Collaviz®

User's needs

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BRGM at a glance

- The France's leading public institution in Earth Science applications for the management of resources and surface and subsurface risks

- Key objectives
  - **Understanding** geological processes, developing new methodologies and techniques, producing and disseminating relevant high-quality data.
  - **Providing** necessary tools:
    - For surface, subsurface and resource management
    - For risk and pollution prevention
    - To support climate change policies

BRGM at a glance

- Key roles
  - Scientific research (~30%)
  - Support to public policy development (~30%)
  - International cooperation (~20%)
  - Mine safety (~20%)

- Status : EPIC (public industrial and commercial institution)
  - Joint supervision
    - Ministry for Higher Education and Research
    - Ministry for Ecology, Energy, Sustainable Development and the Sea
  - Staff:1060

BRGM : 10 thematic areas

Involving modeling / simulation

Geology

Mineral resources

Geothermal energy

Geological storage of CO_2

Water

Post-mining

Natural risks

Polluted soils and waste

Metrology

Information systems

Distant sites

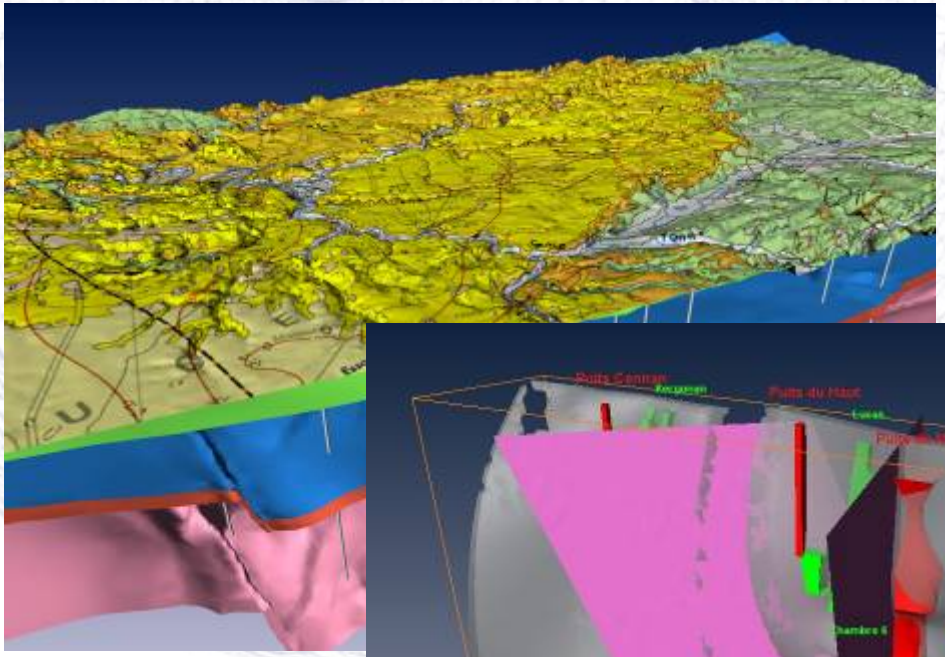
- Head Office (Paris)
- Scientific & technical centre (Orléans) : 27 ha – 25 buildings

- Regional network
  - Metropolitan + overseas (DOM / COM)

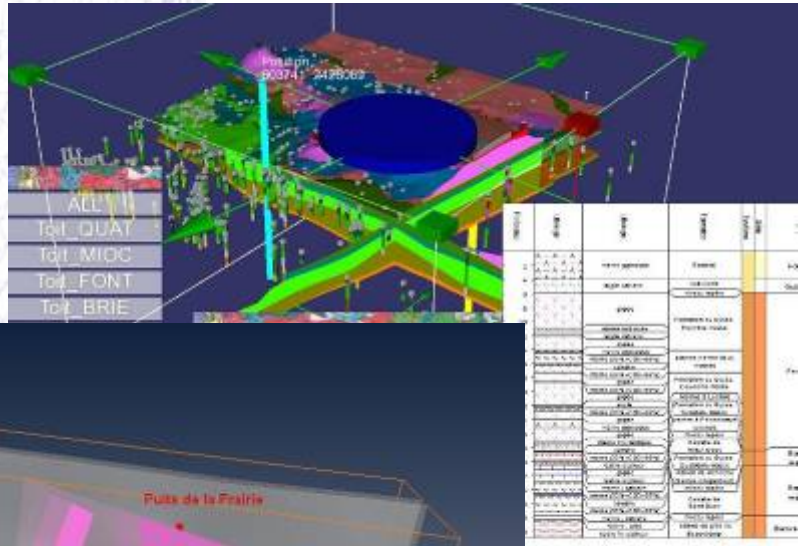
- Post-mine Units

- Clients, partners abroad (more than 40 countries)

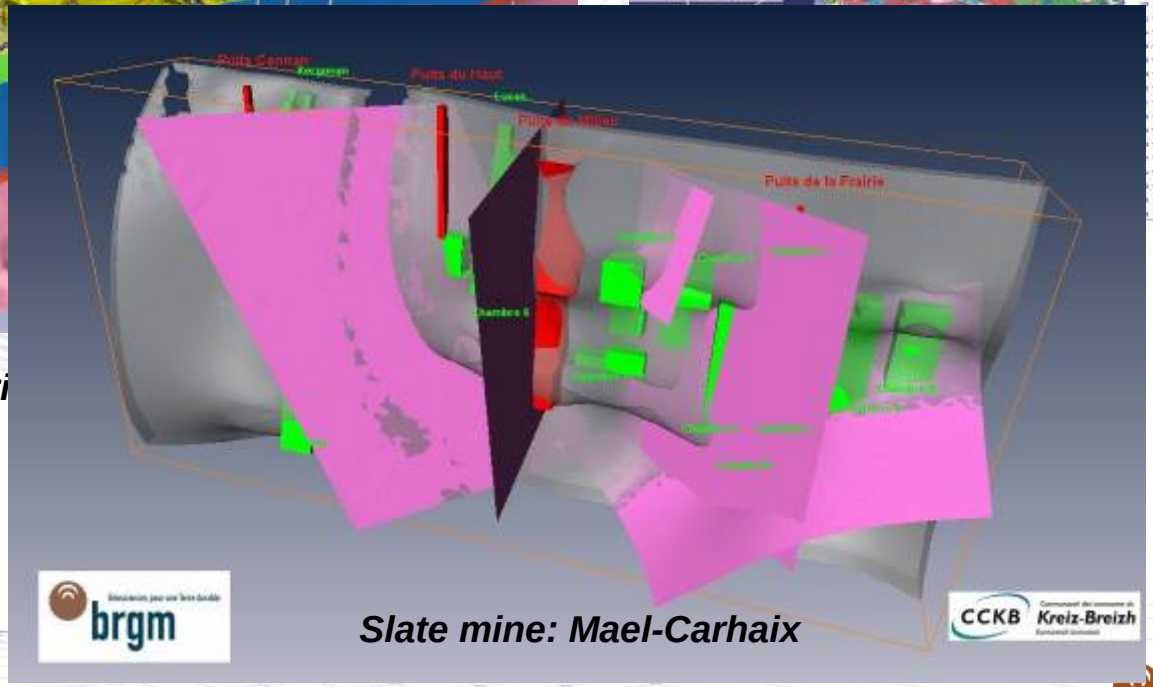
Static models



Basin of Pari



Basin of Paris: Analysis tool



Slate mine: Mael-Carhaix

Static models

Source of data :
City of Toulouse

Reconstruction of Saumur Castle rampart

Collaboration with a VR facilty

Simulation - Tsunamis

B.Poisson – Y.Krien

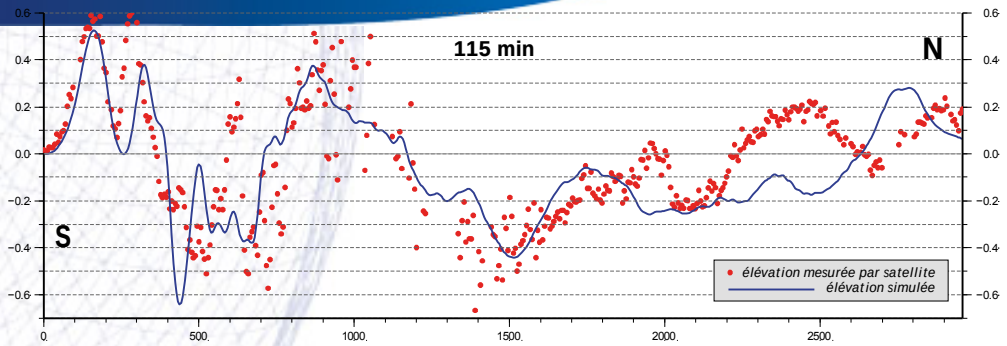
– Generation and propagation of a potential tsunami

- Water elevation
- Risk assessment maps
- …

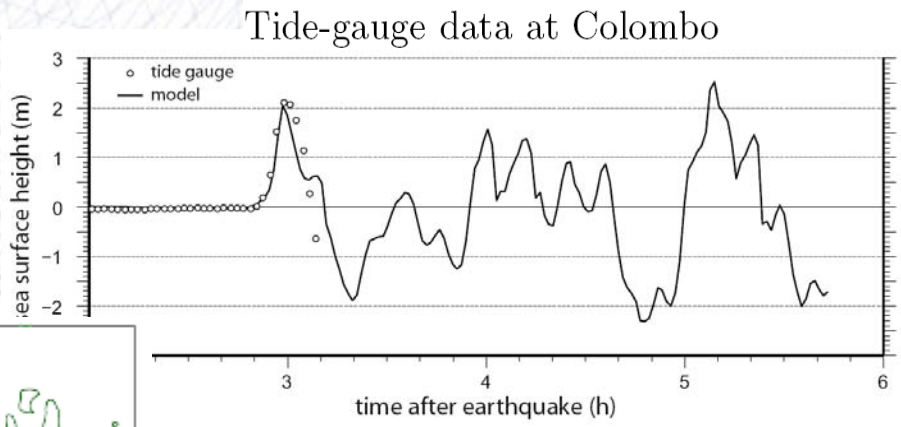
- Tools
  - Software: GEOWAVE (Watts et al 2003)
  - Visualization / post-processing: GMT, SURFER

Tsunami

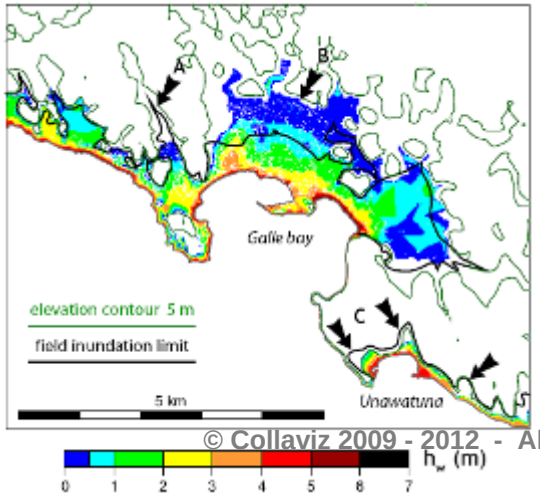
Water elevation at fixed time steps



Evolution of the water elevation in time

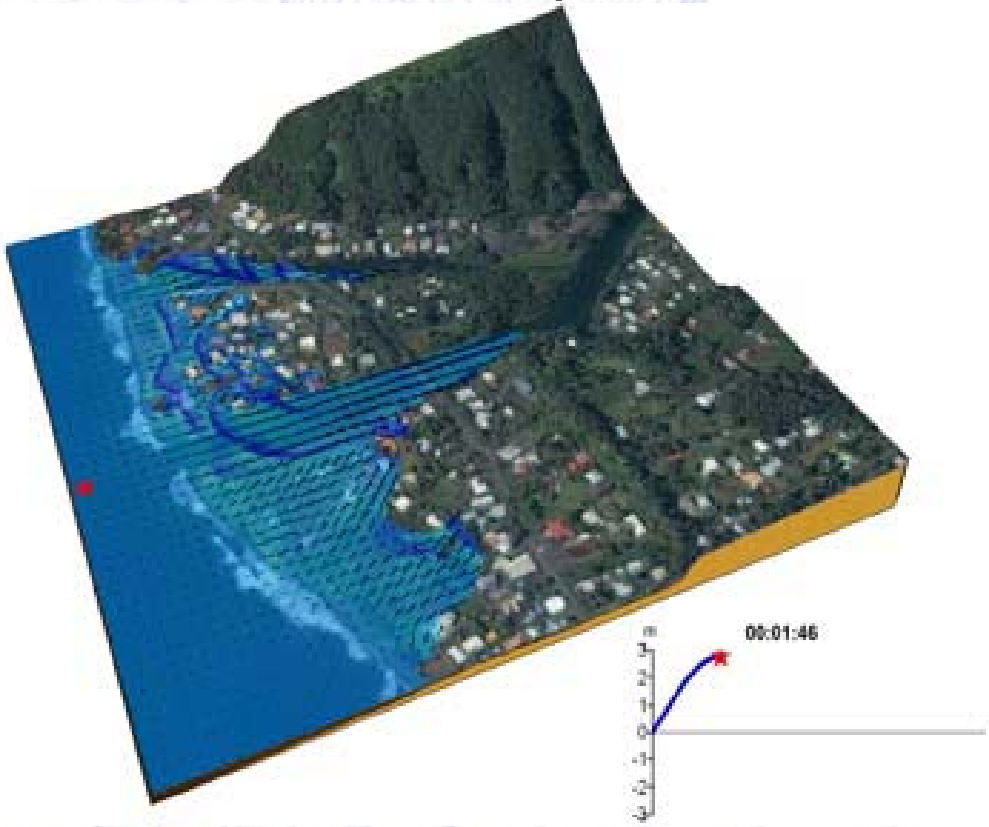


2D maps



Example of a Tsunami: Tahiti – French Polynésie

- Administrative district of Papenoo



Simulation - CO2 injection

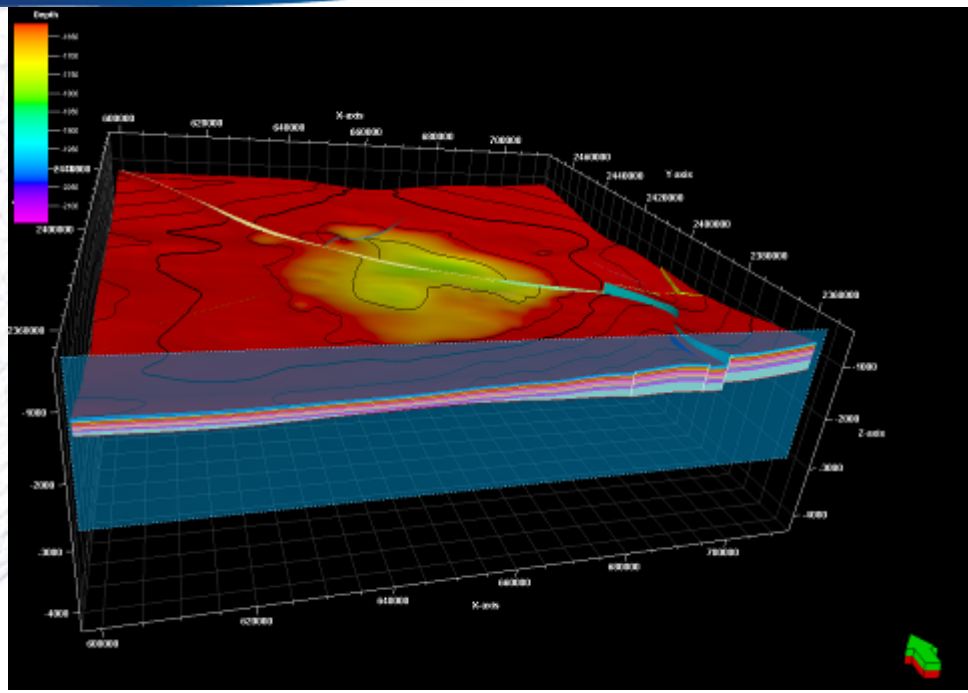
P.Audigane – C.Chiaberge

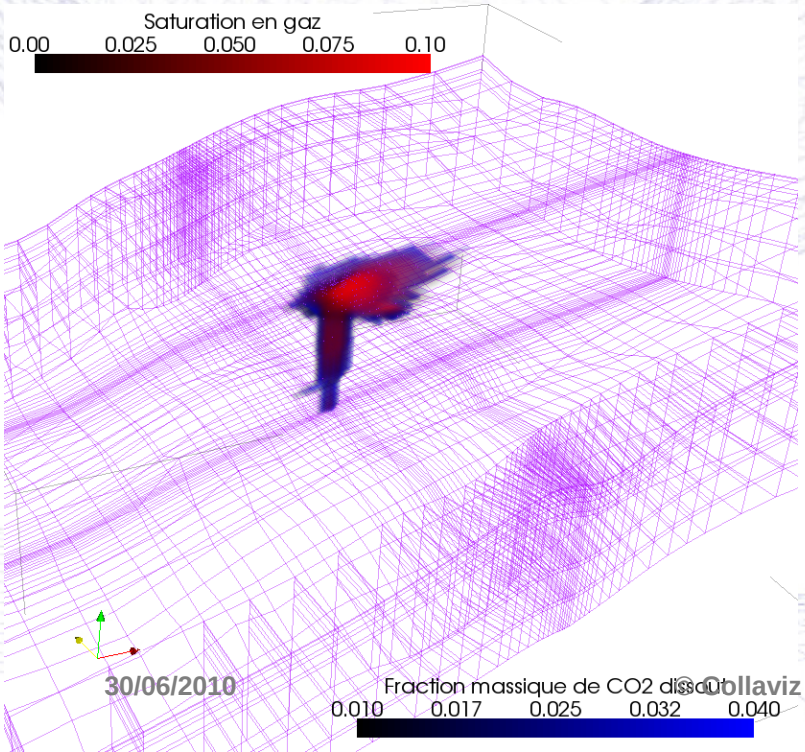
- CO2 injection at the regional scale
  - Pressure
  - Gas saturation
  - CO2 liquid part
- Tools
  - Software: TOUGHREACT (LBNL)
  - Visualization / post-processing: Tecplot / Paraview

Injection de CO2

Géosciences pour une Terre durable
brgm

Geology



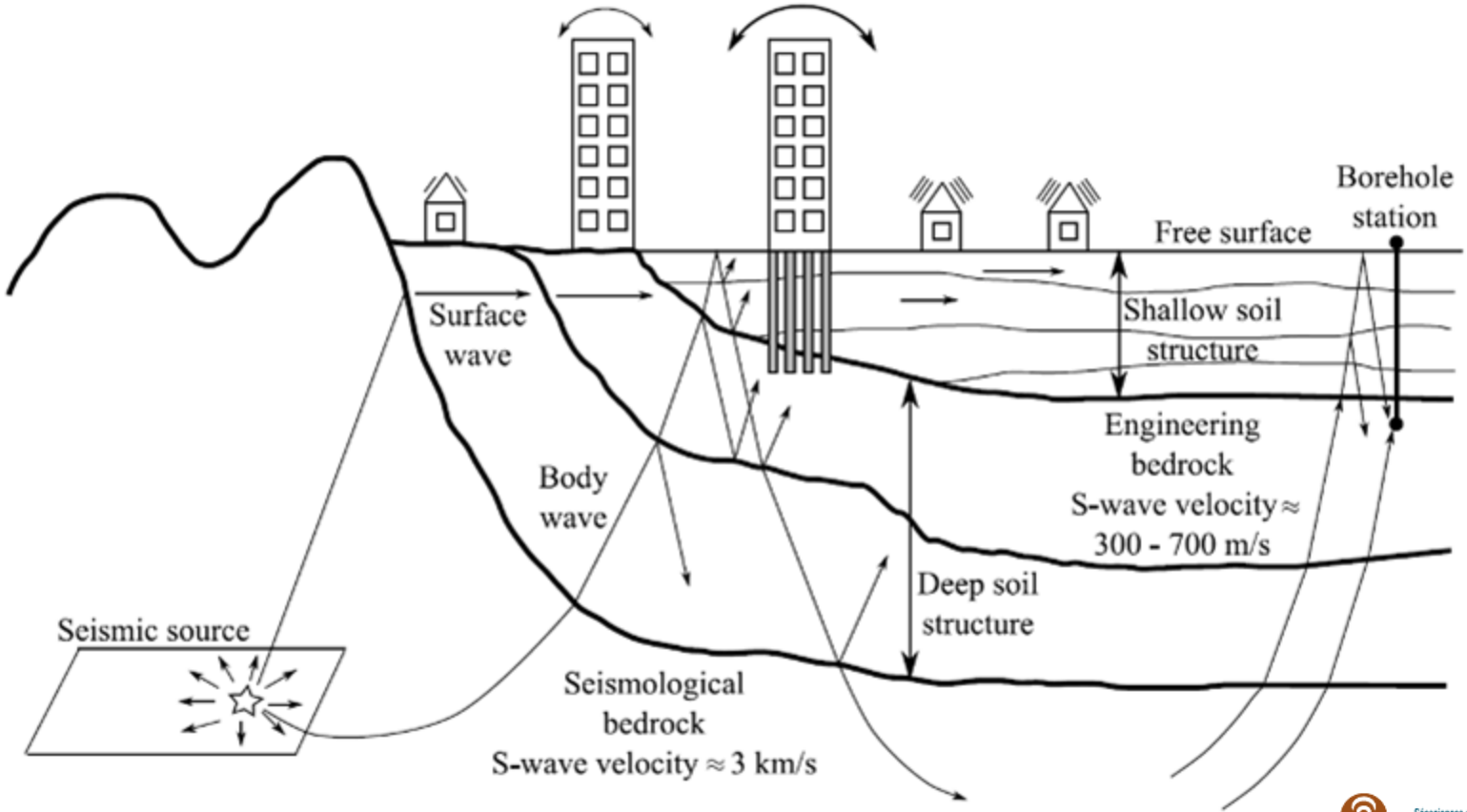


Scalars and vectors fields

Simulations – Seismic risk assessment

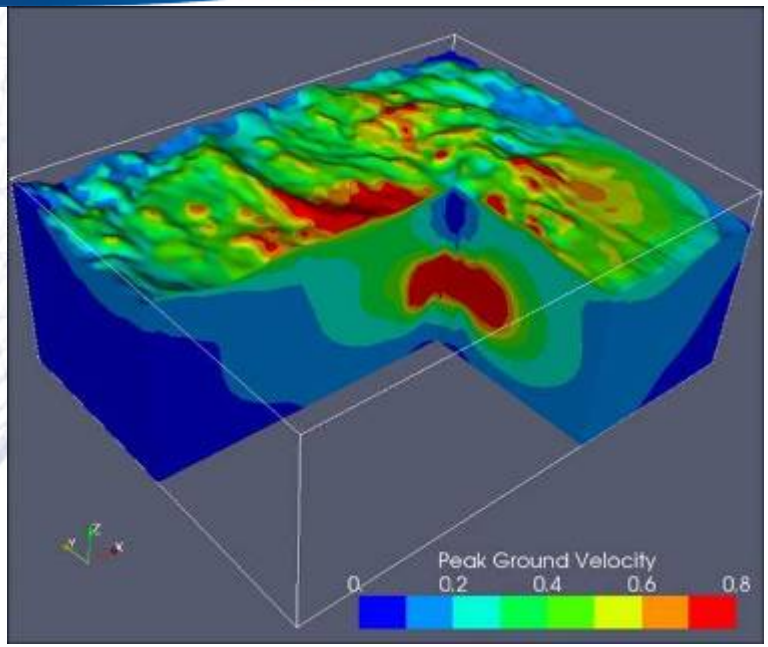
F.De Martin – E.Foerster

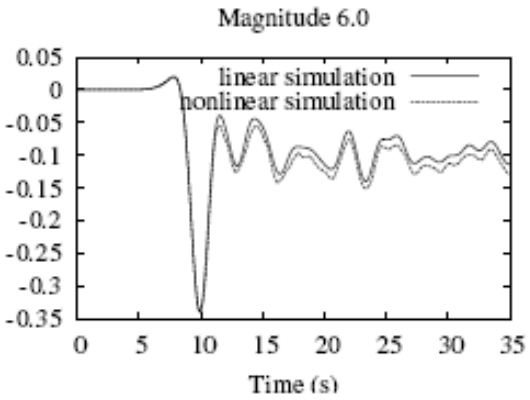
- Understand the soil response under seismic loads

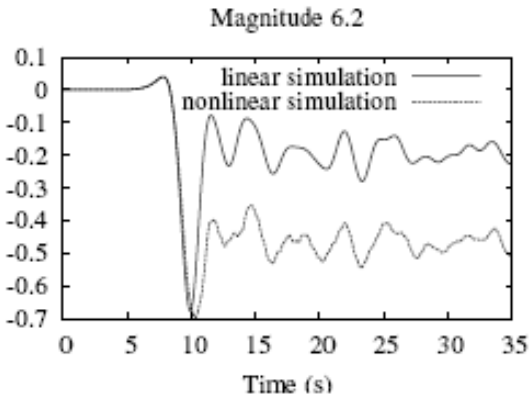


Seismic wave propagation

3D PGV maps







Seismograms

Conclusions

- Collaborative studies
  - Expert in the regional geological context
  - Expert in 3D modeling
  - Computational scientists (geophysics, hydrodynamics, ..)
- Remote collaboration !
- Heterogeneity of the data
  - Static data (geology, buildings…)
  - Dynamic results coming from scientific computing

Conclusions

- Take into account the different domains
  - Adaptability/customization of the tools
  - Enhance internal/external collaboration

- Ongoing project – « Espace Curien »
  - Location → BRGM Campus - Orléans
  - Conference rooms with enhanced 3D and collaborative facilities
  - Support for research projects
  - Communications towards decision makers

Thanks for your attention