

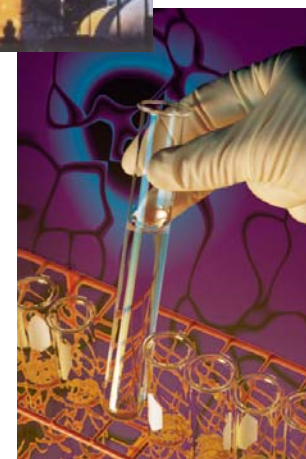
Technical risk maps : the way of swiss cantons



Environment
Toxic release
Explosion
Pathogen
Aircraft risks



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o Problems facing the authorities

- Comparing and Prioritizing risks arising from different activities (production plants, storage, road or rail transport, pipelines etc.)
 - Risk estimations as well as the available data may differ considerably
- Cumulative risks
 - For example air crash into hazardous facilities
- Transit transports are difficult to treat quantitatively
 - Amounts, types of dangerous goods are not known, lack of truly reliable statistics
- Conflicts between risk-inducing activities, sitting and land-use planning
 - New risk exposure situation

Needs of mapping technical/natural risk/hazards

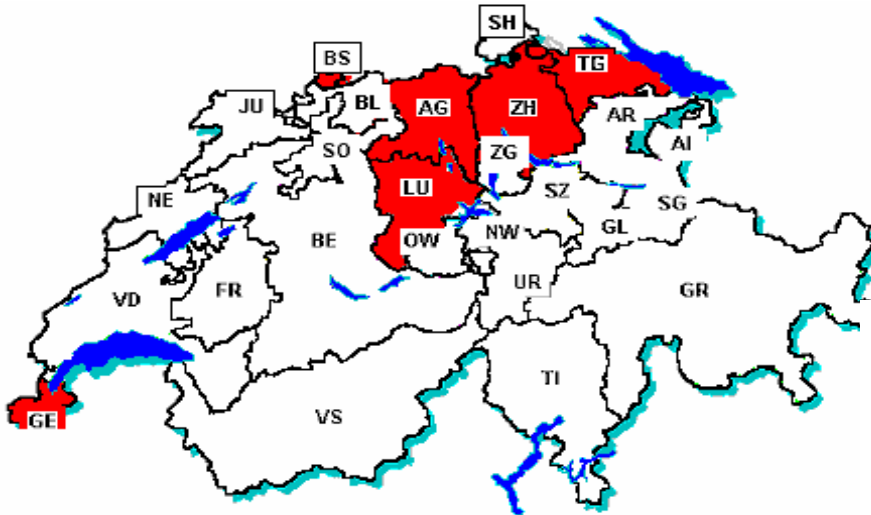
Customized information risk management products for different end users

1. Land-use planners:
 - damage extent, individual risk contour
2. Emergency response :
 - Plant location, plant content and properties, collective risks
3. Decision makers, policy authorities (permits, water agencies) :
 - Prioritization of risks, collective risks, individual risk contours
4. Real estate, engineering consulting companies, industries, public :
 - Plant location, damage extent

Context and actors of the project

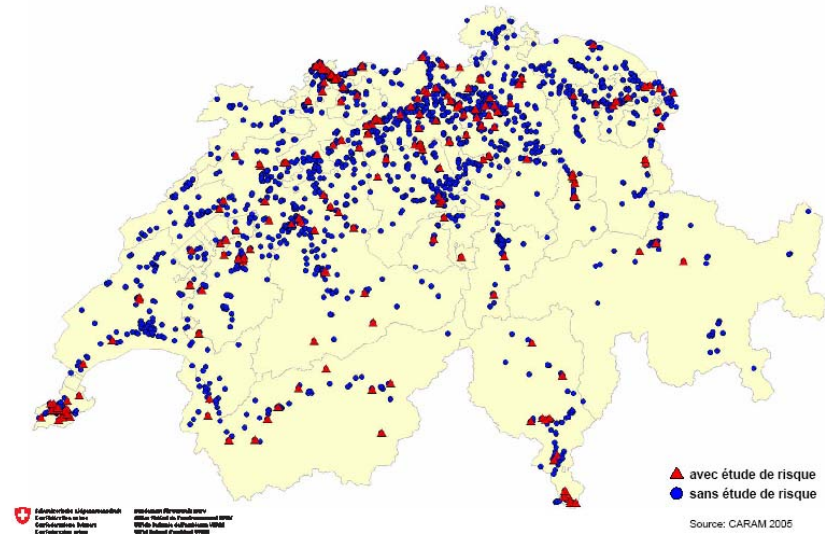
- Needed to have a decision making tool
- Multiple databases were managed by different authorities
- Budget: subsidy required our cantonal parliament to issue debt
- Subsidy of 10% from Swiss Federal Office of the Environment
- Development partnership with the Zurich Canton
- Extension of the regional partnership with other swiss cantons (Aargau, Thurgau, Lucern and Basel)

Partnership with other swiss cantons (Zurich, Aargau, Thurgau and Basel)



Entreprises présentant un danger chimique potentiel
assujetties à l'ordonnance sur les accidents majeurs

État: fin 2005



Domains of application

- Plants subject to the OMA (Swiss Ordinance on Major Hazards)
- Confined use of pathogenic organisms (CO) in plants
- Aircraft crash into hazardous facilities
- Railway installations
- Roads with heavy traffic and highways
- Transport by pipelines (oil and gas)

Common or practical needs for multi-risk maps

Unified criterias for risk calculations, generalization by use of

1. Reference scenarios with reference substances
2. Reference accidental probabilities
3. Reference calculations for damage extent
4. Allowing the use of site specific data

IAEA-TECDOC-727 (Rev.1)

**Manual for the
classification and prioritization of
risks due to major accidents
in process and related industries**

*Inter-Agency Programme on the Assessment and
Management of Health and Environmental Risks from
Energy and Other Complex Industrial Systems*

Jointly sponsored by



Unified criterias for risk calculations outputs

1. Collective risks
2. Individual risk contours
3. Damage extent
4. Classification / prioritization of risk

Interactive ICT structure

1. Data model
2. Data sources
3. Shared data from other databases
4. Dataflow between database - GIS



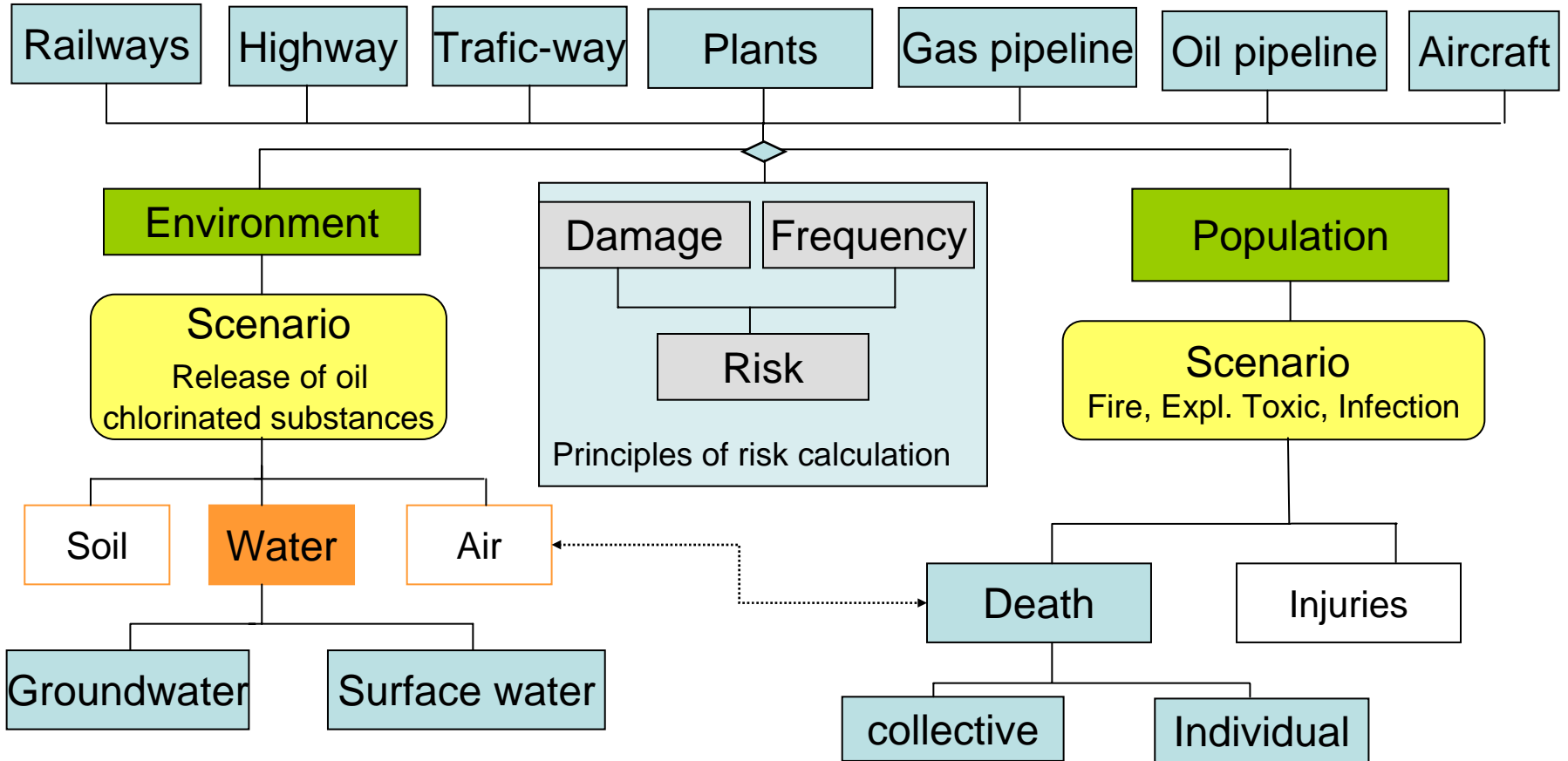
INTERNATIONAL ATOMIC ENERGY AGENCY IAEA



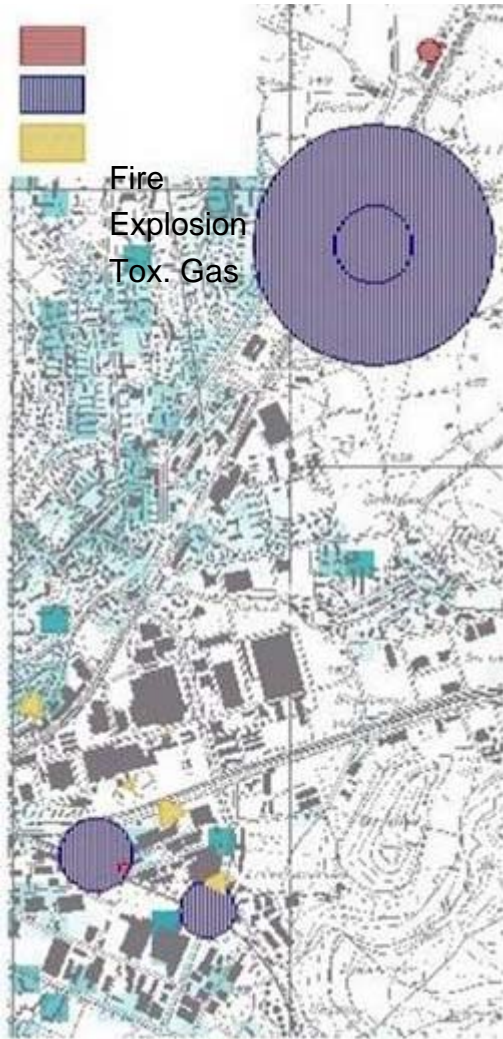
Département de la solidarité et de l'emploi
Office cantonal de l'inspection et des relations du travail

Integration of technical risks into a Risk-register

Data model of the cantonal risk register



How far goes the damages?



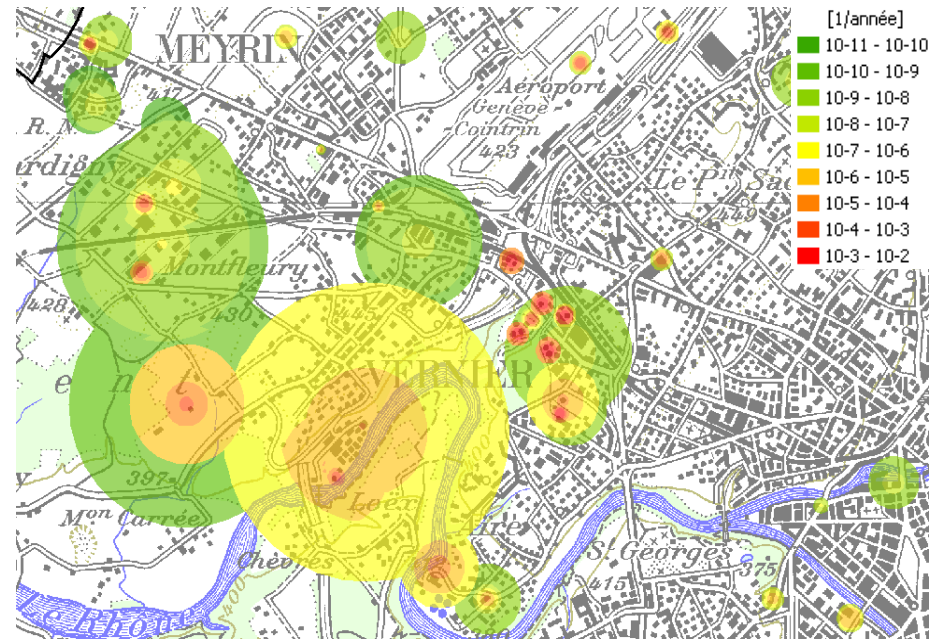
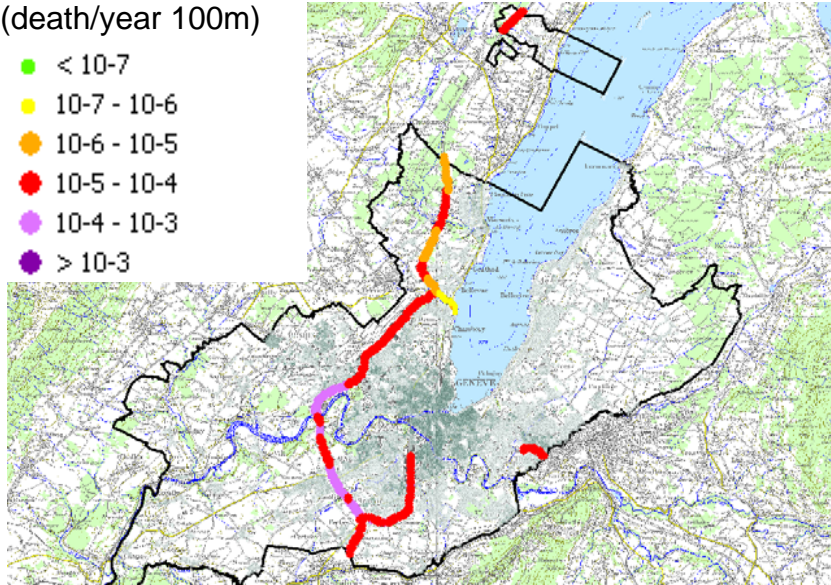
	Fire	Explosion	Tox. Gas
Plants	5-90 m	40-600 m	10-500 m
Gas pipeline	15-120 m	25-170 m	—
Motorway	15-30 m	75-150 m	100-250 m
Railway	20-40 m	150-300 m	300-1'500 m

(Fictious results)

Motorways : total collective risks

(death/year 100m)

- < 10⁻⁷
- 10⁻⁷ - 10⁻⁶
- 10⁻⁶ - 10⁻⁵
- 10⁻⁵ - 10⁻⁴
- 10⁻⁴ - 10⁻³
- > 10⁻³

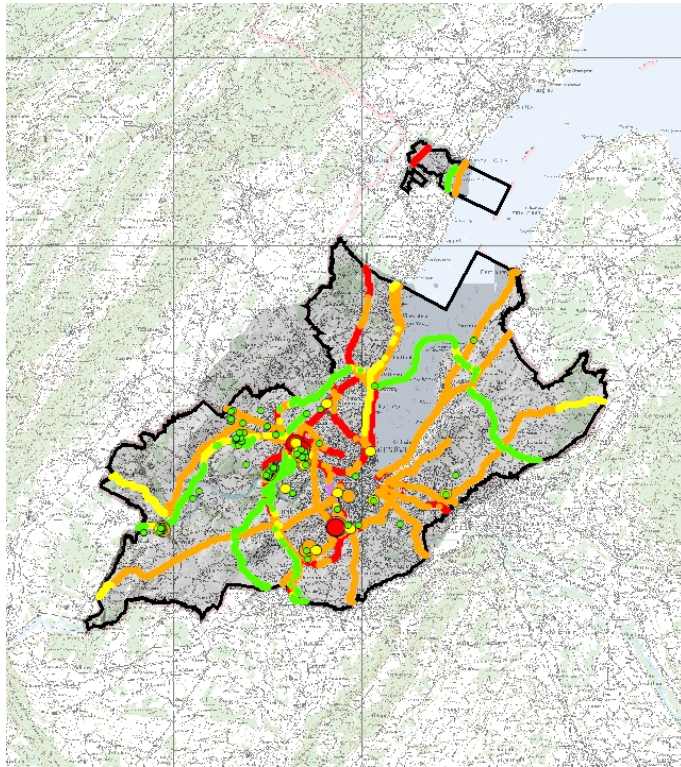


Individual risks: plants - detail

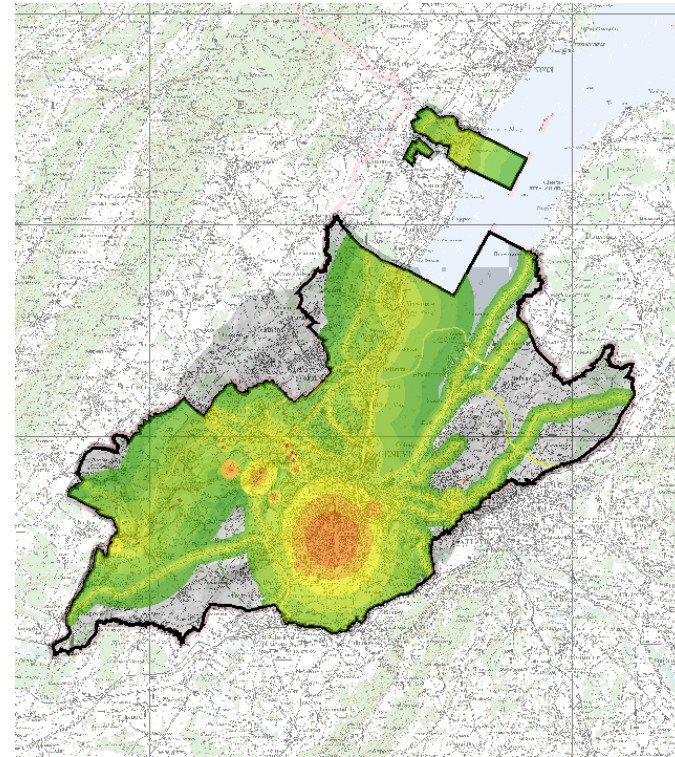
Digital risk maps of facilities, highway, railway and pipelines and air crash

Collective risks

(vulnerability zones)

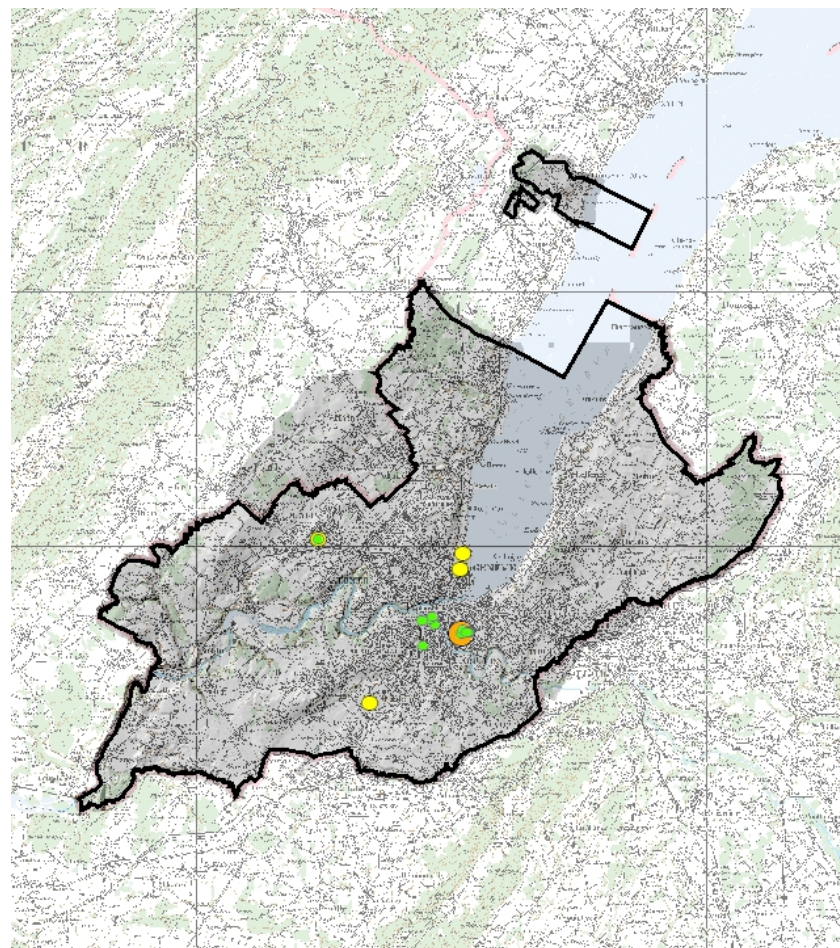
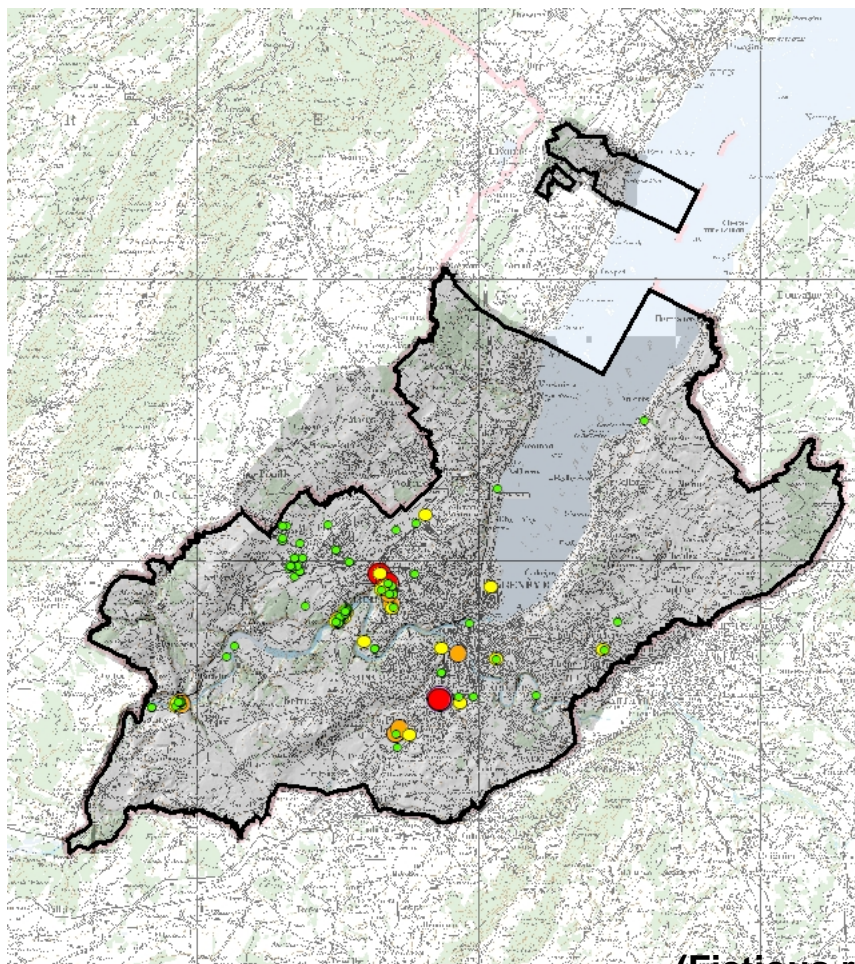


Individual risks



Fictious results

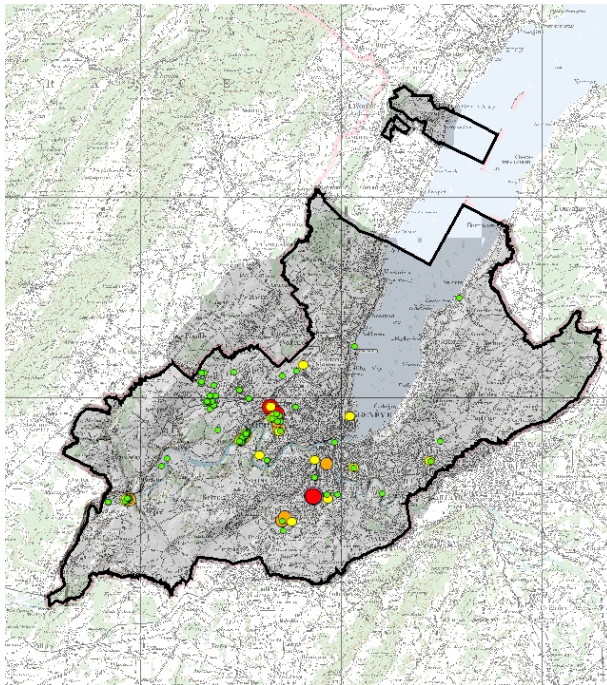
Chemical risks versus biological risks (contained use) in the Geneva area



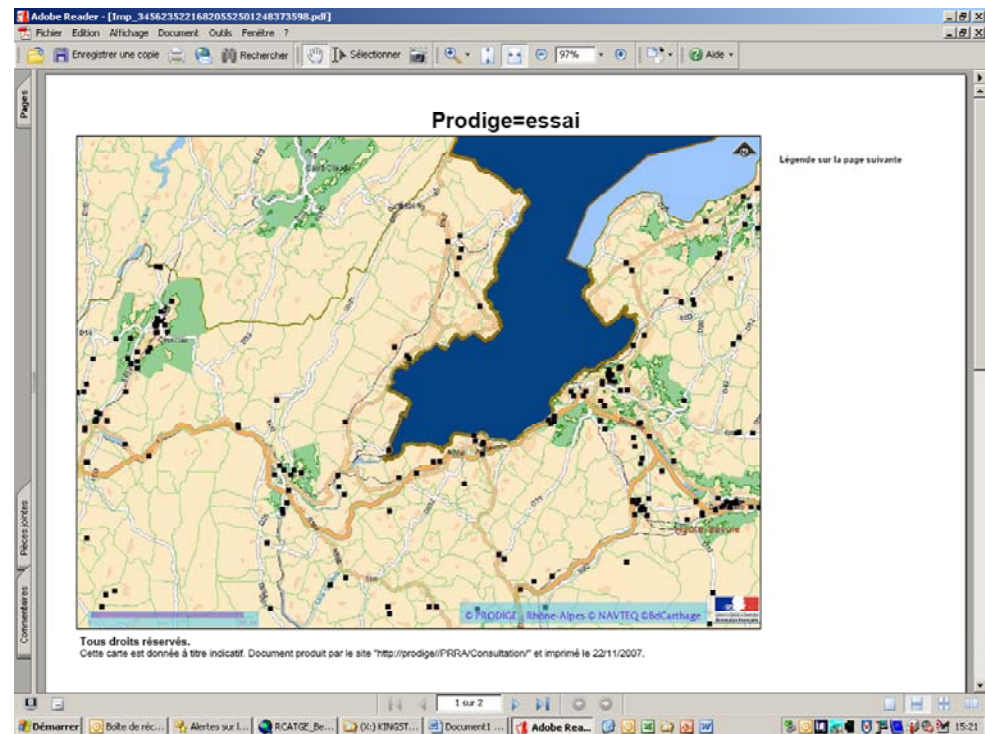
(Fictious results)

Data comparison between CH (SITG) and F (PRODIGE)

**Needs : common transboundary criterias and interconnection
for cartographic risk assessment and risk registers**



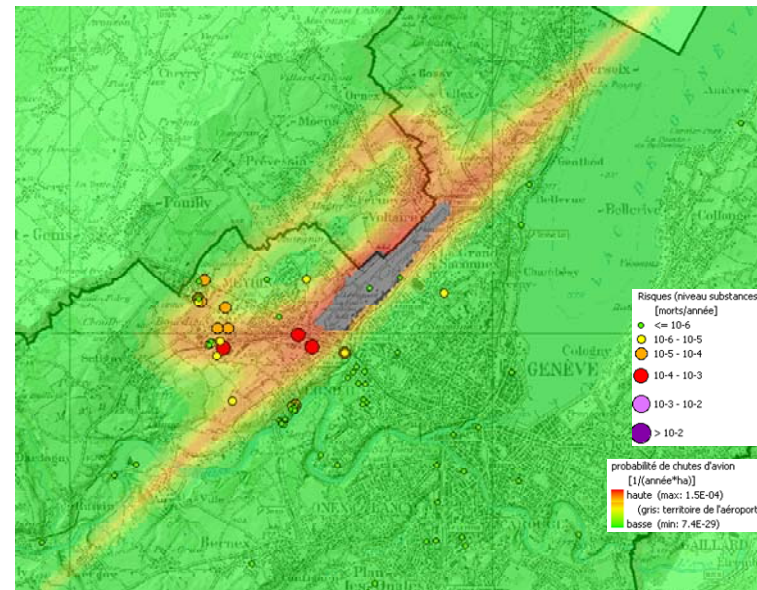
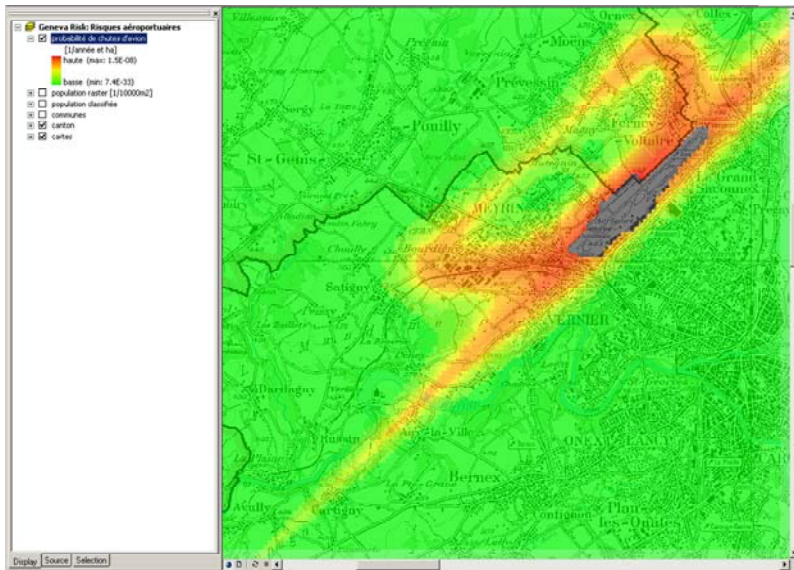
Fictious results



Aircrash frequencies versus aircrash contribution to risk in hazardous facilities

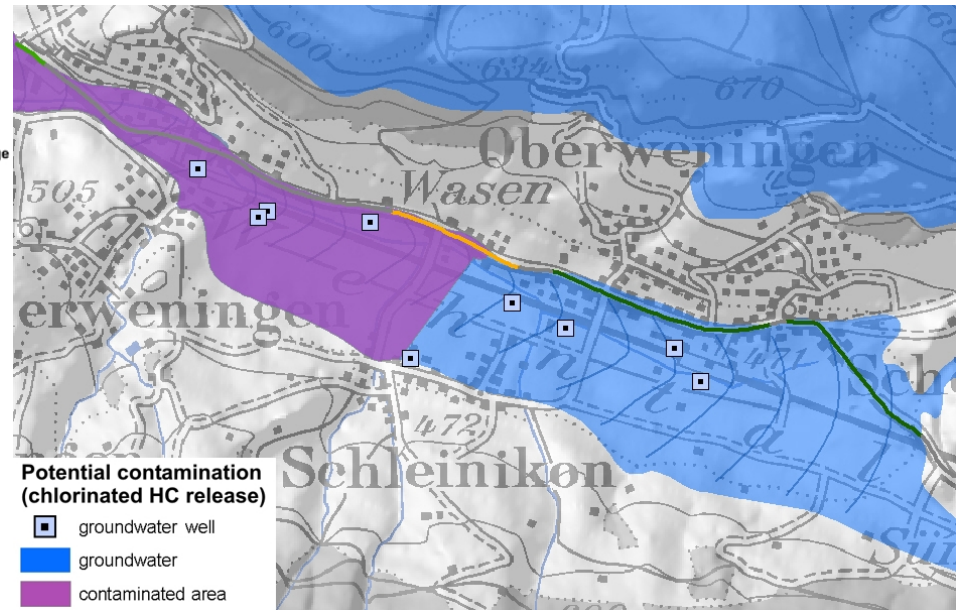
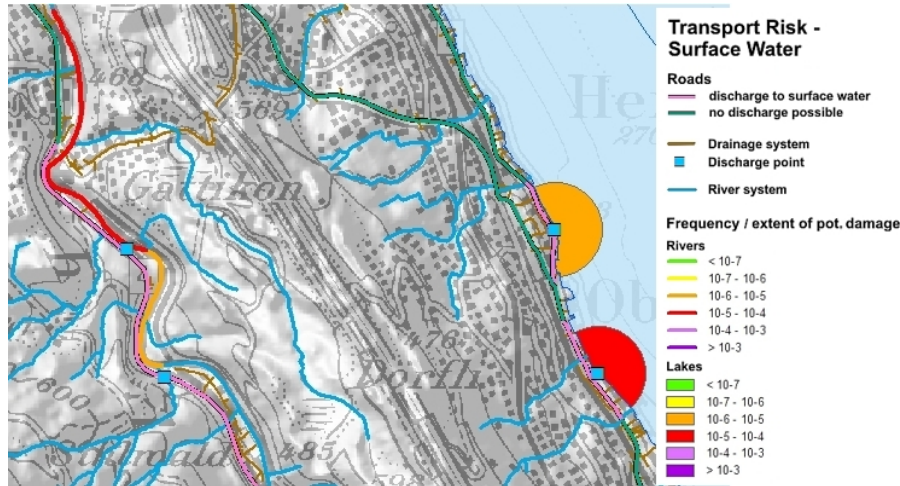
Aircrash-Risiken

...hier sieht man gut, dass im Bereich der hohen Absturzwahrscheinlichkeiten (gelb bis rot) die Aircrash-Risiken hoch sind.



Fictious results

Roads : damage to waterways and lakes in the Zurich region

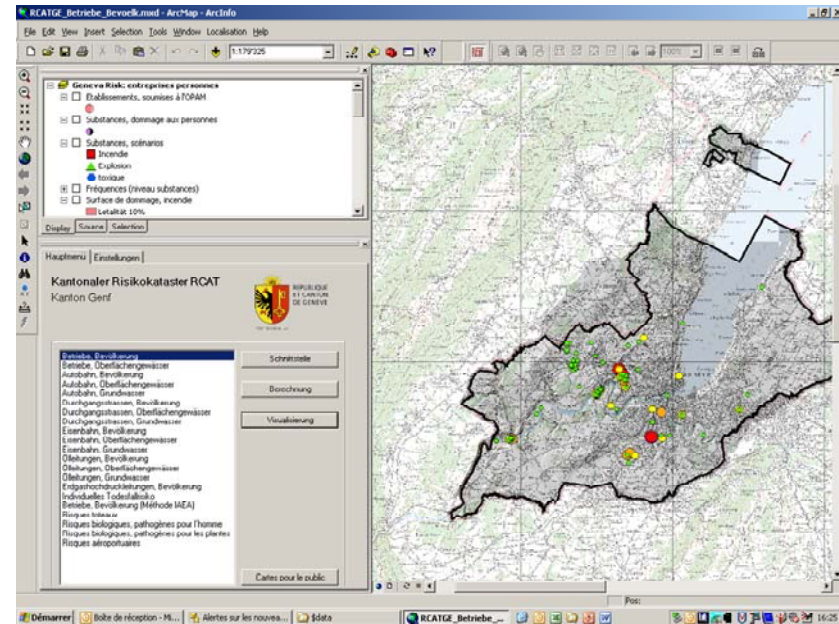


Risks for underground waters : transportation roads in the Zurich region

Wrap-up

The project achieved :

- 21 thematic and global charts
- Public online information
(<http://www.sitg.ch>)
- Sharing of information among stakeholders
(prevention and management of major hazards)
- Link between major hazards and land use planning practices
- Accurate financial management by the help of a regional partnership (now 5 swiss cantons)
Estimated total cost is Euros 300,000 (60'000 E/new layer)
- Maintenance costs are Euros 20'000/year



Future developments
Integrated Risk-Register

