Swiss Danger Maps – Rockfall in Frenieres-sur-Bex (Canton of Vaud, Switzerland)

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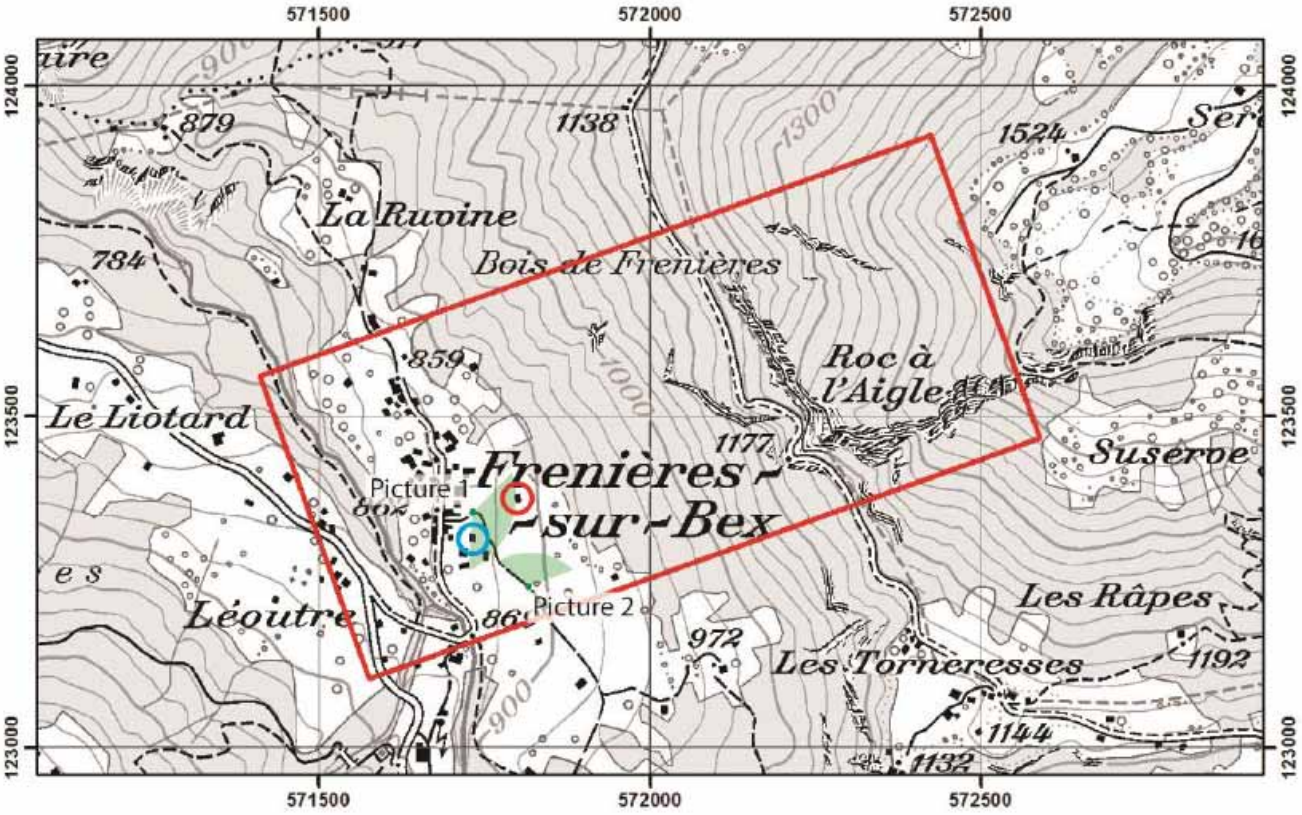
bjective

ate a danger map for Frenieres-sur-Bex for rockfall using modelling

tudy area



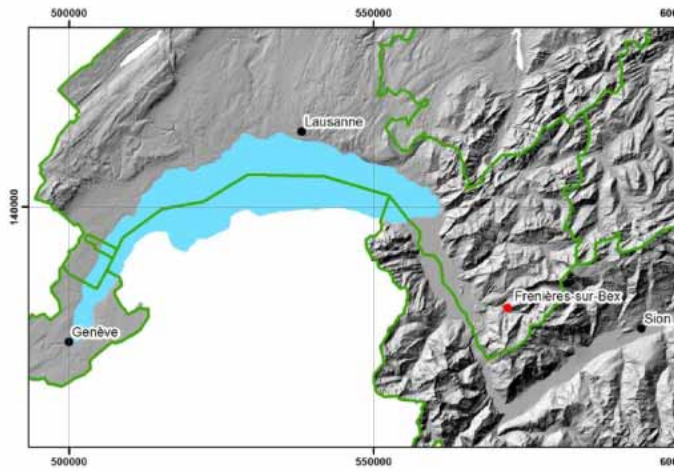


Figure 1: Localization of the study area (coordinates: Swiss metric grid, data: ©Swisstop

Data

- ology map
- rial photo
- pographic map
- AR DEM
- ld observation (photos)

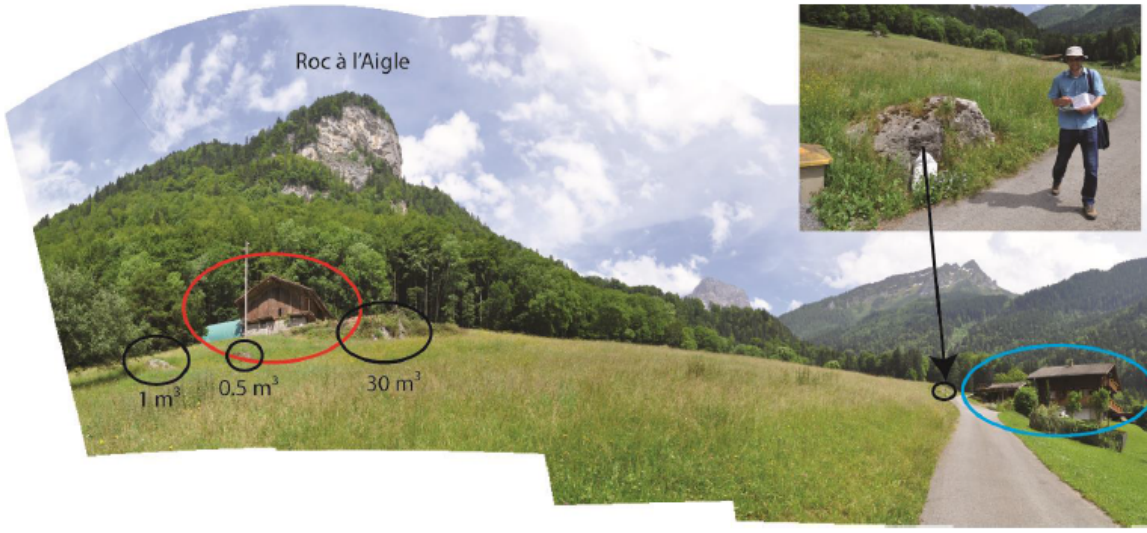


Figure 2: Panoramic view towards the East (picture 1). All blocks are massive limestone

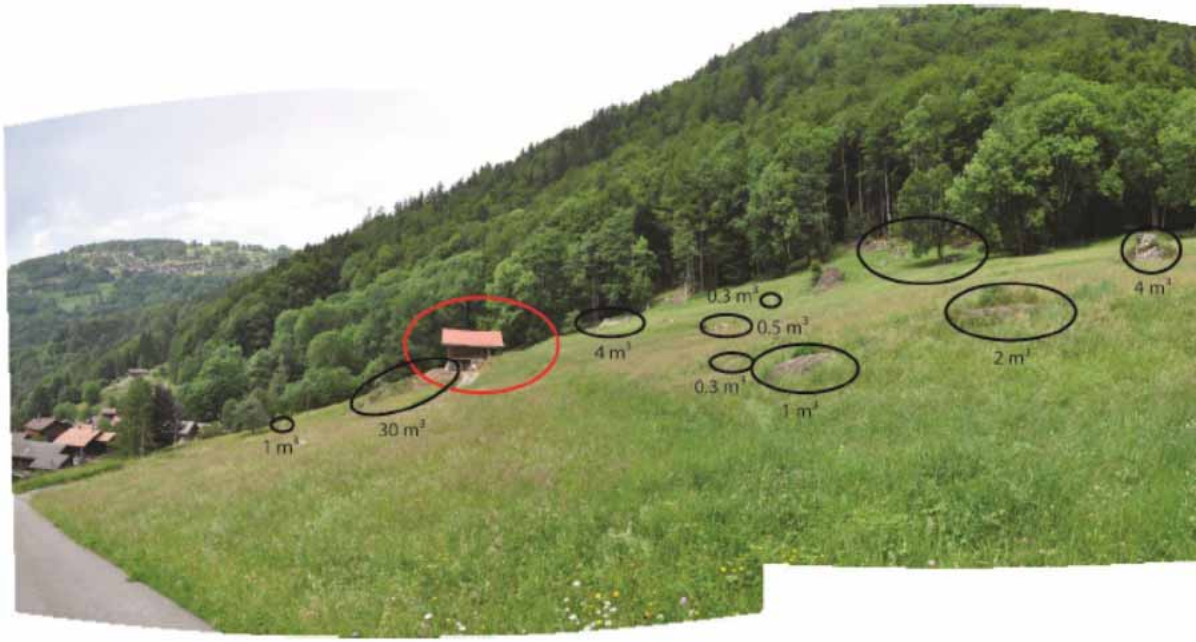


Figure 3: Panoramic view towards the North (picture 2). All blocks are massive limeston

Methodology

istered the boulders in ArcGIS, based on their position in the photos

mated the characteristic blocks with 30, 100 and 300 years return period

pared a shapefile for Rocky3D by dividing the area in homogeneous zones:

- Pasture
- Forest
- Built area
- Outcrop

nsformed the shapefiles resulted in ASCII grids, using Pimp My Rockyfor3D

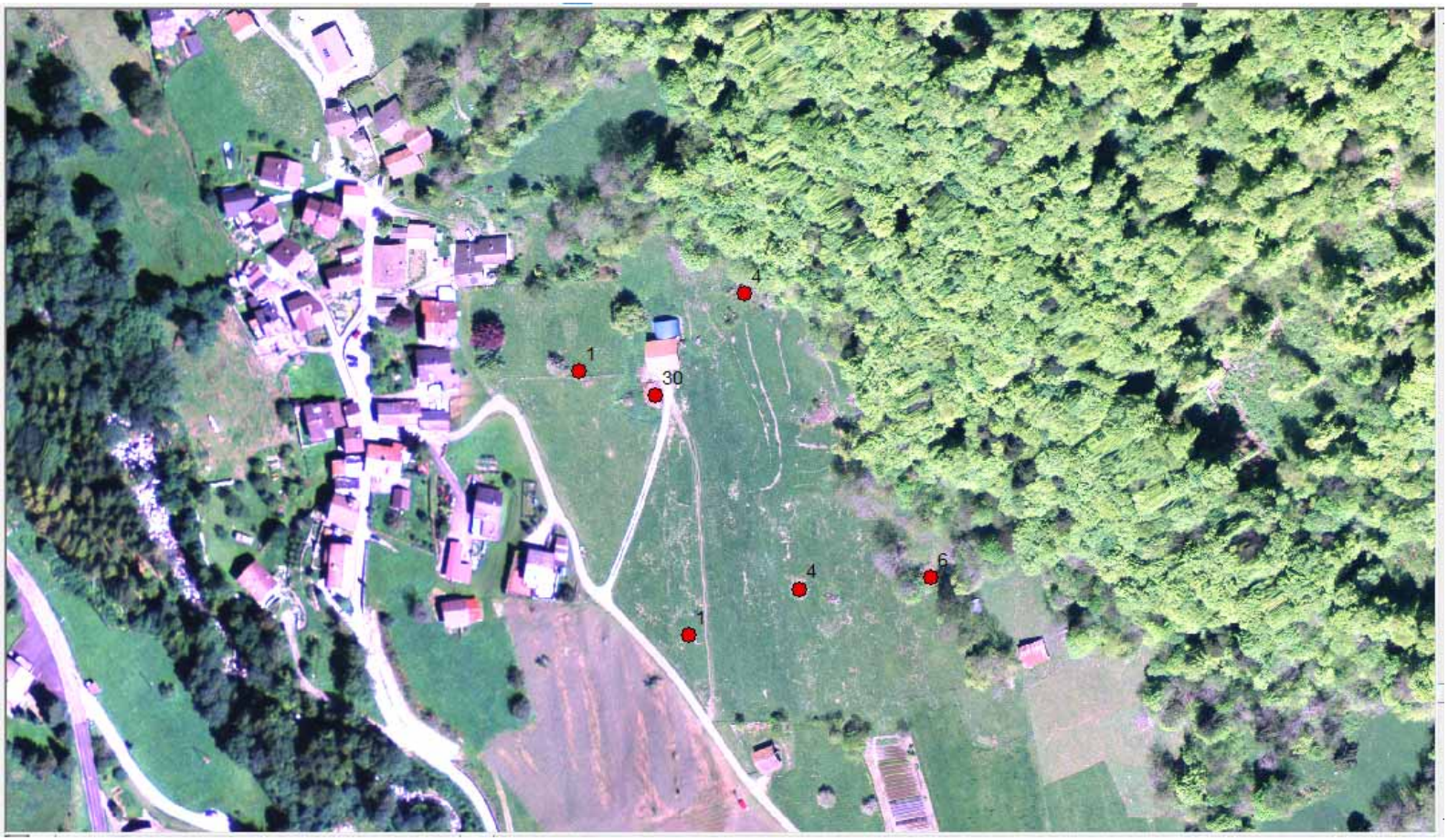
formed a trajectographic study in Rockyfor3D for 3 scenarios:

- 30 years return period
- 100 years return period
- 300 years return period

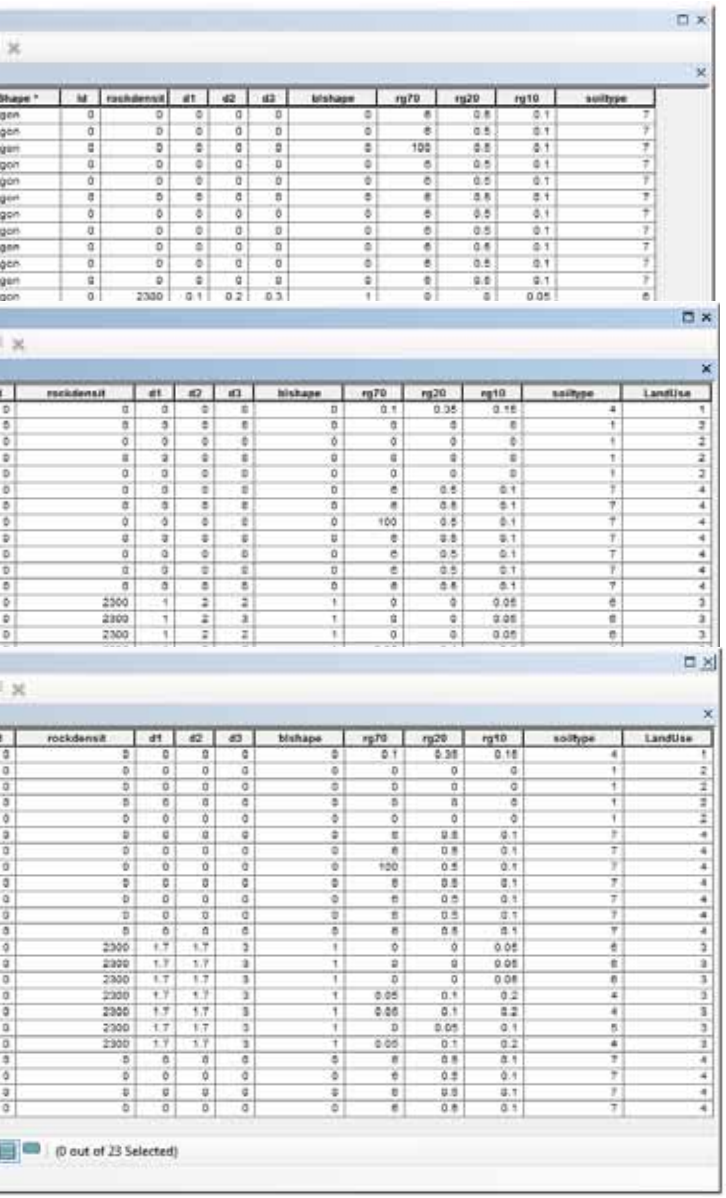
w an intensity map for each scenario

w the hazard map

Registering the boulders in GIS, based on their position in the photos



Estimation of the characteristic blocks with 30, 100 and 300 years return period

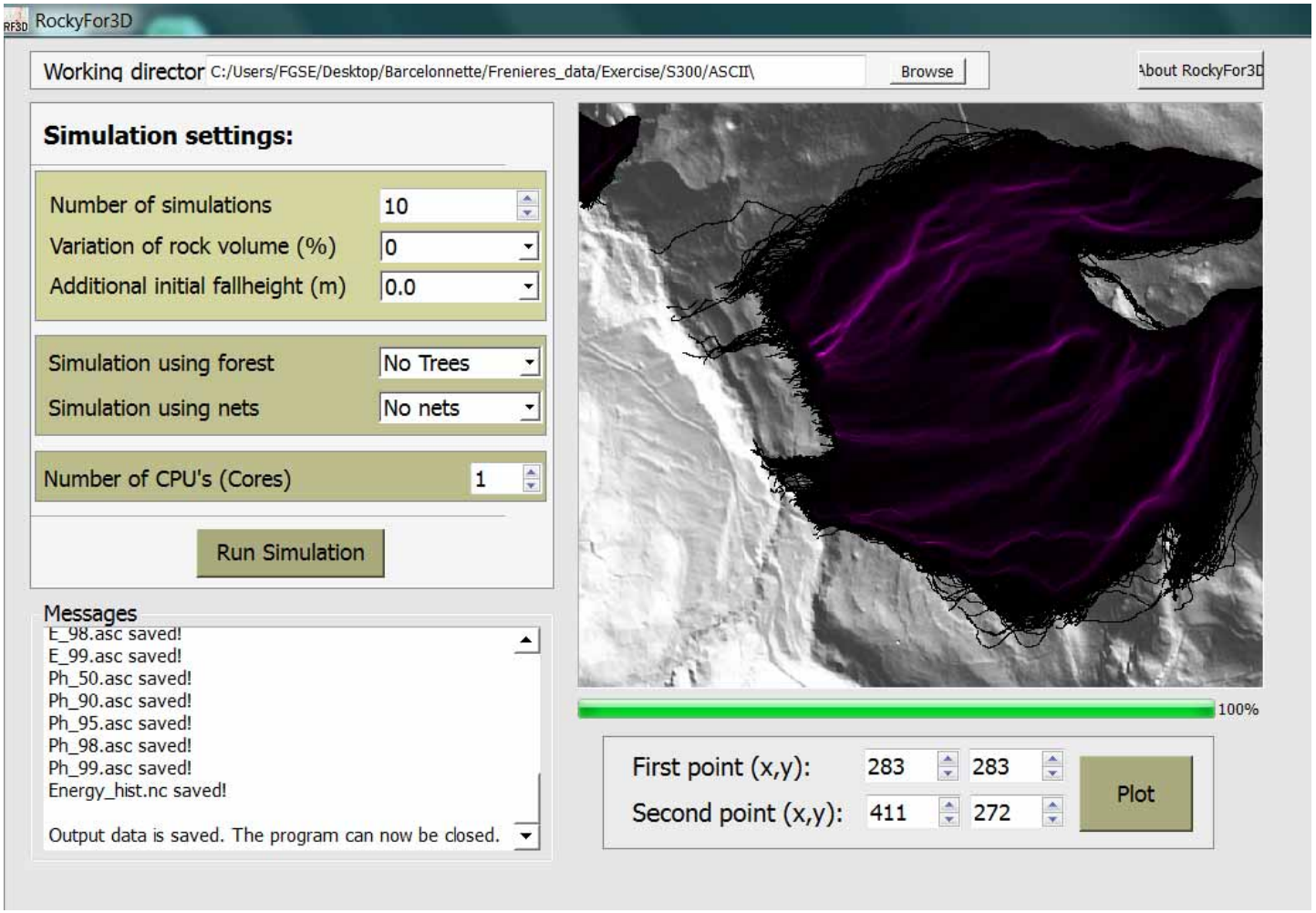


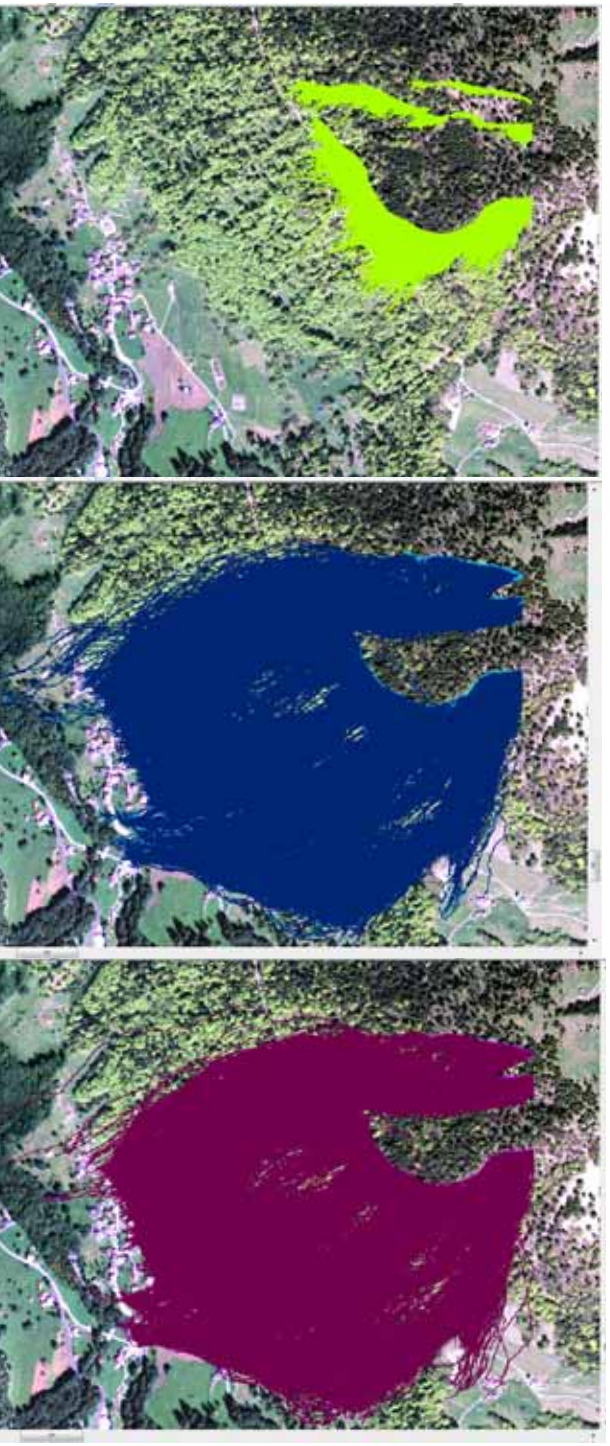
- d1 – height
- d2 – width
- d3 – length
- d1…d3 – based on the volume and on t photos
- rg70, rg20, rg10 – roughness (m) based the guidelines given
- Soil type – based on the aerial photogra and on the guidelines given

Preparation of a shapefile for Rocky3D by dividing the area in homogeneous zones

Land use	Code
Forest	1
Pastures	2
Outcrop	3
Built-up area	4

Modeling in Rockyfor3D





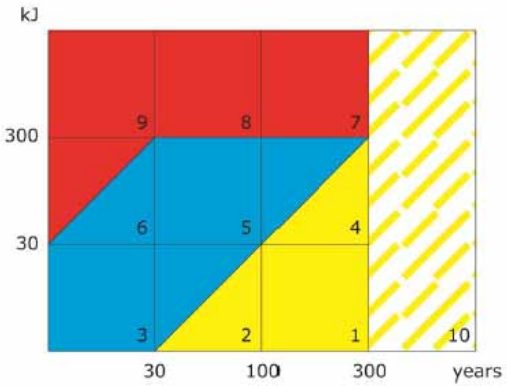
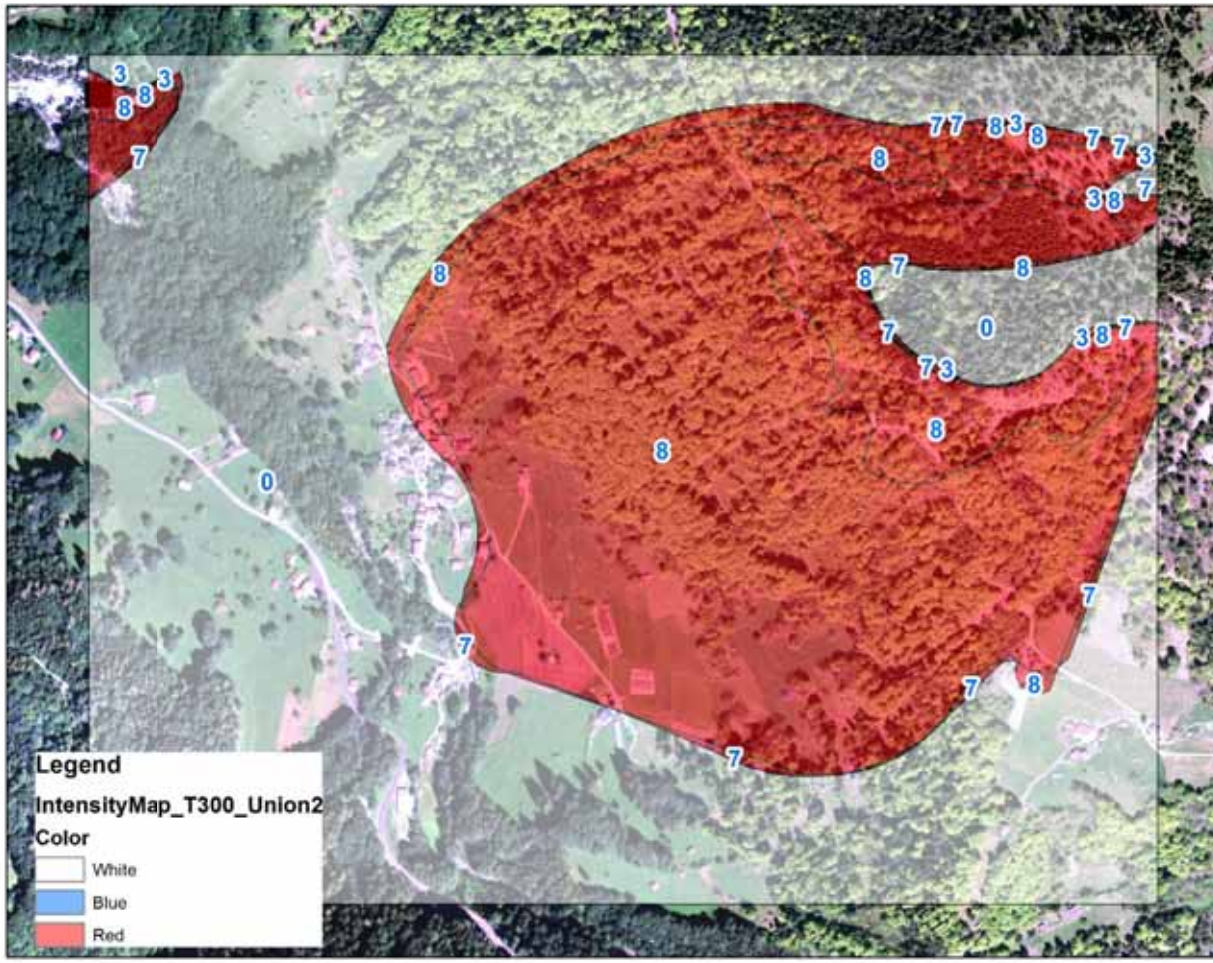


Figure 6: Swiss danger matrix

Results a discussio



Conclusions

- The method is a conservative one and it overestimates the risk
- The values obtained show the presence of a high rockfall risk in the study area
- High risk due to high present exposure compared with past exposure (1870)

Thank you!