

ENIGMA Meeting n°4

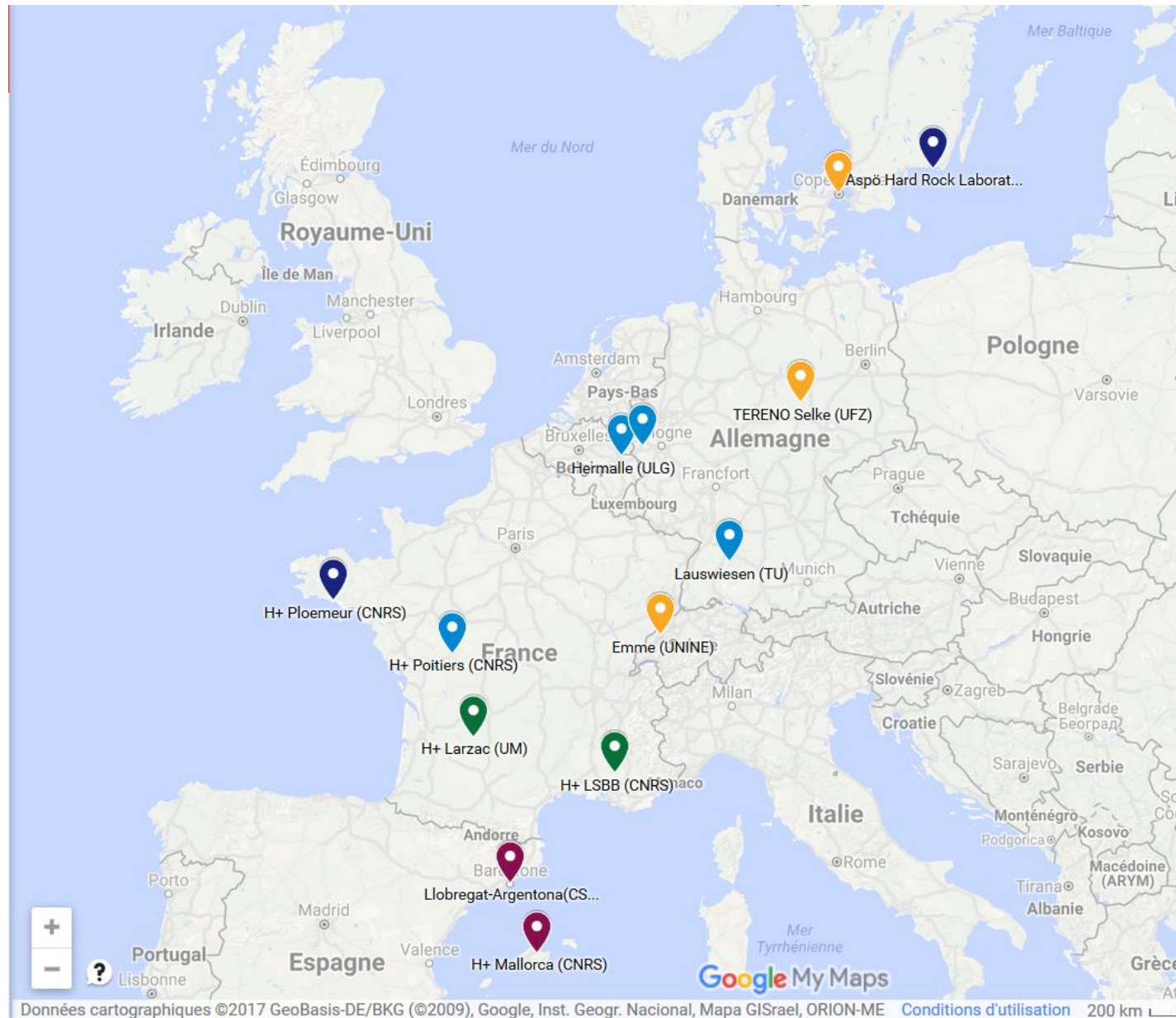
30/06/2018, Cargese

Experimental Infrastructure Board meeting : data & databases aspects





Field Infrastructures (& H+ Hyderabad)









Field infrastructures	Unique attributes
Krauthausen (FZJ), Hermalle (ULG), Lauswiesen (TU), H+ Poitiers (CNRS)	Hydrogeophysical test sites with high borehole density and large hydrogeophysical databases
H+ Ploemeur (CNRS) H+ Hyderabad (BRGM) Aspo Hard Rock Laboratory (SKB)	Fractured rock observatories for long term monitoring and in situ experiments
TERENO- Selke (UFZ) HOBE obs. (UCPH) Emme (UNINE)	Nested observatories in highly instrumented catchments
Llobregat-Argentona (CSIC) H+ Mallorca (CNRS)	Salt water intrusion monitoring and experimentation
H+ Larzac (UM) H+ Low Noise Lab. (CNRS)	Unsaturated zone observatories for long term monitoring and in situ experiments









Field sites and data management plans for the different ESRs




Field sites and data management plans– 1/5

ESR	Sites	Models	Data types	Foreseen Database	Format
ESR11 - ULG Richard 	<ul style="list-style-type: none"> Hermalle sous Argenteau (+Colonster), Hyderabad Test site at Mons? 	HydroGeoSphere Pest	<ul style="list-style-type: none"> Chemistry samples + multiparameter probe data: O2, CO2, pH ... hydraulic data + pumping test data (drawdown) Tracer test: fluoscein concentrations + Temperature (+DTS) - Geophysics: GPR 	<ul style="list-style-type: none"> H+ database H+ database H+ database Repository in H+database 	<ul style="list-style-type: none"> H+ format H+ format H+ format seggy + pdf with explanations
ESR3-UNINE Alvaro 	Emme site	- HydroGeoSphere (HGS) - OpenFOAM	<ul style="list-style-type: none"> Tracer test UAV data Hydraulic data 	<ul style="list-style-type: none"> HydroShare database 	<ul style="list-style-type: none"> To be defined
ESR7-UCPH Joel 	<ul style="list-style-type: none"> HOBE sites (UCPH) TERENO sites (UFZ) 	Hydrogeosphere	<ul style="list-style-type: none"> UAV data Hydraulic data DTS data Temperature (profile) data 	HOBE database	<ul style="list-style-type: none"> H+ format

ESR	Sites	Models	Data types	Foreseen Database	Format
ESR2-UFZ Guilherme 	<ul style="list-style-type: none"> • TERENO Selke (UFZ) • HOBE sites (UCPH) 	MIN3P / (HGS)	<ul style="list-style-type: none"> • Time series of Q,WL,T,EC,DO • Tracer test data (salt, reactive compounds: DO, Raz/Rru) • ERT • Hydrogeological parameters (aquifer props.) 	To be defined	To be defined
ESR8-μQuans Anne-Karin 	<ul style="list-style-type: none"> • Larzac (H+) • HOBE sites (UCPH) 	Pflotran, R, pyGrav	absolute and relative gravity and vertical gravity gradient time series	H+ database	H+ format
ESR5-CNRS Lara 	<ul style="list-style-type: none"> • Ploemeur • Orgeval • HRL SKB 	<ul style="list-style-type: none"> • SWIP • PFC3D, 3DEC 	<ul style="list-style-type: none"> - • Seismic data • Core data 	<ul style="list-style-type: none"> • H+ database • Irstea Oracle • Aspo HRL database 	<ul style="list-style-type: none"> • H+ format • segy

ESR	Sites	Models	Data types	Foreseen Database	Format
ESR12-FZJ Satoshi 	<ul style="list-style-type: none"> Ploemeur site SIP measurement system Imaging setup (camera etc.) 		<ul style="list-style-type: none"> SIP signal Image data Hydraulic parameters 		
ESR15-ULG 	<ul style="list-style-type: none"> Hermalle sous Argenteau Llobregat-Argentona 	-pyGIMLi -mGstat	<ul style="list-style-type: none"> ERT (surface and borehole) GPR (borehole) Tracer test 	<ul style="list-style-type: none"> H+ database 	<ul style="list-style-type: none"> H+ format
ESR14-CSIC Andrea 	<ul style="list-style-type: none"> Argentona site 		<ul style="list-style-type: none"> Time lapse ERT (crosshole) Heat tracer data (fiber optics) Time series of Head data, conductivity, temperature, salinity (borehole monitoring) 	<ul style="list-style-type: none"> H+ database (in discussion) 	<ul style="list-style-type: none"> H+ format

ESR	Sites	Models	Data types	Foreseen Database	Format
ESR 1- CSIC Kevin 	Argentona site	<ul style="list-style-type: none"> • SUTRA • TRANSIN • COMSOL 	<ul style="list-style-type: none"> • Tracer Test, Pumping Test geophysical data 	H+ database	H+ format
ESR6- CNRS Behzad 	<ul style="list-style-type: none"> • Ploemeur • HRL SKB 	<ul style="list-style-type: none"> • MATLAB • COMSOL 	DTS, DSS	H+ database	H+ format
ESR9- UNIL Alejandro 	Possibly, Argentona site	<ul style="list-style-type: none"> • MATLAB • COMSOL 	Tracer tests at laboratory scale. Electrical conductivity.		

ESR	Sites	Models	Data types	Foreseen Database	Format
ESR10- FZJ Peleg 	Krauthausen	TRACE and PARTRACE codes (written in FZJ); gprMax	Tracer test (saline), GPR	TERENO data portal	
ESR13-UT Veronika 	Lauswiesen	e4d-pflotran (USGS) DUNE modelling code (https://www.dune-project.org/news/) - high performance PDE solver	<ul style="list-style-type: none"> • Tracer tests (heat, salt) <ul style="list-style-type: none"> • ERT • GPR 	CAMPOS Database	- To be defined
ESR 4 –Itasca Justine 	Äspö	- Matlab/Python/C++ - PFC3D	<ul style="list-style-type: none"> • GPR • hydraulic data • geological data • Tracer test (to confirm !) 	<ul style="list-style-type: none"> • SKB database • H+ database ? (to discuss) 	. rad / rd3 / rd7 - excel



Achieved

Multi-tracer experiment in fractured rock (Mons/Liège)

Leaders: Richard Hoffmann and Pascal Goderniaux

Participants: CNRS

Periodic hydraulic test experiment (Argentona)

Leaders: Oliver Bour, Maria Pool, Jesus Carrera

Participants: CNRS, CSIC

Planned

Krauthausen natural gradient tracer experiment (Jülich)

Leaders: Peleg Haruzi and Jan Van der Kruk

Participants: ULG Liege + Guilherme Nogueira + other interested?

SKB tracer test experiment

Leaders: Justine Molron, Niklas Linde, Philippe Davy

Participants: Lara Blazevic, Behzad Pouladi, Tanguy Le Borgne, Olivier Bour

Possible opportunities

Hyporheic zone experiment (Leipzig)

Leaders: Guiherme and Jan Fleckenstein

Participants: all partners (during 6th ENIGMA meeting)

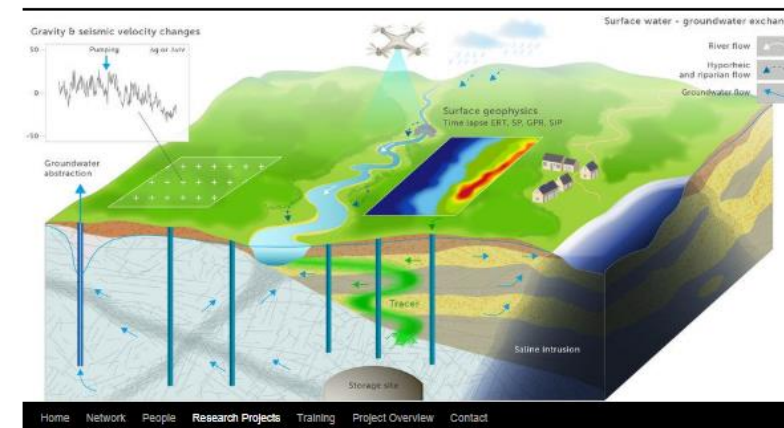
Lauswiesen site forced gradient tracer experiment (Leipzig)

Leaders: Veronika Rieckh and Carsten Leven

Participants: Peleg Haruzi

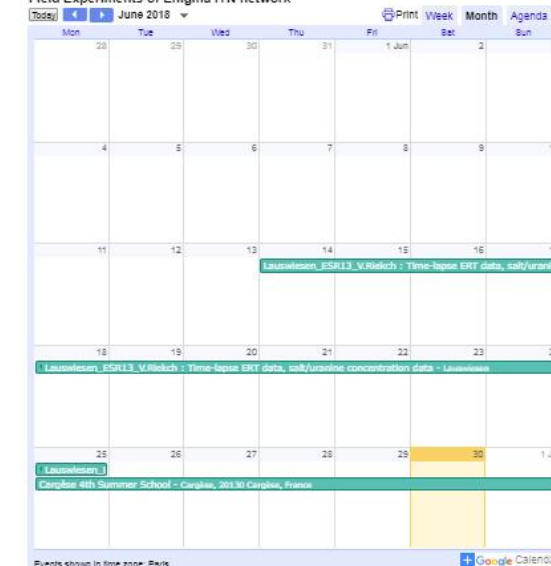
On line calendar of field experiments

ENIGMA ITN



Field Experiments Calendar

Field Experiments of Enigma ITN network



- H+, HOBE, TERENO, CAMPOS
- Identified gap: hydrogeophysical databases



Platform-based database

- Well (general characteristics)
- Well logs
- Core / cuttings sampling
- Borehole geophysics
- Borehole flowmetry
- Piezometric survey
- Hydraulic tests
- Chemical analysis
- Tracing tests
- Meteorological data

3D-field (meta)database

- "Geophysical" and geological survey

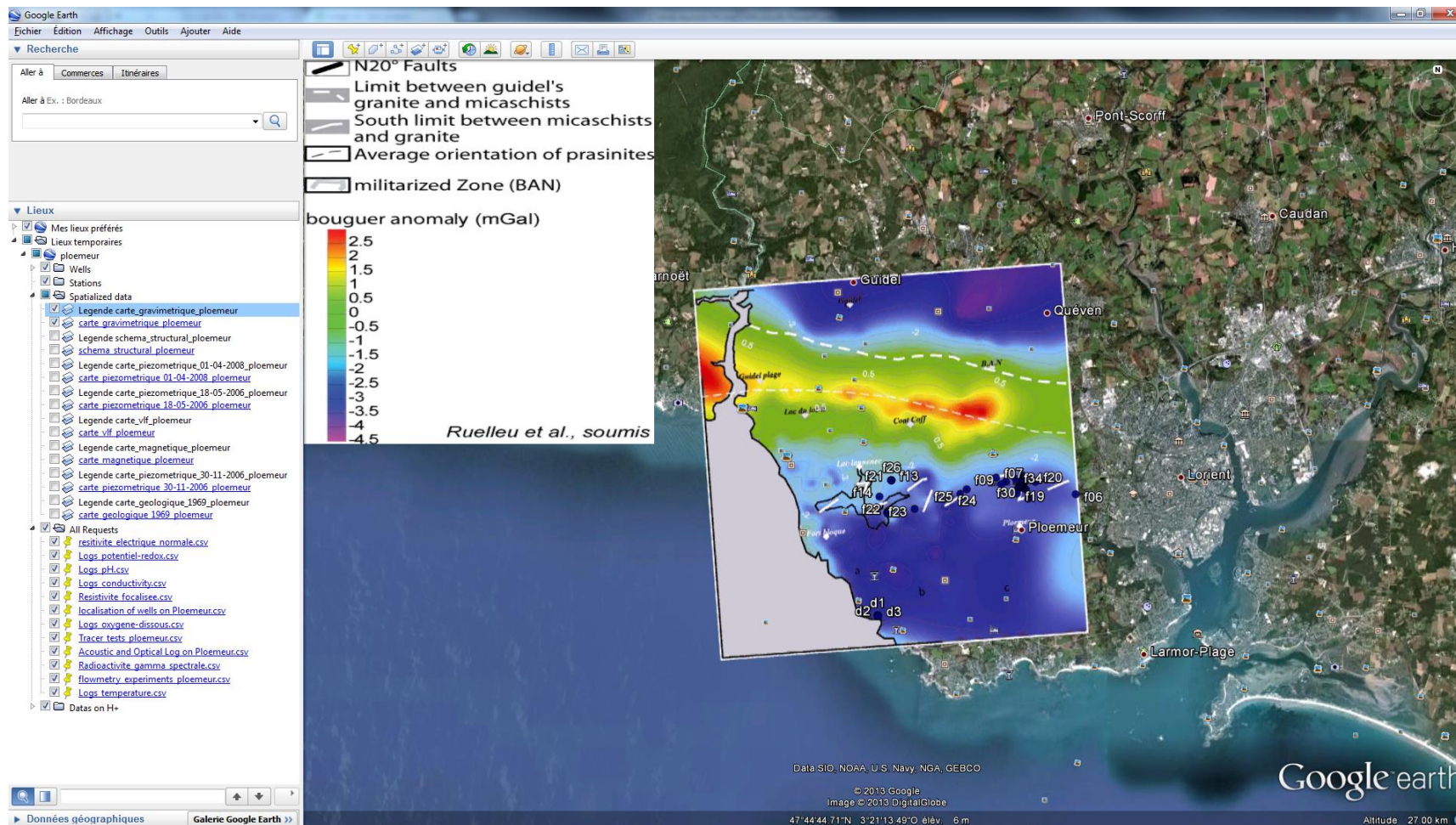


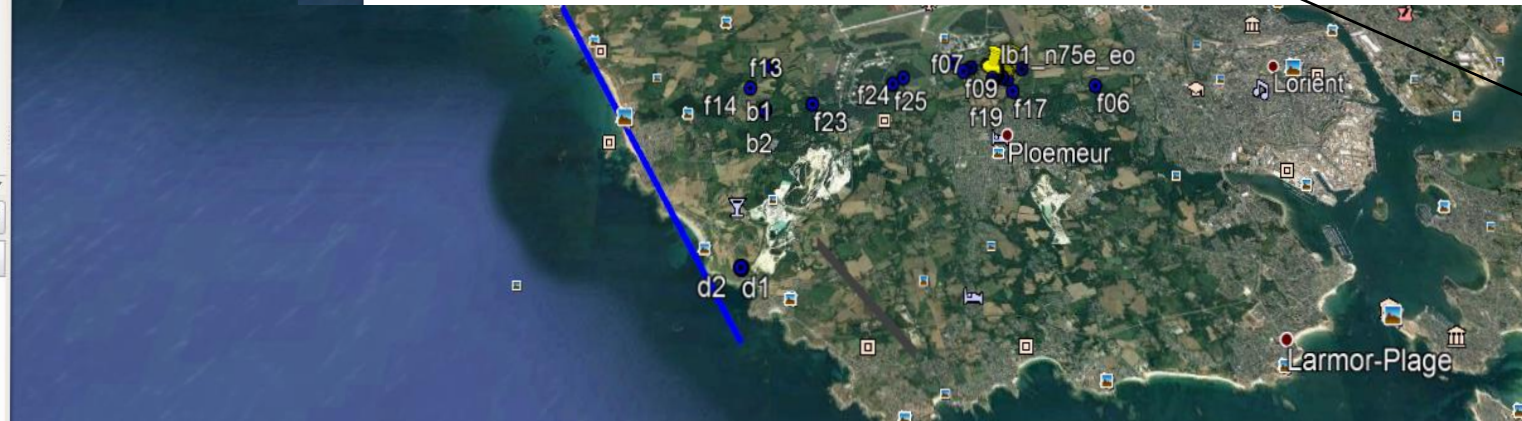
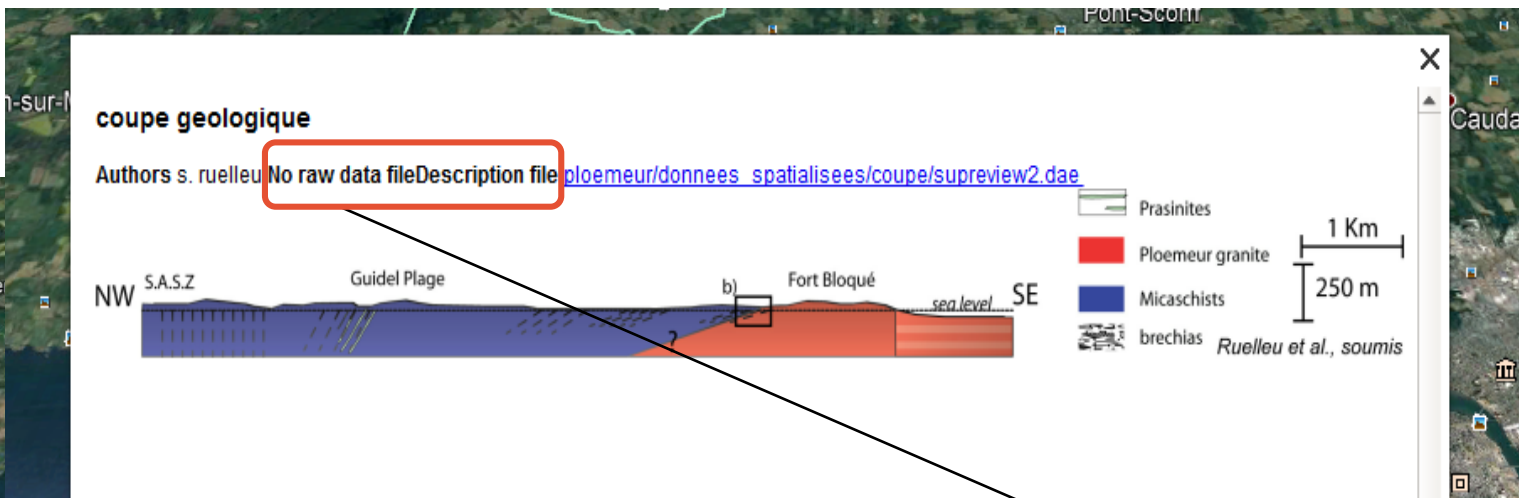
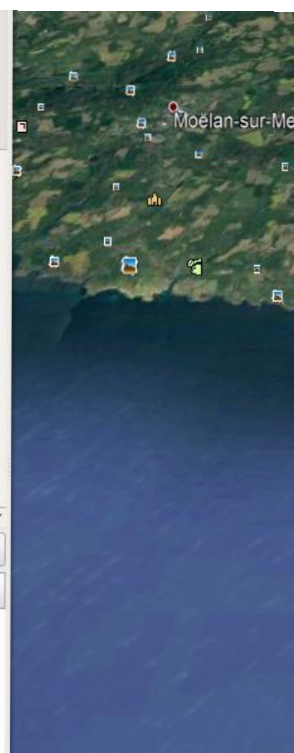
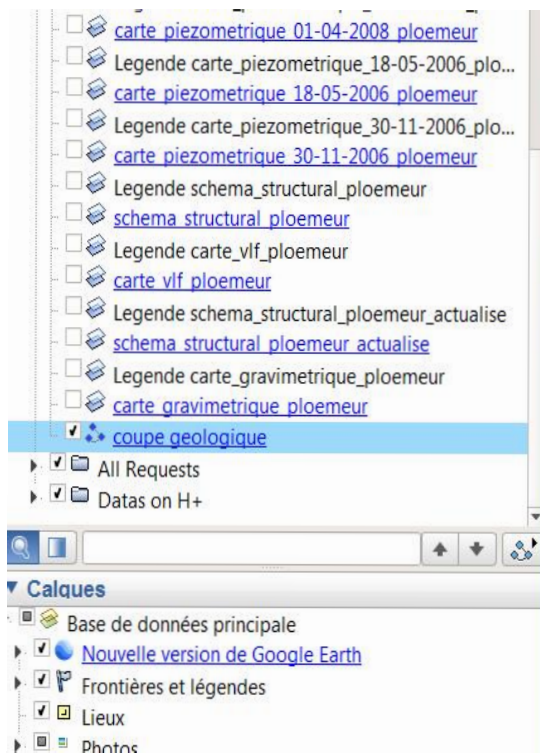
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- Accumulative knowledge
- Availability for the scientific community **website : hplus.ore.fr**





- Data file
- Description file
- Authors ...

Geological cross sections, seismic lines (cross section?)

-> spatialized data :

- 2 geographical coordinates (start and end points),
- image file, data file (segy ...), description file (pdf ...)
- can be linked to an experiment

Surface GPR data

- data file (segy) + image file
- can be linked to an experiment
- link to a network of points (to be created)

Borehole GPR :

radar imaging (like acoustic imaging or optical imaging)

Drone :

image + data file + description file

ERT on surface

- spatialized data : image file + data file + description file
- can be linked to a network of points (to be created)
- can be linked to an experiment
- measurements in data file or in database ?