: Spatial distribution of a) number of fatalities, b) number of events c) population, d) mortality rate (fatalities per million population per year) using a 10x10km raster grid.

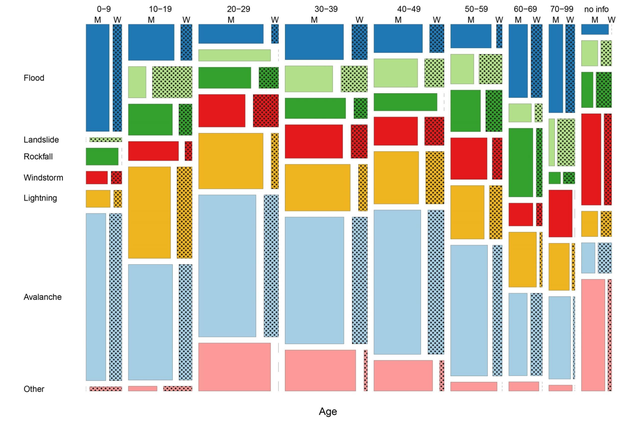


Figure: Mosaic plot of fatality process, age and gender.

- The average age of the victims was approximately **36 years** and about **75%** were **males**.

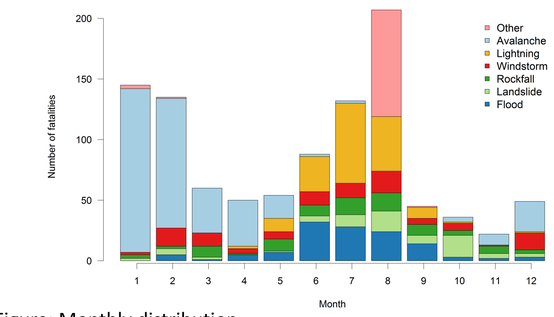


Figure: Monthly distribution

- Two distinct peaks: in winter (mostly avalanches) and summer (mostly flood, lightning)

CONCLUSIONS

- Significant decrease in yearly natural hazard fatalities
- Mortality rate in Switzerland lower compared to abroad
- Traffic accidents in Switzerland cause 60 times more fatalities than natural hazards

[1] Badoux, A., Andres, N., Techel, F., Hegg, Ch. (2016). Natural hazard fatalities in Switzerland from 1946 to 2015. Nat. Hazards Earth Syst. Sci., 16, 2747-2768.
[2] Insurance Information Institute (2016). http://www.iii.org/fact-statistic/ catastrophes-global, access: 27.6.2016.
[3] http://www.wsl.ch/fe/gebirgshydrologie/HEX/projekte/schadendatenbank/index_EN
[4] http://www.slf.ch/ueber/organisation/warnung_praevention/projekte/unfallberichte/index_EN
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