

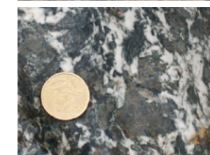
# Geographical Information Systems and Virtual Globes for Secondary Education: Uses and Stakes



[eric.sanchez@inrp.fr](mailto:eric.sanchez@inrp.fr)



ESRI Europe, Middle East and Africa  
User Conference 2008  
London 28 – 30 October



# National Institute for Educational Research



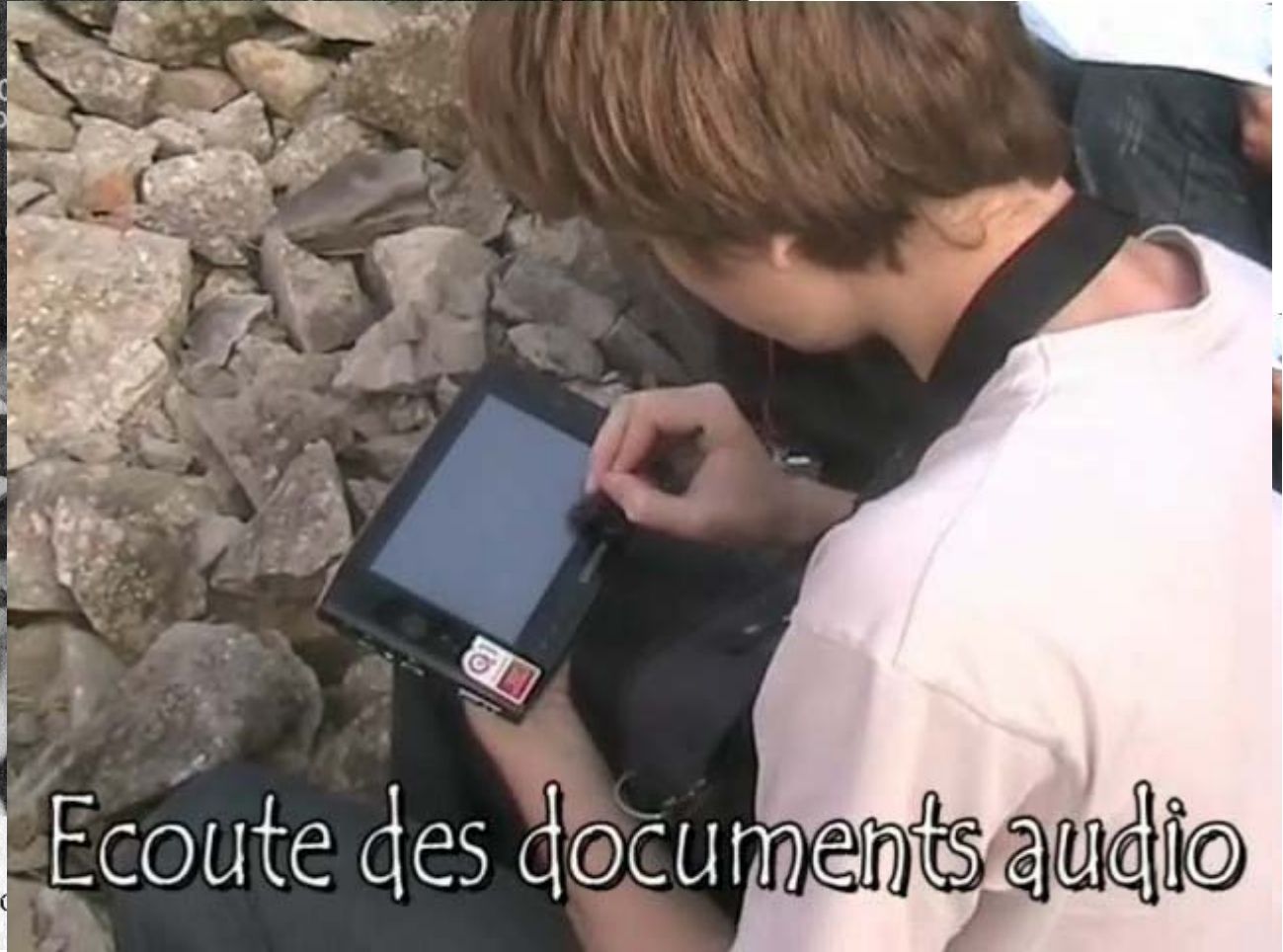
- Research : uses of **ICT** for **geology/geography education**
- Design of **teaching material**
- **Teachers' training**



# Context : The Links between Learning and Technology



"To-c



Ecoule des documents audio

# Questions about the Uses of GIS and Virtual Globes

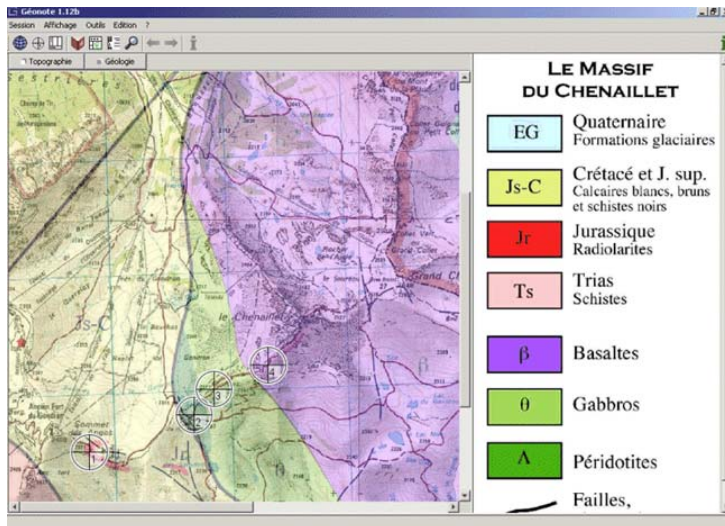
- How do the teachers integrate GIS and Virtual Globes into geography and geology courses?
- What are the stakes of the uses of GIS and Virtual Globes for secondary education?

# Methodology : an Online Inquiry

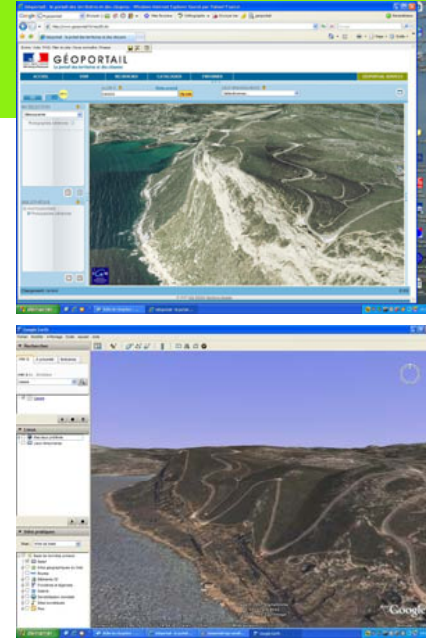
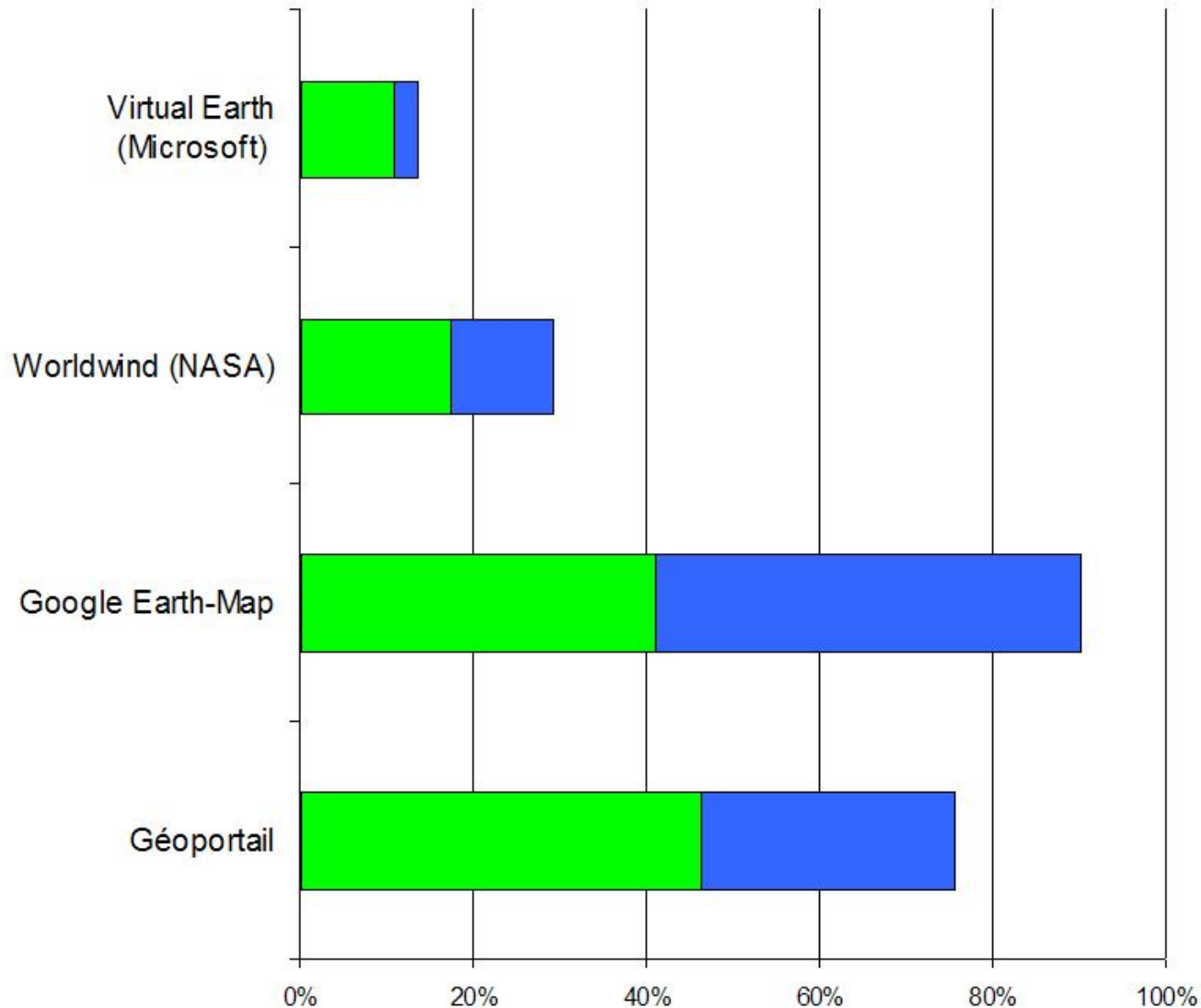
- **A questionnaire** : 19 questions about teachers' practices
- **An Online Inquiry** : 862 teachers (history and geography teachers 50,1%, geology and biology teachers 49,9%)

# GIS vs Virtual Globes

- GIS : 9%
- Virtual Globes : 49%



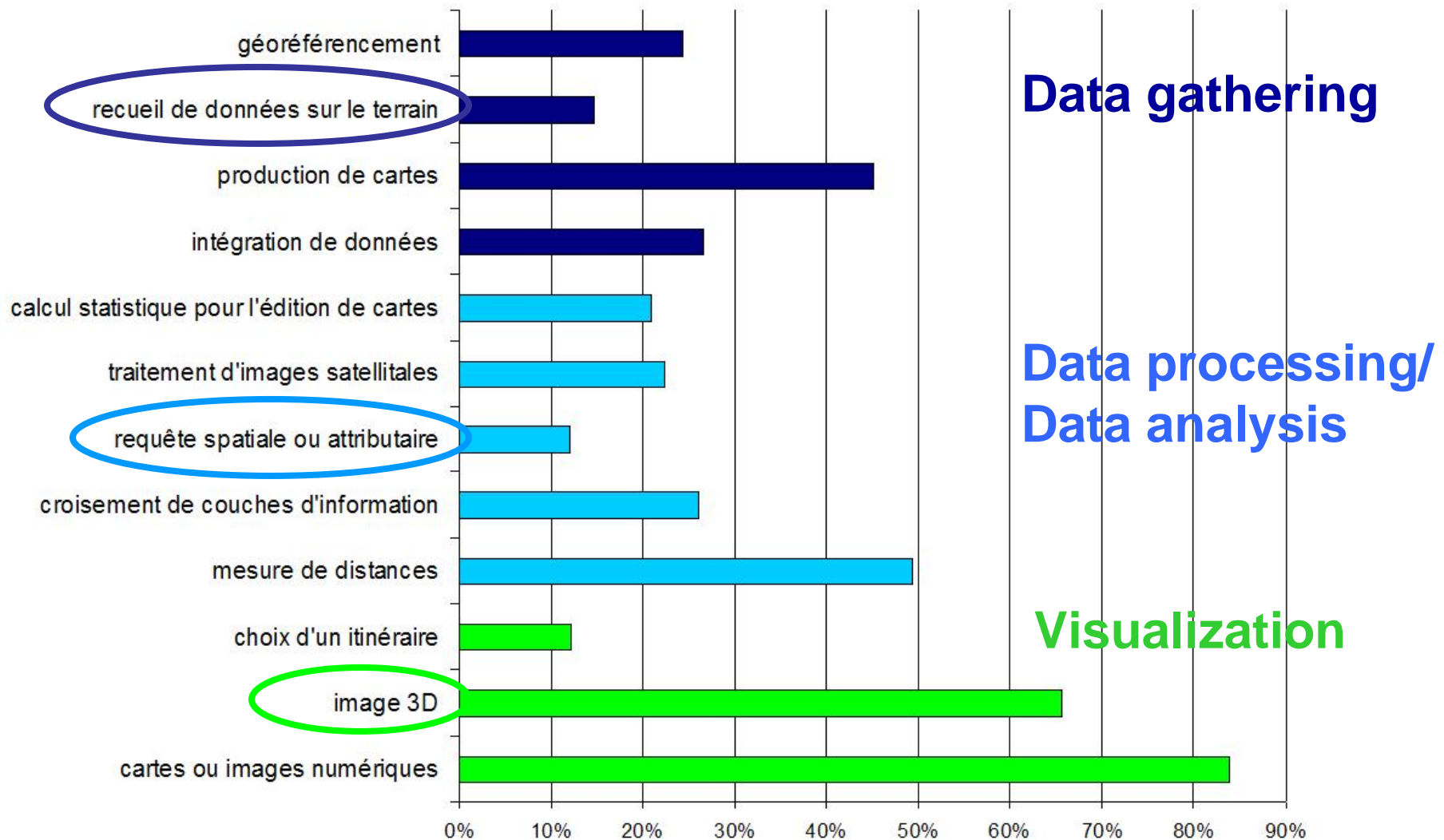
# The Success of Virtual Globes



■ usage personnel  
■ usage en classe

n=862

# Different Uses...

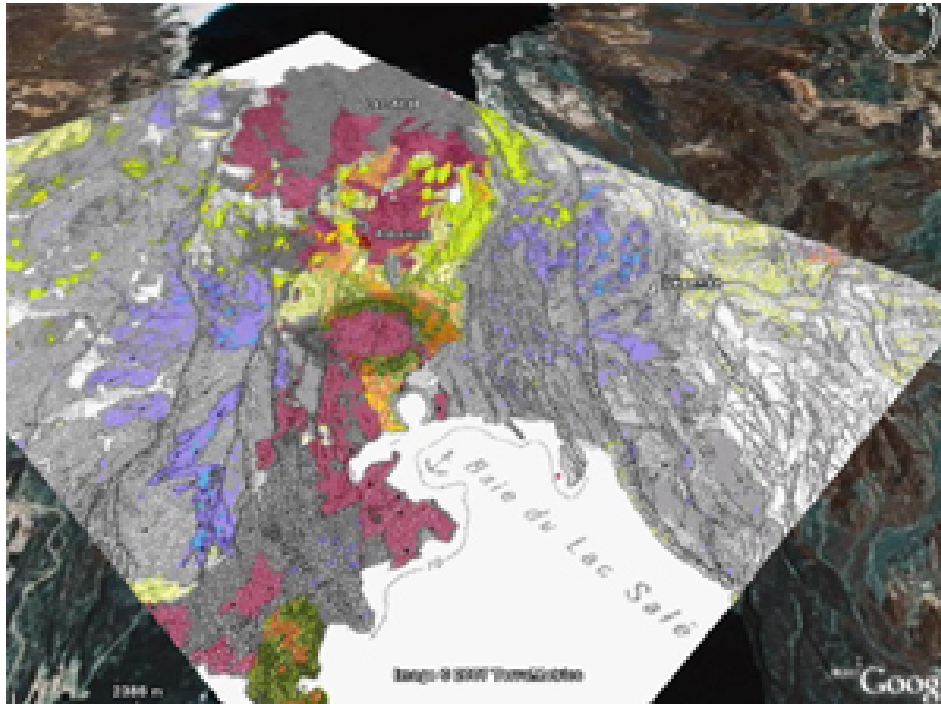




# Assets to integrate Geomatics into the Curriculum in France

- The willing of teachers to use Virtual Globes (80%)
- A compulsory fieldwork for the geosciences curriculum
- Geom@tic : 4 online teachers' training courses

# Visualization of Geographical/Geological Information



- The Assal-Ghoubet rift (MJ Broussaud)  
*geological map and Google Earth*

Rechercher

Aller à ex. : Bordeaux

- [Cassis](#)

Lieux

- [Mes lieux préférés](#)
- [Lieux temporaires](#)

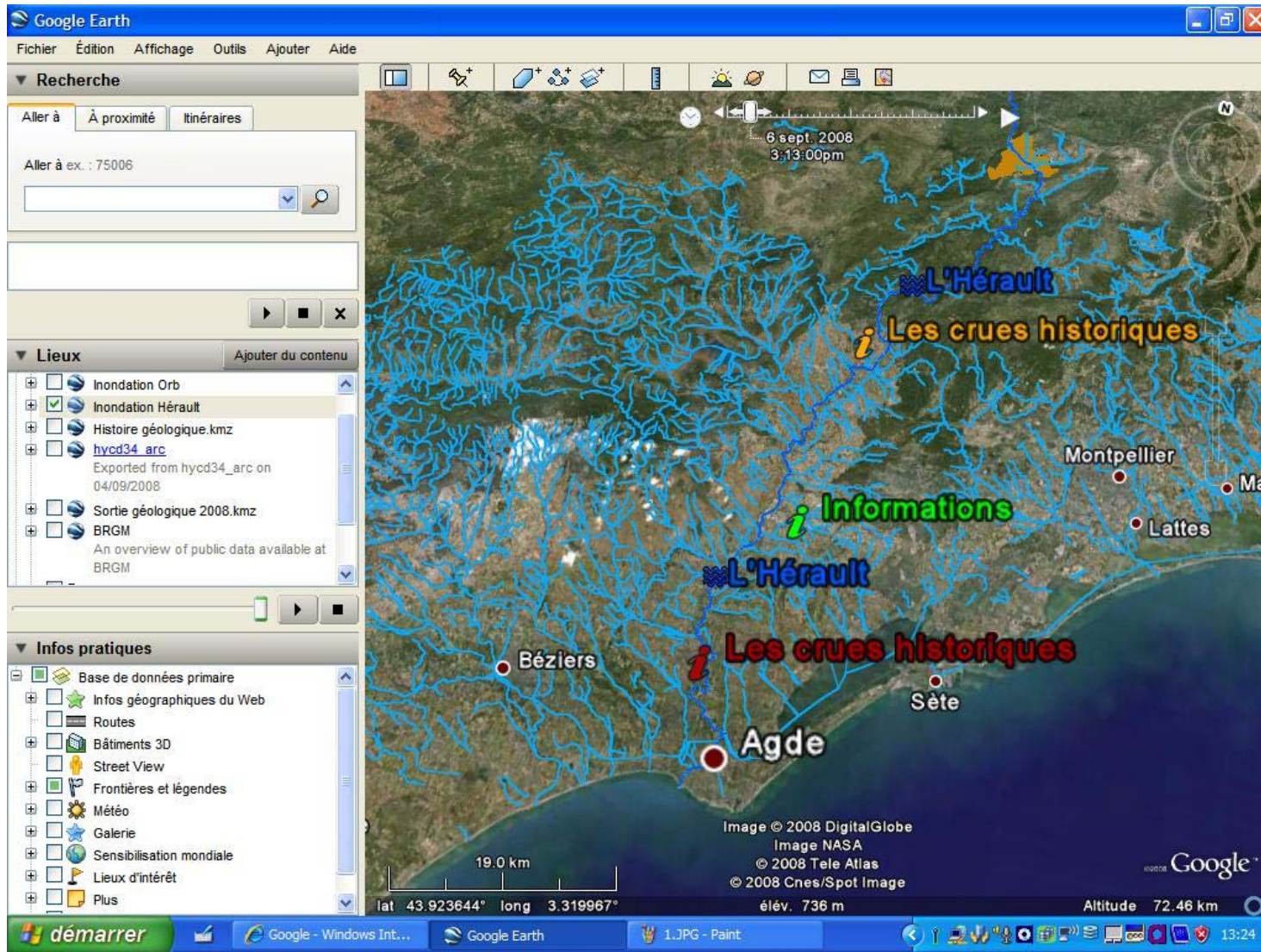
Infos pratiques

Vue :

- Base de données primaire
- Relief
- Infos géographiques du Web
- Routes
- Bâtiments 3D
- Frontières et légendes
- Galerie
- Sensibilisation mondiale
- Sites touristiques
- Plus



# Simulation and Visualization



Ludovic Delorme – ac Montpellier

recherche

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r à ex. : 75006

Search input field with a magnifying glass icon.

Empty search results area.



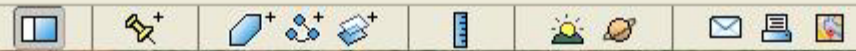
lieux Ajouter du contenu

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infos pratiques

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- Bâtiments 3D
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- Météo
- Galerie
- Sensibilisation mondiale
- Lieux d'intérêt
- Plus



lat 43.605059° long 3.153633°

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Altitude 72.46 km

recherche

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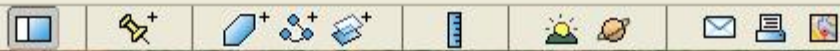
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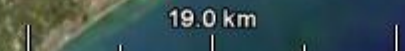
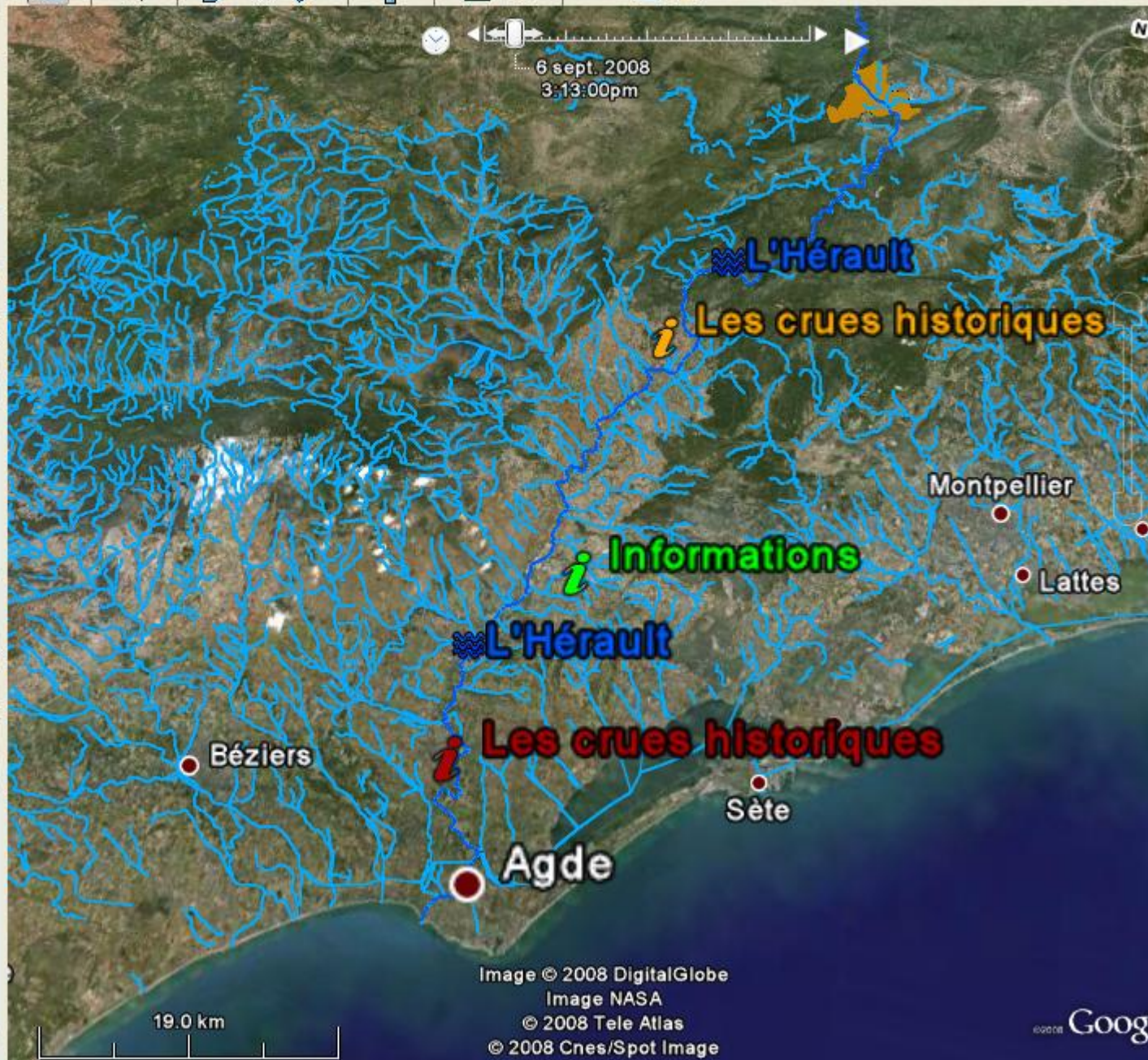
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6 sept. 2008  
3:13:00pm



lat 43.923644° long 3.319967°

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élev. 736 m

Altitude 72.46 km

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lat 43.578133° long 3.359085°

élev. 187 m

Altitude 72.46 km

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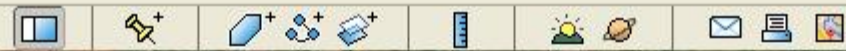


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lat 43.930983° long 3.362300°

élev. 754 m

Altitude 72.46 km



recherche

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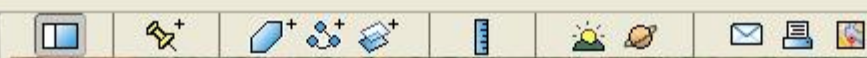
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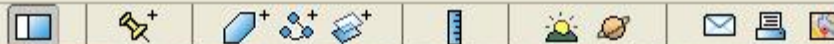
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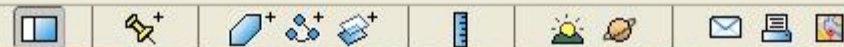
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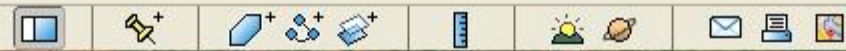
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6 sept. 2008  
4:33:22pm

L'Hérault  
Les crues historiques

Informations

L'Hérault  
Les crues historiques

19.0 km

lat 43.950427° long 3.500709°

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Altitude 72.46 km

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lat 43.958801° long 3.541263°

élev. 699 m

Altitude 72.46 km

Recherche

À proximité Itinéraires

à ex. : 75006



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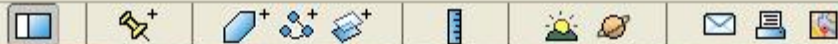


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- Plus



# A matter of semiography



...visualization doesn't necessary lead to understand



# Fieldwork

Are the French-Alps a continent to continent collision range?



**A** Preparation  
2h

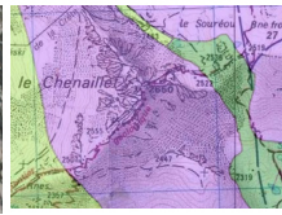
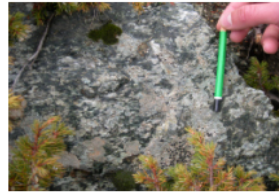


**B** Fieldwork  
2 days

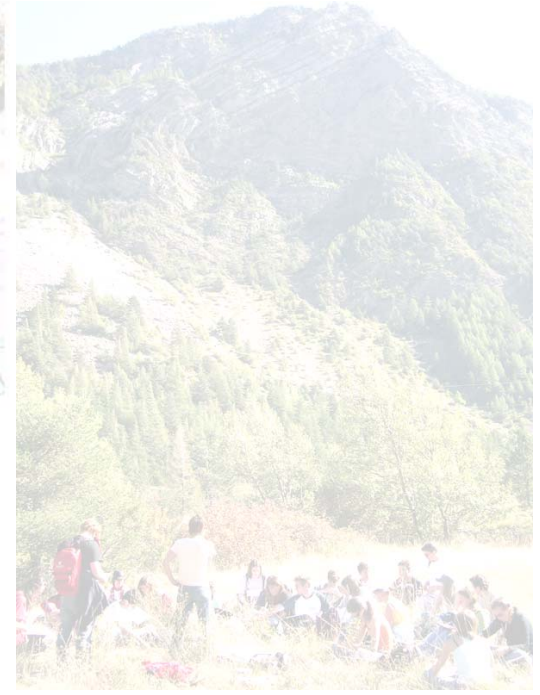


**C** Exploitation  
2h

# Fieldwork



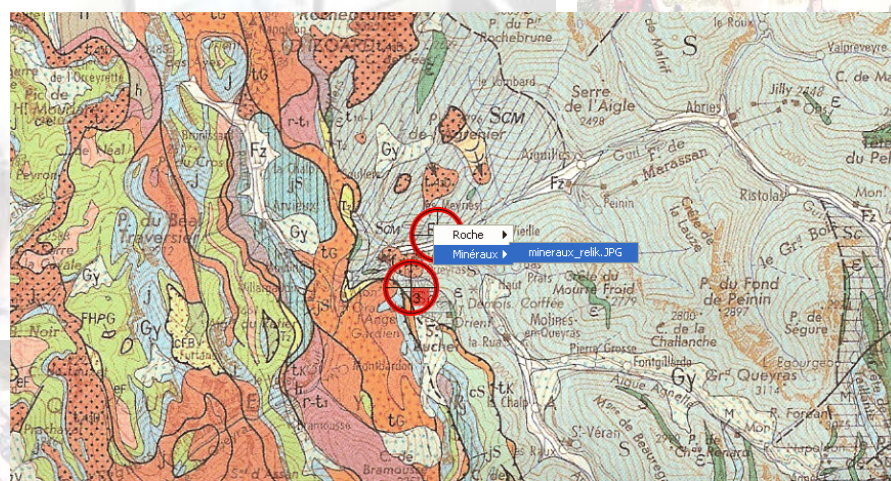
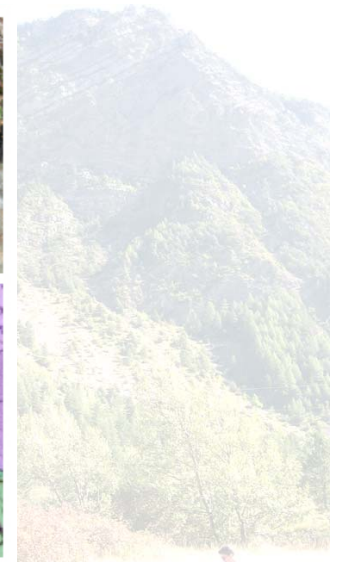
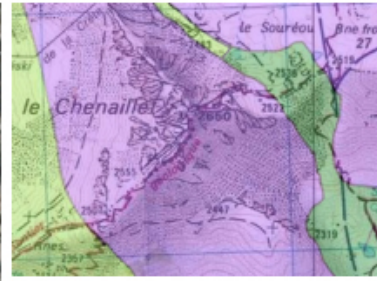
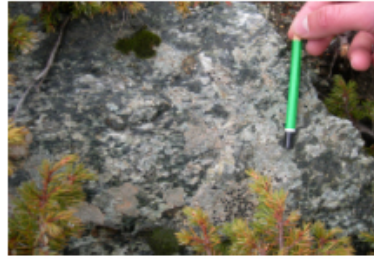
# Fieldwork : preparing the trip



# Fieldwork : on the field



# Fieldwork : data analysis and data edition



# Inquiry Based Learning

*“... an approach to learning that involves a process of exploration, that leads to asking questions and making discoveries in the search for new understandings”*

(National Science Foundation, 2000)

# The Influence of GIS on the Learning Process

- **1 Student1** Come on, I have found a ring ...
- **2 Student2** In the middle it's pyroxene, it's a ring of what?
- **3 S1** Pyroxene and here it's actinolite... and chlorite. OK we will take the whole... Look at that... the green, the black and here, it's hornblende. You have to take the thr... two.
- **4 S2** The two sides... I have to take?
- **5 S1** Yeah
- **6 S2** OK, it's cool, I will [...]...
- **7 S1** Of course not... You take this one, and then this one...
- **8 S2** [...]
- **9 S1** Take this one, the objective is to take this one...
- **10 S2** [...]
- **11 S1** Zoom in here. Don't you want to zoom in? Because it's important... No, zoom in here...I can hold the coin if you want.
- **12 S2** What we want is to see is this...



**[Students take a picture]**

# The Influence of GIS on the Learning Process

- **2 Student2** In the middle it's pyroxene, it's a ring of what?
- **3 S1** Pyroxene and here it's actinolite... and chlorite. OK we will take the whole... Look at that... the green, the black and here, it's hornblende. You have to take the thr... two.



mineral  
identification



# The Influence of GIS on the Learning Process

- **4 S2** The two sides... I have to take?
- **5 S1** Yeah
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Choice of the picture to take

# The Influence of GIS on the Learning Process

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**[Students take a picture]**

# From school 1.0 to school 2.0

*"I think scientific education might do more to ease what is a very big transition: from learning what other people once discovered to making your own discoveries."*

Schwartz M. A. (2008) The importance of stupidity in scientific research. *Journal of Cell Science* 121, 1771

# In short...

- The diversity of the uses of GIS and Virtual Globes and the willing of teachers to integrate these tools into their practices
- GIS and VG give the opportunity to implement a student centered pedagogy (school 1.0 vs school 2.0)
- The way of using a tool is more important than the tool itself
- A great stake : the digital culture of students



For more information...



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