

CARTOZONING From Risk Mapping to Risk Zoning

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Site : large avalanche of Tunnel of Mont-Blanc

(= Glaciers avalanche or Aiguille du Midi avalanche)
Chamonix Valley – France
Overall view of catchment areas and avalanche paths (gradient : 2 000 meters +)

1st overlay : risk mapping

(a preliminary avalanche cartography)

Analysis of the fine topography (potential start zones, paths and trajectories, extensions)
Field work : damage to vegetation and geomorphological traces, ...
with a multidisciplinary team : experts in nivology, glaciology, dendromorphology...

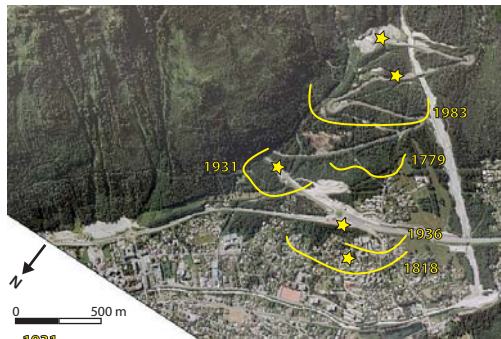


- main trajectory
- punctual departure, secondary flows
- usual extension
- probable maxi extension
- aerosol avalanche + airblast
- dense snow avalanche



2nd layer : historians contributions

Historical records , combined with the first analysis , confirm exceptional trajectories and extensions : 05/1779, 02/1795, 03/1818, 05/1843, 02/1844, 1906, 1910, 1914, 1923, 1924, 03/1931, 04/1936, 1960, 03/1971, 02/1978, 02/1980, 1981, 05/1983, 02/1999



1931 maxi known extensions (+ year) damages



archives winter 1818

3rd layer : Avalanche map / risk map

From ordinary phenomena to exceptional phenomena
Definition according to intensity and/or frequency, with informations of 1st and 2nd layers , and eventually a numerical modeling.



- aerosol – powder avalanche + airblast effects
- dense heavy snow avalanche
- high hazard (high intensity + high or average frequency)
- moderate hazard (average intensity)
- exceptional hazard (high or average intensity + rare frequency) : disasters only occurring every several centuries

4th layer : risk zoning

(the regulatory zoning)



4 colors for 4 zones

- red zone = high risk (building prohibited)
- intermediate zone = moderate risk, with progressive transition (architectural constraints...)
- yellow zone = extreme phenomena
- white zone = presumed without risk
- high – stake targets/vulnerabilities : international road, school...

Conclusion

Cartography + zoning = a vital challenge for the spatial management of avalanche risk

For authorities : a finished product, immediately usable, with a constant « double view-point ».