

Assemblée Générale / Objectif Sciences International

Responsable de Programme de Recherche et d'Éducation aux Sciences */ Research and Educational Program Manager*

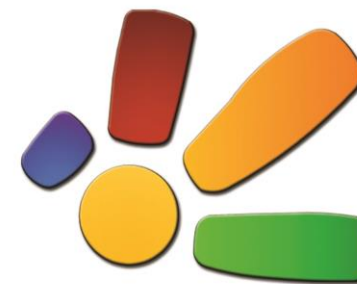


NOM du Programme : **MINEO**

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**Objectif
Sciences
International**

Organisation Internationale Non Gouvernementale

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- 4. Résultats obtenus / *Results***
5. Potentiels de développement et d'amélioration
/ *Development and improvement possibilities*

L'éducation est l'arme la plus puissante qu'on puisse utiliser pour changer le monde.

Nelson Mandela



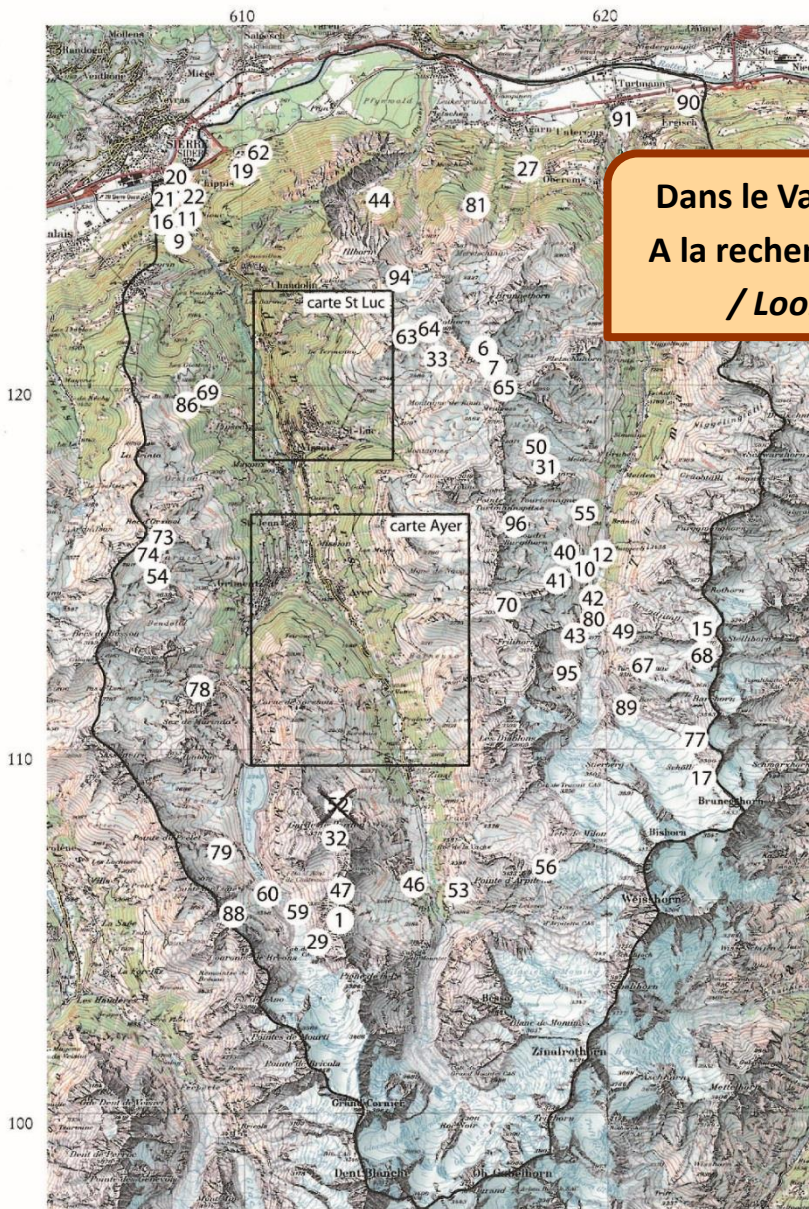


4. Résultats obtenus / *Results*

Découvertes / *Discovery*

Réalisations / *Realisations*

Séjour « Le TrésOR des MINES »



Dans le Val d'Anniviers, en Suisse
A la recherche des mines oubliées
/ Looking for lost mines

Localisation des gîtes
Autorisation de l'Office fédérale de topographie Swisstopo BA071663 du 26.10.2007

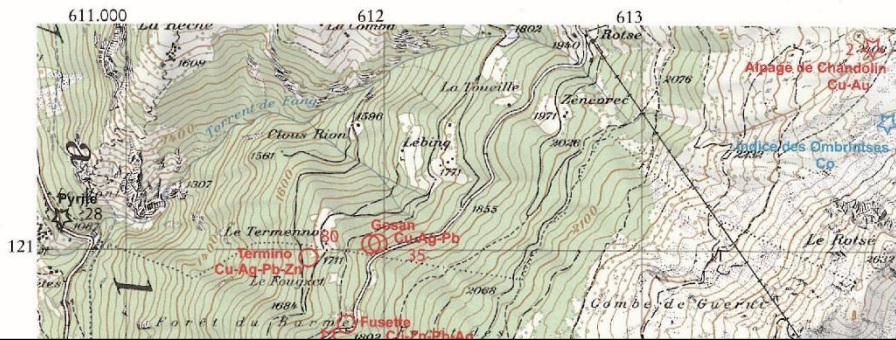
Mines et minéraux du Valais. Tome 2. Anniviers et Tourtemagne.
Stefan Ansermet et Nicolas Meisser. Editions Porte-plumes. 2012.



- 36 mines connues
- Innombrables indices métallifères

• 2 mines étudiées en 2016
/ 2 studied mines





MINE DES MOULINS

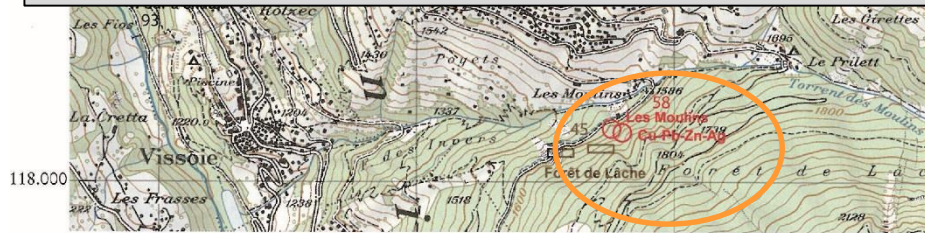
- Exploité de 1820 à 1870
- Mine d'argent, de cuivre et de plomb
- 4 galeries superposées
- Minéralogie complexe

Où est la galerie inférieure ? / Where is the bottom gallery ?

Hypothèses / Hypothesis

Les galeries de la mine des Moulins sont reliées par des descenderies

/ The mine's galleries are connected



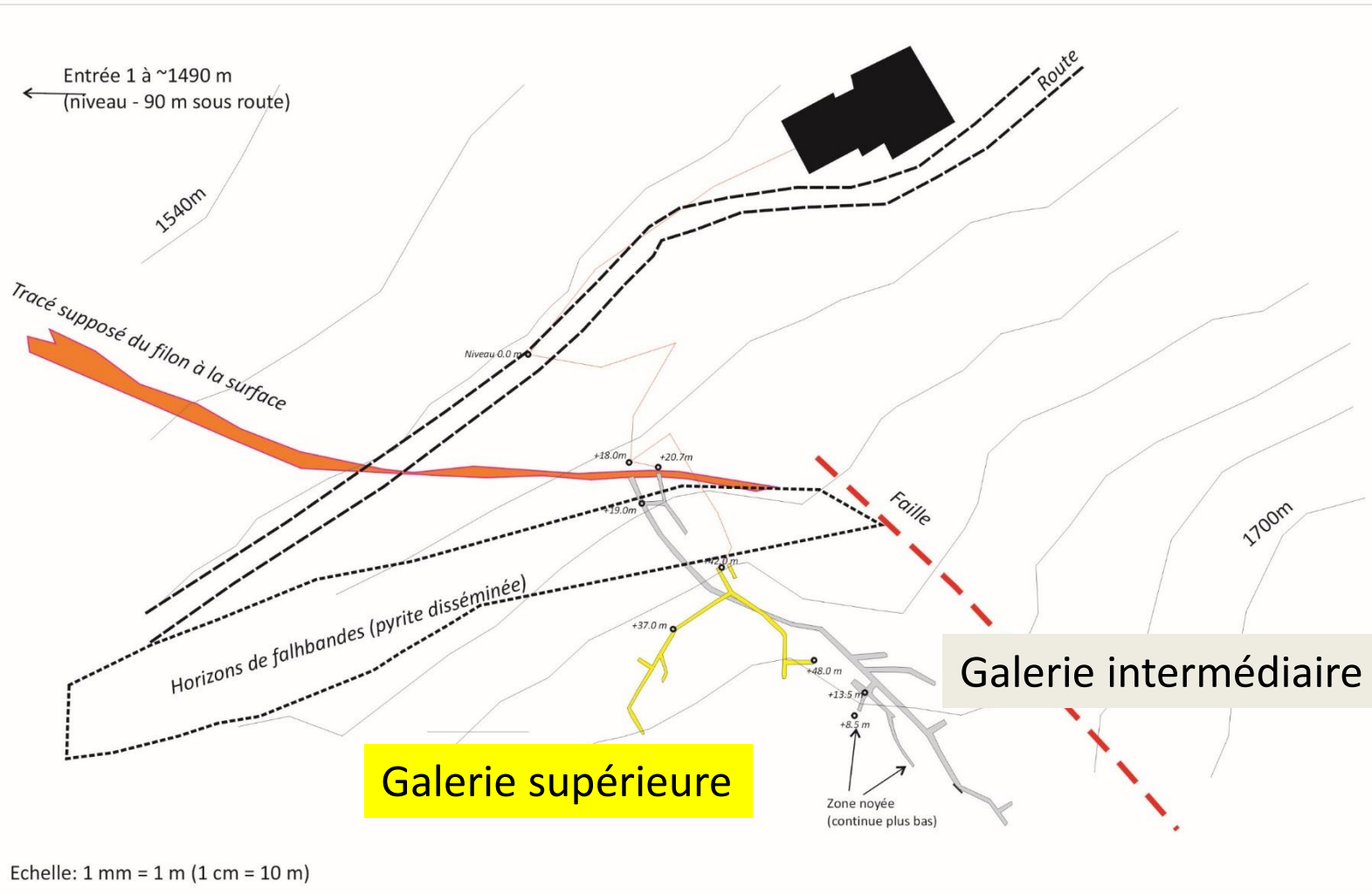
Carte de la région de Saint-Luc
Autorisation de l'Office fédérale de topographie Swisstopo BA071663 du 26.10.2007

- | | |
|---------------------|--|
| ○ Travaux miniers | ■ Cuivre, argent, zinc, bismuth, (plomb, or) |
| ☆ Indice minéralisé | ■ Cobalt, nickel (bismuth, arsenic) |
| □ Fahlbände | ■ Plomb, zinc, argent (cuivre, bismuth) |
| | ■ Autres minéralisations (pyrite) |



4. Résultats obtenus / Results

Carte de la mine des des Moulins



Réalisée lors des camps scientifiques « Le TrésOR des MINES » 2016.

JOUBERT ROMAIN, Neve Adèle, ARNAULT Mélodie, PETER Sarah, COURTEVILLE Anouck, NICOLAZZI Keiko, REYGAGNE Valentin, KLEINE-WEISCHEDE Thomas, ROTH Nicolas, COLMAR Sumäi, NARCY Carla, MAZURIE Anna, BERNTENIS Odysseas, SONNERAT Nolan, KLEINE-WEISCHEDE Thomas, WEBER Timéo, FONLUPT Louis, THRISTAN Théodore, ALFONSI Albert, MELZER Viktoria, Louison et Lucia, Pierre-Alain Wülser, Christophe Gironis, Karol Marty, Emilie Delpech

4. Résultats obtenus / Results

Séjour « Le TrésOR des MINES » Phase contact : la métallurgie ? */ first step: the metallurgy*

CHASSE AUX TRESORS

CRÉE TA PROPRE HISTOIRE

MISE EN SCÈNE



Etape 2 : tous à la mine !

/ second step: the mine

EXTRACTION / *Sample collection*



CONCASSAGE ET TRIAGE / *Sorting*
Directement sur le carreau de la mine



Chalcopyrite : principal minerais de Cu

/ main Cu-rich minerals



Etape 3 : traitement du minerai

/ third step: ore processing

INSTALLATION D'UNE CHAINE DE TRAITEMENT
/ Setting up a processing flowsheet
Lavage, concassage, lavage, tri, broyage, lavage, tamisage, tri, orpillage



Etape 4 : Précipitation des métaux et purification

/ fourth step: precipitation and purification

Grillage du minerai / *Roasting ore*



Décantation du complexe cuivre aminé (avec ammoniac)



Résidu du précipité par cémentation (cuivre) / *Copper powder*



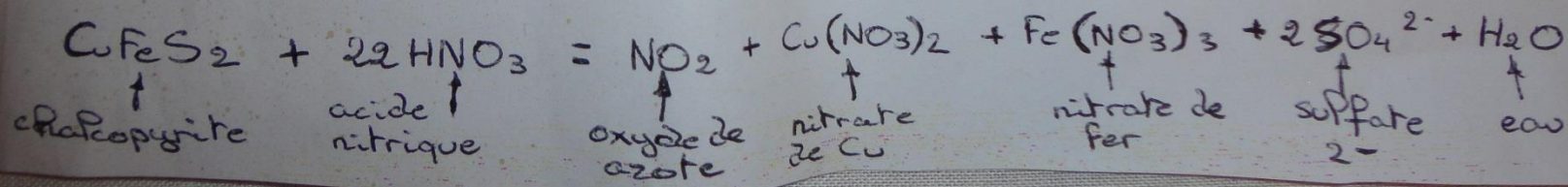
Etape 5 : Présentation et rédaction

/ fifth step: presentation and redaction



**AQUISITION DE SOLIDES
CONNAISSANCES EN CHIMIE**
/ Learning by doing chemistry

**MEILLEURE COMPREHENSION DE
L'ORIGINE DES MATIERES PREMIERES**
*/ Better understanding of raw materials
origin*



4. Résultats obtenus / Results

PRODUCTION 2016 :

- 20g de plomb argentifère / *argent-rich lead*
- 15g de cuivre pur / *Native copper*
- 10 mg d'argent pur / *Native silver*



4. Résultats obtenus / Results

Séjour « Attention Volcans » Elaboration d'un projet pédagogique

- accès journalisme scientifique
/ elaboration of methodology and tools to develop journalism

PRODUCTION 2016 :

- 2 articles scientifiques
- 2 interviews

Consultable sur www.mineo.org

- centré sur « vivre ensemble »
/ focused on social aspect

Séjour 2016 : Serviabilité / helpfulness !

Logistique

Mise en place d'un lieu de stockage

/ Finding a storage place



Volcanic and geophysical phenomena monitoring in Italy

Italy, what a beautiful and volcanic country! Here, at the INGV, the national institute of geophysics and volcanology, volcanoes are studied continuously. The INGV has departments located in main cities and particularly in volcanic areas of Italy. In Sicily, at Catania and in the Aeolian Islands, it studies Stromboli, Vulcano and mainly Etna. How does this institute study volcanoes and particularly the complex volcanic system in Etna?

Etna is complex because it exhibits diverse, current and past, types of eruptions: effusive, explosive and phreatomagmatic. As normal volcano does, Etna is built by the succession of eruptive products which form different layers. In the last years, it erupted up two times in a month, with one or two large eruptions (paroxysm) per year. Today, on the 26th of August 2016, there are four craters in the summit area and more than 250 adventive craters; an adventive crater is formed on the flanks of a volcano. During paroxysm event, Etna produces lava flows and fire-fountains but we cannot predict if it will come out a fissure on the flank, a new crater or fissure. Another specificity of this volcano is that since the eruptions of 2001 and 2002, which were very explosives and unexpected, it's today one of the most studied volcanoes in the world.

Here is a short history of some famous eruptions at Etna:

- In 1669, a big eruption which came from Monti Rossi arrived in Catania and partially burned it.
- In 1893, Sicilians first tried to divert the lava flow that threatened Catania.
- In 1991, Italian and American marine forces (and fishermen) successfully diverted the lava flow that threatened Zafferana.

In conclusion, Etna is an unusual volcano which is interesting for many scientists worldwide. Thus, it is covered by plenty of measurement and geolocalisation equipments installed by the INGV. Currently it monitors a network of approximately 200 stations.

INGV has two main missions:

- To study volcanoes and to try understanding them,
- To inform the Civil Protection and the government to protect the population.

To study the volcano the institute collects information in real time on the three zones: East, South and West.

- There is about sixty seismic stations around the volcano. A meaningful increase of seismic activity can be caused by the ascension of magma in the magmatic conduits.
- Infrasonic stations to localize where magma rises along a conduit
- GPS radio stations to monitor the movement of rocks on surface
- Clinometric stations to measure the angle of the slope and detect small swelling or collapse of all the edifice
- Camera to look at the summit (two types: thermal to detect the heat in the night and visible)
- Meteorological stations to study the wind and smoke clouds directions to inform airports
- Gravimetric stations to analyze change in gravity, modified when a hot liquid is under the crust
- Magnetic stations, because a fluid present under the crust disrupt the magnetism the most studied volcanoes in the world.

INGV's researchers normally climb Etna's summit to make observations each week but when the volcano is in activity they try to go even more often because of the importance to collect observations continuously.

They collect observations like morphological variations and bring back samples of lava or tephra to study them in the INGV laboratory. In the laboratory at Catania, scientists like Daniele Andronico analyze the components and the morphology of ash to comprehend the eruptive dynamism and to follow the shifting of the magma level in the volcanic conduit. Ash can be composed of fresh magma, called "juvenile", of crystals, or "lithic fragments" composed of pre-existing rocks, and displays different morphologies (vesicular, fluidal, elongated and compact). All the information is sent to the central control room in Catania. Here, there is always someone present because they make 24-hours rotations (0-8h, 8-16h and 16-24h). They collect information on Etna, but also keep eyes open on the entire Italy and all around the World, no to miss any possible origin for some earthquakes.

INGV has however some limitation to collect information:

- It's difficult to obtain permission from the government to film public places on volcanoes.
- It's even more difficult to find suitable places to install sensors and cameras.
- There are too many sensors and it causes additional problems.
- Lighting storms can also cut off the power in sensors and cameras. It's expensive to send people or drones to repair them.
- Before the economic crisis in 2007-2008, they had enough money to maintain all the sensors and video cameras, even when they got damaged. Today, it's more difficult.

In conclusion studying a volcano requires a multitude of data. Like at the INGV, an efficient research in volcanology and geophysics requires a real time survey, continuous observation, reliable and robust equipment, many analyses of rocks, earthquakes monitoring and many other data.



Article written by Elouan, Raphaëlle and François, the participants of the scientific expedition « Attention Volcans ». It's organised by the program MINEO of Objectif Sciences International (OSI). The 26th August 2016.



Objectif
Sciences
International
25 YEARS
INGO
ANS 1992
ANS 2017

4. Résultats Obtenus (suite) / Results

Réalisations / Productions

- ✓ 7 Journaux de bord / 7 *daily journals*
- ✓ 2 articles scientifiques / 2 *articles*
- ✓ 5 vidéos / 5 *clips*
- ✓ Posters / *posters*
- ✓ Fiches techniques et fiches d'activités / *technical forms*

