



Insegnaci Etna 2019



IISS Benedetto Radice
Bronte, Sicilia
10-14 October 2019

Seminario di Geoscienze Insegnaci Etna 2019

(IISS Benedetto Radice, October 10-14, 2019)

Welcome! Benvenuti!

Dear teachers,

Welcome to the 2019 edition of the Insegnaci Etna School!

As you know, this school reunites a number of schools from eastern Sicily, an extraordinary area, obviously one of the most fantastic in Europe, for teaching many aspect of the geosciences directly in the field. . And not only about the Etna volcano, but also about earthquakes, tsunami, meteorology, geo-environment, and the relations that exist between all these elements (and hazards) with the people who are living in that area.

We are very happy about the renewed and increasing presence of EduMed, a newly created Observatory (University Côte d'Azur) at Nice, in France. This new Observatory, and its European partners, have largely widened the field of their didactic activity to all aspects of the geosciences (and geo-hazards) in the Mediterranean, now not limited to earthquakes. Etna is, of course, a perfect candidate to bring European teachers and their classes in direct contact with various aspects of geosciences well beyond the seismology-only classes.

Also, thanks to a financial help of the European Geoscience Union (EGU), it has been possible this year to invite 6 teachers from Albania, France, Greece, Portugal and the United Kingdom to participate to this school. We hope that this first step will favour exchanges among teachers (from intermediate and high schools) from all Europe, and their will to continue beyond this School with exchanges of students and classes. In this exchange the schools (intermediate and high schools) of the Etna region are playing a key role because these connexions are taking place and growing within their premises, on the slopes of Etna. We believe that this is an extraordinary opportunity for both the Sicilian and European teachers.

During the first day of the school, you will have several presentations by well known scientists on different aspects of the Etna: its eruptions, the way to survey its volcanic activity and also its vegetation, all different aspects of the « life » of the volcano.

In the second day, you will have the opportunity to follow three different « Classrooms activities » on earthquakes, with the « Sismobox », on measuring the optical density of the atmosphere, particularly around the Etna, with the Calitoo photometer, and also the Seismo data analysis. This last activity will also stage the students from the IISS Benedetto Radice who have exploited the data collected by the pedagogical seismographs around the Etna. Pupils from Acireale and Riposto will also present their activity.

These « classroom activities » will continue on the third day, with the presentation of the « Hydrologic warehouse », followed by a « Satellite warehouse » a series of presentation of the utilisation of didactic programs distributed by the European Space Agency (ESA).

The beauty and the power of the Etna volcano have fascinated not only scientists, but also poets and historian. It is not surprising that myths and legends have been numerous around the Etna. And it is, therefore, also natural that the last presentation on the third day will deal with this aspect.

In the afternoon of Saturday we'll visit a farm of pistachios, a fruit which has made Bronte famous, not only in Sicily, not only in Italy, but worldwide!

And the day will end with a presentation of the excursion for Sunday, by the leaders of this excursion. And Sunday we will enjoy all the different aspects of the excursion!

It will then be the time for a Goodbye! and Arrivederci all'anno prossimo !, sempre più numerosi !

The Organizing Committee of Insegnaci Etna 2019

Ringraziamenti / acknowledgements

We would like to thank all the persons and institutions that have contributed to the organization of Insegnaci Etna 2019!

First, Mrs Maria-Pia Calanna, Headmaster, and all the personnel of the IISS Benedetto Radice, whose warm welcome in their school has been instrumental for the success of this school! And we do not wish to forget all the other persons from this school!

The EDUMED organization, whose contribution is not only limited to this school, but extends also all year around for discussions and installation of new instruments.

The European Geoscience Union, whose financial contribution has made possible for the first time the participation of European teachers from outside Italy, and thus contributed to the establishment of contacts among teachers on an European scale.

The Istituto Nazionale di Geofisica e Vulcanologia - Osservatorio Etneo at Catania, for its overall contributions, notably the participation of high-class internationally known speakers.

The European Space Agency (ESA) for providing the material and the speaker of the “Satellite Warehouse”.

The Educational Association Eugea for financial help.

Maria Privitera for her invaluable, efficient and kind action in the organization of the School.

...and we thank all the speakers who have contributed to this educational workshop and their institutions!

Seminario di Geoscienze Insegnaci Etna 2019 (IISS Benedetto Radice, October 10-14, 2019) *Program*

Thursday October 10, 2019

9:00 Welcome Adresses and Introduction

- Maria-Pia Calanna, dirigente dell'IISS Benedetto Radice
- Sindaco di Bronte
- Sebastiana Fisticaro, USR Sicilia
- Carlo Laj, European Geophysical Union

Parte 1 : Eruzioni e monitoraggio/ Eruptions and surveying

9:30 – 10:10

Boris Behncke, INGV-OE

L'attività presente dell'Etna, eruzione recenti, tipi di eruzione, bellezza dell'attività vulcanica.

Present activity of the Etna, recent eruptions, types of eruptions, beauty of volcanic activity

10:10 – 10:50

Salvatore Consoli, INGV-OE

Strumenti e rete di monitoraggio vulcanico dell'Etna

Instruments and surveying network of the Etna

10:50 – 11:20 Coffee Break

Parte 2: Conoscere i rischi / Know the risks

11:20 – 12:00

Alessandro Bonforte, Giuseppe Patti, Maria Assunta Giuffrida, Giorgio D'Amico, Giovanni Spadaro + alunni Liceo Archimede Acireale

Il progetto INGV-Archimede “Georischi: Conoscendo mi difendo”

The INGV project Archimede : “Georisks : knowing I defend myself”

12:00 – 12:40

Francesca Cifelli

Terremoti e rischi

Earthquakes and risks

12:40 – 14:10 Lunch Break

Parte 3: "Κίον οὐρανία" A Muntagna/ The mountain

14:10 – 14:50

Stefano Branca, INGV-OE

Current knowledge of Etna's flank eruptions over the past 2500 years

14:50 – 15:30

Emilia Poli-Marchese & Giuseppe Patti

Un viaggio intorno alla carta della vegetazione dell'Etna

A trip around the Etna vegetation map

15:15 – 16:00

Discussione Generale – General Discussion

Friday October 11, 2019

Three different activities at the IISS Benedetto Radice

Working Languages: English, Italian and French

Each activity is presented three times, in order to divide the attending teachers in three groups of 12-13 people each. The duration of each activity is 2 hours

Timetable for the activities for Friday 11

8:30 – 10:30

11:00 – 13:00

Afternoon

14:30 – 16:30

Activity 1 (animated by Francesca Cifelli): The "**Sismobox warehouse**": how to use the sismobox to show your students the different aspects of seismicity contained in the sismobox

Activity 2 (animated by Diane Carrer and Fabrice Mourau): **the "Calitoo Warehouse"** how the monitoring of the optical density of the atmosphere (including the presence of particles in the plume of Etna)

Activity 3 (animated by Jean-Luc Berenguer): "**Seismo-data Warehouse**" how to analyze and interpret the data registered by the pedagogical seismographs installed around the Etna in the Insegnaci Etna framework, together with the students of the IISS Benedetto Radice.

Starting at 16:30 during the rest of the afternoon:

- the students of Bronte will show the results they have obtained in seismology (seismic crisis relative to the Christmas 2018 eruption by the students of Bronte)
- The students from the Istituto Nautico of Riposto will describe the installation and first results concerning the tides in the harbour of Riposto
- The students from the IC "Galileo Galilei" at Acireale will describe the results obtained with the Calitoo spectrophotometer.

Saturday October 12, 2019

Activity 4 (animated by Fabrice Mourau): "**Idrogeologic Warehouse**": how to monitor of superficial and underground waters using pedagogical hydrogeologic sensors

Activity 5 (animated by Amalia Castro Gómez): "**Satellite Warehouse**" how to read and use the data from the satellites of the European Space Agency (ESA), with exemples and utilisation of the didactic programs distributed by ESA.

12:30 -13:00

Louisa Laj
Miti e leggende greche e romane dell'Etna

13:00 – 14:30 Lunch Break

14:30 -17:00

Visita dell'azienda di Pistacchi con Biagio Fallico
Visit to the Pistakio farm with Biagio Fallico

At the IISS Benedetto Radice:

17:30-18:00

Angelo Spitalieri
Responsabile del CAI di Bronte
Introduzione all'escursione geologica di Domenica 13 Ottobre

18:30 – 19:30

Giuseppe Patti
Some rocks you may encounter during the excursion (and some other too!)

Sunday October 13, 2019

Escursione con Angelo Spitalieri, Emilia Poli-Marchese, Giuseppe Patti, ...

SPEAKERS AND ABSTRACTS



Boris Behncke

Research Scientist
Istituto Nazionale di Geofisica e Vulcanologia
& Osservatorio Etneo
Catania

Nato a Frankfurt (Francoforte) sul Meno in Germania, Boris Behncke vive in Sicilia dalla metà degli anni 1990 ed è ricercatore presso l'Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo, Catania (INGV-OE).

Vulcanologo di formazione (laureato in Germania, dottorato in Italia), Behncke si occupa della mappatura di nuovi prodotti eruttivi sui vulcani attivi siciliani, ed è responsabile degli aggiornamenti sull'attività vulcanica sul sito dell'INGV-OE.

Inoltre, si occupa di divulgazione sia presso l'INGV-OE sia presso scuole e altri forum, e spesso tiene conferenze pubbliche a proposito delle problematiche legate alla vita su un vulcano attivo come l'Etna. Behncke è autore di più di 40 pubblicazioni su riviste internazionali e ha partecipato a numerosi convegni nazionali ed internazionali.

Oltre dell'Etna, Boris Behncke è affascinato dalla gente dell'Etna, gli etnei, che per lui rappresentano una specie molto particolare, la cui mentalità, e il cui linguaggio rispecchiano in molti rispetti il loro rapporto con l'Etna e con questa terra, quasi sempre estremamente accogliente ma a volte altrettanto ostile e violenta.

Born in Frankfurt am Main in Germany, Boris Behncke lives in Sicily from the mid 1990s and is a research Scientist at the Istituto Nazionale di Geofisica e Vulcanologia, Osservatorio Etneo, Catania (INGV-OE).

As a volcanologist (Laurea in Germany, PhD in Italy), Behncke is working on the description of new eruptive products of active Sicilian volcanoes, and he is responsible for updating of volcanic activity on the site of INGV-OE.

In addition, he is active in the divulgation at the INGV-OE as well as in the schools and other forums, and often in public conferences, on the theme and issues relative to the "life" of an active volcano such as Etna. Behncke is the author of more than 40 articles in international scientific journals and has participated to numerous national and international conferences.

In addition to the Etna, Boris Behncke is fascinated by "the people of the Etna" the "Etnai", who for him represent some sort of particular population, whose mentality and language reflect in many aspects their relation to the Etna and to this land, almost always extremely welcoming but sometimes just as hostile and violent.

L'Etna: storie di eruzioni, di disastri e di bellezza

Boris Behncke

Istituto Nazionale di Geofisica e Vulcanologia – Osservatorio Etneo

Uno dei vulcani più attivi al mondo, l'Etna è certamente quello più “versatile”, unendo nella sua vasta gamma di fenomeni vulcanici praticamente tutti gli stili eruttivi conosciuti. Eruzioni sommitali, sono quelle che avvengono ad uno o più dei quattro (e mezzo?) crateri che si aprono in cima al vulcano: a volte estremamente violente e spettacolari, le eruzioni sommitali non rappresentano una minaccia immediata per le vite e la proprietà delle persone che abitano intorno all'Etna. Potenzialmente più pericolose e, in rari casi, devastanti, sono le eruzioni di fianco: esse si svolgono a bocche e fessure che si aprono sui fianchi della montagna, a volte anche a quote molto basse e quindi nelle vicinanze delle aree popolate. Mentre l'attività sommitale è quasi continua, anche se subisce forti fluttuazioni, le eruzioni di fianco avvengono ad intervalli irregolari, che vanno da pochi mesi a diversi decenni. L'eruzione di dicembre 2018 è stata la prima eruzione di fianco dopo più di 10 anni e fortunatamente non ha minacciato aree abitate; tuttavia l'attività sismica che l'ha accompagnata e seguita ha causato estesi danni nel settore sud-orientale del vulcano. Saranno illustrati i processi che portano alla transizione da eruzioni sommitali a quelle di fianco, e il rapporto fra accumulo/intrusione di magma ed i movimenti del fianco orientale, che spesso provoca terremoti potenzialmente distruttivi.

Etna: tales of eruptions, disasters, and beauty

One of the most active volcanoes on Earth, Etna is certainly the most “versatile” volcano, whose vast range of eruptive phenomena covers practically all known eruptive styles. Summit eruptions are those that take place at one or more of the four (and a half?) craters that open at the top of the volcano: at times extremely violent and spectacular, summit eruptions are not a direct threat to the lives and property of the people living around Etna. Flank eruptions, on the other hand, can be potentially dangerous and, in rare cases, also devastating; these take place at craters and fissures that open at lower elevation on the flanks of the mountain, sometimes at rather low elevation, and thus close to populated areas. Whereas summit activity is almost continuous, though with significant fluctuations, flank eruptions take place at irregular intervals, which range from a few months to several decades. The December 2018 eruption was the first flank eruption after more than 10 years, and fortunately did not threaten inhabited areas; however, intense seismic activity accompanying and following the eruption caused extensive damage in the southeastern sector of the volcano. We will illustrate the processes that cause the transition from summit to flank eruptions and the relationship between magma accumulation/intrusion, and the instability and movements of the eastern flank, which often provokes potentially destructive earthquakes.



Salvatore Consoli

INGV-OE

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EDUCATION

Diploma di maturità scientifica presso il Liceo Scientifico statale Archimede di Acireale .
Diploma di Alpiere scelto
Diploma di operatore professionale di campagna per tecniche Real-Time GPS
Attestato del C.N.S.A.S. (soccorso alpino)

CAREER

Responsabile dell'Autoparco dell'INGV sezione di Catania. Dal 1999 ad oggi partecipazione alle campagne di misura dell'Etna e delle Isole Eolie finalizzate al monitoraggio delle deformazioni del suolo con il conseguimento di esperienza e competenza professionale sia nell'uso del geodimetro di alta precisione AGA 6000 che di tutta la strumentazione GPS utilizzata dalla sezione INGV di Catania. Organizzazione delle attività di misura delle reti periodiche geodetiche della Sez. di Catania. Attività di supporto logistico al gruppo vulcanologico; in particolare ,durante la collaborazione con quest'ultimo, sono stati svolti rilievi, attraverso varie tecniche (GPS-Kinematic, telecamera termica, distanziometriche, di temperatura), su campi lavici dell'Etna. Collaborazione alla realizzazione e all'installazione della rete di telecamere dedicata alla sorveglianza e al monitoraggio dei vulcani attivi della Sicilia orientale. Conduzione mezzi d'alta montagna (motoslitta-gatto delle nevi-quad) di supporto per le attività di manutenzione delle stazioni permanenti GPS, delle stazioni remote e della sorveglianza vulcanica. Turni di presidio H24 svolti presso la sala operativa di Catania.

PUBLICATIONS AND SERVICES

Alessandro Bonforte, Sonia Fagone, Carmelo Giardina, Simone Genovese, Gianpiero Aiesi, Francesco Calvagna, Massimo Cantarero, Orazio Consoli, Salvatore Consoli, Francesco Guglielmino, Biagio Puglisi, Giuseppe Puglisi & Benedetto Saraceno. (2016).

Global positioning system survey data for active seismic and volcanic areas of eastern Sicily, 1994 to 2013 Scientific Data. DOI: 10.1038/sdata.2016.62

Bonforte, A. Brandi, G. Calvagna, F. Consoli, S. Gambino, S. Guglielmino, F. Obrizzo, F. Puglisi, G. Saraceno, B. (2011) The trecastagni fault (Mt. Etna): Integrated approach and installation of a leveling network for vertical ground deformation monitoring, La Faglia di Trecastagni (M. Etna): approccio integrato e realizzazione di una rete di livellazione per il monitoraggio dei movimenti verticali del suolo. Quaderni di Geofisica

Geodetic surveys: Logistics and measurements

Stefano Consoli

Istituto Nazionale di Geofisica e Vulcanologia - Osservatorio Etno

Sicilian volcanoes are among the very first in the World to be studied by geodetic techniques. First geodetic networks were installed in the '70 and since then a fairly continuous monitoring was never interrupted, providing one of the longest and most complete time series in the World. In the last four decades, the geodetic networks evolved from discrete terrestrial networks to continuous terrestrial and spatial networks. The oldest networks were based mainly on optical topographic systems, EDM (i.e. distance measurements) and levelling measurements (i.e. a mono-dimensional height variation); current geodetic networks are based on the tri-dimensional GNSS measurements, even if some techniques, such as the levelling one, are still applied due to their higher precision. This evolution was performed with big effort both on engineering and logistics, in order to obtain more data and improve the knowledge of phenomena; in fact, thanks to the change from optical to satellite-based techniques, several benchmarks were moved to more accessible sites in order to reduce the installation times and efforts, and much other benchmarks were added to the initial network configuration, in order to improve the spatial resolution. The new benchmarks design was also thought to minimize the installation errors and the sites were chosen to allow semi-permanent installations for temporary continuous monitoring of the ongoing phenomena.

I vulcani siciliani sono stati tra i primi ad essere studiati con tecniche geodetiche. Le prime reti geodetiche furono installate negli anni '70 e, da allora, il continuo monitoraggio geodetico non è mai stato interrotto, producendo una delle serie storiche di misura più lunghe e complete al mondo. Negli ultimi quattro decenni, le reti geodetiche si sono evolute da reti terrestri discrete a reti terrestri e spaziali continue. Le reti più vecchie si basavano principalmente su misurazioni ottiche, EDM (misura di distanze) e di livellazione (ovvero una misura mono-dimensionale di altezza); le attuali reti geodetiche si basano su misurazioni GNSS tridimensionali, anche se alcune tecniche, come la livellazione, sono ancora utilizzate per la loro maggiore precisione. Questa evoluzione è stata possibile grazie al grande sforzo sia ingegneristico che logistico, al fine di ottenere più dati e migliorare la conoscenza dei fenomeni; infatti, grazie al passaggio dalle tecniche ottiche a quelle spaziali, molti capisaldi sono stati reinstallati in siti più accessibili per ridurre i tempi e gli sforzi per le installazioni, e molti altri sono stati aggiunti alla configurazione iniziale della rete, per migliorare la risoluzione spaziale. I nuovi capisaldi sono anche stati progettati per minimizzare gli errori di installazione ed i siti sono stati scelti per permettere installazioni semi-permanenti per il monitoraggio continuo temporaneo di fenomeni in corso.



Alessandro Bonforte

Researcher

Istituto Nazionale di Geofisica e Vulcanologia
Sezione di Catania – Osservatorio Etneo
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EDUCATION

Alessandro Bonforte achieved the Degree in Geology in 1994. He performed a National CNR fellowship in 1997-1998 participating also to the International course on Volcanic hazard assessment, monitoring and risk mitigation at University of Azores and, in the same year, to same stages at IPGP in France. Since 1999 he started his Doctorate course, achieving the PhD in 2002, by studying the ground deformation on volcanic (Etna) and tectonic (Hyblean Plateau) environments, followed by a Research Grant from 2002 to 2003; during this period he participated to the volcanic emergencies due to Etna eruptions in 2001 and 2002-2003 and Stromboli eruption in 2002-2003.

CAREER

1997-1998	Fellowship CNR-IIV
1998-1999	Cooperation contract CNR-IIV
1999-2002	PhD University of Catania
2002-2003	Research Grant INGV
2003-present	Researcher INGV

RESEARCH INTERESTS

Geophysicist, volcanologist. Interested in studying the geodynamics controlling volcanic and tectonic activity and the shallow and deep structure of volcanoes, such as their feeding system, structural assessment and flank instability, mainly through crustal deformation analysis by terrestrial and spatial techniques, remote sensing and integration of multidisciplinary (geophysical, geochemical, geological) data and computer modelling. Involved in all emergencies on Etna and Stromboli volcanoes.

PUBLICATIONS AND SERVICES

Recent publications on international journals deal about the deformation affecting Sicilian volcanoes (Etna, Stromboli, Eolian islands) and measured by a multidisciplinary and integrated approach (ground and satellite techniques) and tectonic areas of eastern Sicily, modeling of the volcanic sources, comparison and integration with other multiparametric data (seismicity, gravity, geochemistry).

Since the beginning of his work at INGV he is involved in real-time surveillance in the control room, as well as in participation to external emergencies such as in El Salvador in 2014.

AWARDS AND HONORS

In 2014 he was awarded by the Lifetime Achievement Award (Premio alla Carriera) by Telethon & ConfCulture, Catania (Italia).



Giuseppe Patti

Docente scuola superiore
Liceo Scientifico “Archimede” Acireale (CT), Sicilia, Italia
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EDUCATION

1988 - Laurea in Scienze Geologiche

CAREER

Dal 1990 Docente Geografia e di Scienze della Terra, Chimica e Biologia presso Istituti superiori. Attualmente presso il Liceo Scientifico “Archimede” di Acireale (CT), Sicilia, Italia.

Docenza: “Cartografia tematica e fotointerpretazione” nell'ambito del Master in "Procedure di Valutazione d'Impatto Ambientale"

Attività libera professione

Dal 1988: Professione Geologo

1994 - Società di Botanica Italiana - Ministero dell'Ambiente – CEE - Rilevatore censimento e cartografia "Progetto di ricerca sugli habitats prioritari presenti in Sicilia"

1996 - Dipartimento di Biologia Animale dell'Università di Catania - Censimento dei Siti di Importanza Comunitaria (SIC) della Regione Siciliana, nell'ambito del Progetto Bioitaly.

2003 – 2004 - Ente Parco dell'Etna

Consulenza per la realizzazione del progetto: “Potenziamento ed introduzione dati nel sistema informativo territoriale del Parco dell'Etna, con funzione di osservatorio locale sull'ambiente”.

RESEARCH INTERESTS AND SERVICES

1982 – 1989 - Istituto Internazionale di Vulcanologia di Catania - Ricerca

rilevamento e raccolta dati macrosismici e vulcanologici nell'area etnea

1983 – 2002 -. Realizzazione: “Carta degli ambienti naturali dell'Etna”, Gruppo di lavoro progetto P. O. P. Sicilia "Inquinamento ed erosione del suolo: indagine sperimentale su valutazione e controllo dell'erosione".

AWARDS AND HONORS

**ASUform - Università di Catania e la Rete delle Istituzioni scolastiche della Provincia di Catania
- Componente gruppo di lavoro materie Scientifiche**

Il progetto INGV-Archimede “Georisch: Conoscendo mi difendo”

Alessandro Bonforte

*Istituto Nazionale di Geofisica e Vulcanologia Sezione di Catania – Osservatorio Etneo
&*

**Giuseppe Patti, Maria Assunta Giuffrida, D'Amico Giorgio, Giovanni Spadaro + alunni
Liceo Scientifico "Archimede" di Acireale**

Il progetto “Georisch: Conoscendo mi Difendo” nasce dalla volontà di formare ed educare i giovani studenti del Liceo Scientifico alla comprensione e gestione dei rischi naturali legati al territorio in cui vivono. Una migliore formazione in questo campo può favorire ed accelerare un processo di educazione civile e di interazione tra il mondo della Ricerca e quello della Scuola, chiamando anch'essa ad operare nel delicato settore della conoscenza e difesa del territorio. Una migliore educazione alla gestione del territorio può migliorare la consapevolezza ed abbassare il "rischio", oltre a innescare un processo di interazione virtuosa con il mondo della Ricerca con gli studenti che vengono anche educati ad adottare una metodologia d'intervento e di analisi con approccio scientifico.

Il progetto è stato articolato alternando lezioni e seminari con numerose escursioni nel territorio etneo ed attività pratiche. Le lezioni sono state svolte da diversi ricercatori dell'INGV e programmate in modo da coprire aspetti molto diversi della ricerca scientifica, in modo da far capire agli studenti la complessità degli studi che vengono condotti per la comprensione dei fenomeni geologici e geodinamici. Le escursioni, della durata di una intera giornata ciascuno, sono state dedicate alla visione del territorio da un punto di vista non solo paesaggistico ma analitico, analizzando ed evidenziando le morfologie e fenomenologie, associabili a diversi rischi naturali (vulcanico, sismico, idraulico, idrogeologico). Tutte le attività sono state documentate da diari e fotografie per studi futuri. Tutte le attività sono state divulgate tramite un sito web dedicato, creato dagli studenti, e attraverso le pagine social del progetto, così i prodotti ottenuti sono stati diffusi sempre attraverso il web (#georischiasl).

The “Georisch: Conoscendo mi Difendo” (Knowing I defend myself) project was created for form and educate the young students of scientific High School to the knowledge and management of natural risks related to the territory where they live. A better formation in this field may spur and accelerate a civic education process and interaction between the research and school universes, involving the school in operating in the knowledge and sustainable development fields. A better education in the management of the territory may contribute to the awareness of the students and to the reduction of the “risk”; it may favor a virtuous interaction with the research activities, educating the students also to adopt more scientific methodologies and practices in their analytical approach.

The structure of the project has been designed alternating seminars and lectures with several practical and external activities in the field. Lectures have been performed by several INGV researchers and planned in order to cover much different fields of the research activities, to let the students understand the complexity of the studies carried out for investigating the geological and geodynamic phenomena. Excursions in the field, lasting one entire day each, have been devoted to look at the territory not only for the beautiful landscapes but by analyzing and highlighting the morphology and associated phenomena, related to different natural hazards (such as volcanic, seismic, hydrologic and hydrogeologic). All performed activities have been documented by diaries and photos for future studies. Everything has been divulgated through a dedicated website, created by the students, and through social networks, as well as the products of the project have been disseminated through the web (#georischiasl)

Website: <https://georischiwixsite.com/conoscendomidifendo>

Instagram: <https://www.instagram.com/georisch/>

Facebook: <https://www.facebook.com/pages/category/Website/Geo-rischi-conoscendo-mi-difendo-1832327490133173/>



Francesca Cifelli

Associate Professor
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I am associate professor in structural geology at the Department of Science of Roma TRE University. My research activity mainly focuses on paleomagnetic studies applied to the reconstruction of the rotational history and structural evolution of curved mountain chains. I'm very active in science communication and high-school teachers training. I'm a member of Educational Committee of Education (CoE) of the European Geosciences Union (EGU) for the organization of the GIFT (Geophysical Information for Teachers) workshop.

Earthquakes in the classroom

Francesca Cifelli

Università degli Studi di Roma TRE, Rome, Italy

To prevent population against seismic risk, people must know where earthquakes take places, when earthquakes occur and how much is the released energy. In Italy, many people seem not to be aware of the seismic risk. This 'insensibility' mainly derives from the lack of education to the knowledge of the territory where citizens live. The only way forward is to educate new generations to a deep awareness of risk. This task can be reached effectively only by school, which is the best place for the growth and training of young people destined to occupy different positions in adulthood, including decision makers in society. University may play as well a fundamental role in the education on the awareness of the territory and prevention, starting from sensitization of young people to local territorial realities. That is in order to transform part of them into conscientious citizens able to work for the good of the community through the active protection of the territory.

Laboratories in teaching Earth Sciences are a fundamental in the learning process, since practical activities allow the 'visualization' of natural phenomena without resorting to abstraction. The seismo-box is an educational kit that combines knowledge and know-how, with three main objectives 1) to stimulate the students, intended as future citizens, to the knowledge of earthquake as a natural phenomenon, and in particular to the awareness of the consequences that an earthquake may have in relation to the sub-surface geology and the type and quality of buildings in the areas most affected by earthquakes; 2) to stimulate students to practical laboratory activities, also through the creation of experimental devices; 3) to promote in students the acquisition of methodological/didactic skills in the field of dissemination of scientific culture. The idea of proposing the 'Seismo-box' Educational Kit in school came from François Tilquin, a French teacher inventor of this educational kit (www.sismobox.com).

The experiments proposed in the seismo-box educational kit are of two types (Fig. 1): 1) a first set of experiments is dedicated to the physical understanding of an earthquake. Experiences such as the origin of an earthquake, the propagation of seismic waves and their recording, help students to visualize earthquakes and identify them as natural and unavoidable phenomena. 2) the second set of experiments is dedicated to the effects of an earthquake, depending on the type of construction and the subsurface geology on which the buildings are located.

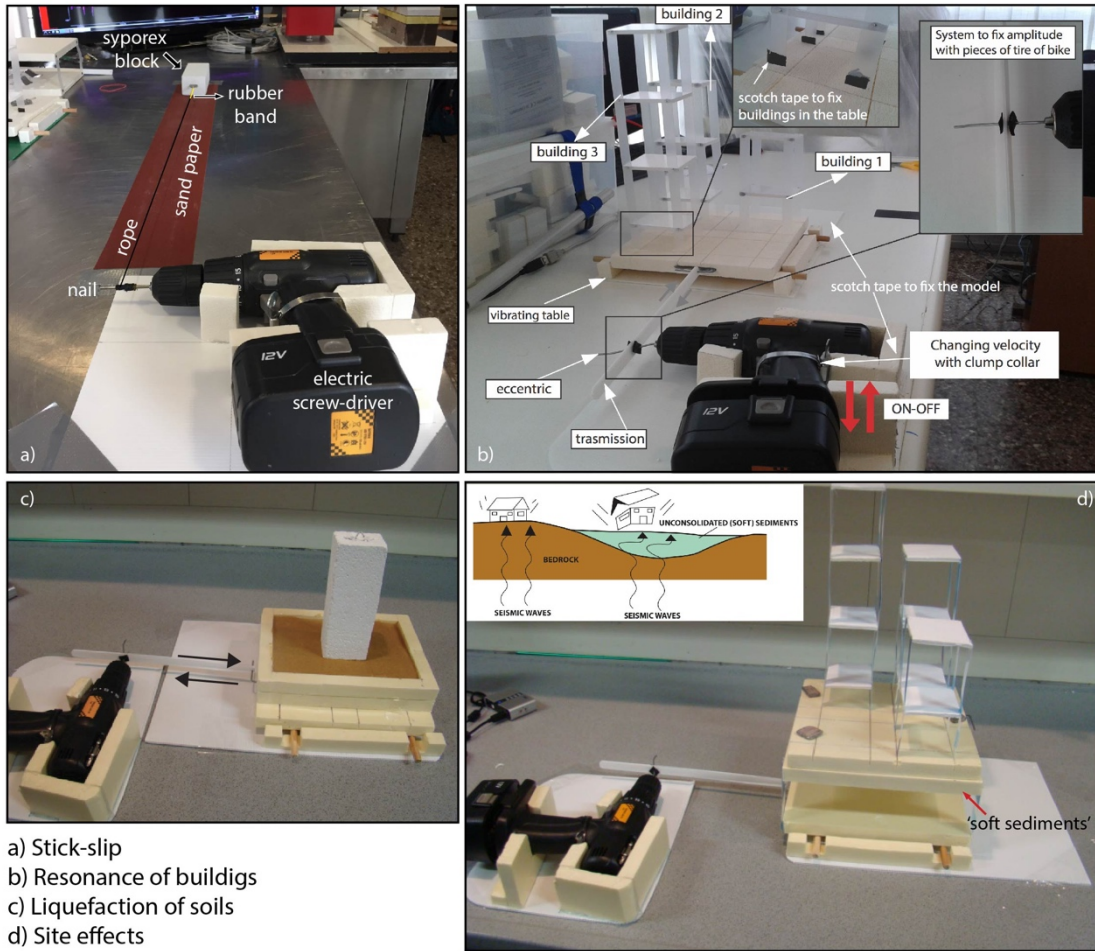


Figure 1 – Some examples of experiments we can do with seismo-box.



Dr Stefano Branca

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EDUCATION

1993 - Degree in Geological Sciences at the University of Catania (110/110)
1995/96 - CNR fellowship at the Department of Physics, Geophysics and Environmental Physics, University of Messina
1997/2000 - PhD at the Department of Geological Sciences, University of Catania
2000 - Specialization Course: “Field Studies in Volcanology”, Department of Earth and Planetary Sciences, University of New Mexico (USA)
2001/03 - Post-Doctoral fellowship at the Department of Geological Sciences, University of Catania
2004/05 - Research fellowship at Istituto Nazionale di Geofisica e Vulcanologia (INGV), Sezione di Catania

CAREER

01/12/2005 - Researcher, scientific area: Volcanology, at INGV, Sezione di Catania
01/01/2008 - Senior Researcher, scientific area: Volcanology, at INGV, Sezione di Catania
09/01/2017 - Manager of Volcanological Monitoring of INGV, Sezione di Catania
01/10/2019 - Director of INGV-Sezione di Catania

RESEARCH INTERESTS

His research is focused on geological and stratigraphic investigations of Etna, Vulcano and Stromboli volcanoes and on the reconstruction of historical and prehistorical eruptive activity of Etna. He also deals with the monitoring of active Sicilians volcanoes. The research includes also geology and geomorphology of volcanic areas, volcano stratigraphy and tephrostratigraphy, volcano instability and the relationship with the sedimentary basement, volcanoes and environmental change, volcano dynamics and regional tectonic, reconstructing historical volcanic eruptions and their impacts on the society.

PUBLICATIONS AND SERVICES

- Branca S., Del Carlo P. (2005) Types of eruptions of Etna Volcano AD 1670-2003: Implications for short-term eruptive behaviour. *Bull. Volcanol.*, 67, 732-742.
- Branca S., Coltelli M., Groppelli G., Lentini F. (2011) Geological map of Etna volcano, 1:50,000 scale. *Ital. J. Geosci.*, 130 (3), 265-291, doi: 10.3301/IJG.2011.15.
- Abate T., Branca S. (2015) ILLUSTRATING AND MAPPING ETNA’S ERUPTIONS. The progress of iconography since the 16th century. Edizioni Caracol, Palermo. ISBN: 978-88-98546-29-9, 111 pp.

Current knowledge of Etna's flank eruptions (Italy) over the past 2500 years

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The knowledge of Etna's eruptions has been profoundly influenced by the illustrations, though these can only provide limited information on the lava flows and their effects on the territory. Indeed, the absence of iconographic sources or the disparity between the physical reality and the illustrations has led to many gaps and uncertainties that have lasted for centuries. This paper traces the progress of the representations of the historical eruptions of Etna volcano, from the earliest attempts in the 17th century, be they iconographic documents or pictorial illustrations, to the modern geological cartography of 21st century reconstructing the evolution of the history and methods of representing Etnean eruptions, highlighting the crucial steps in the progress of knowledge on the historical flank eruptions. The turning point in the long process of drafting and rendering the eruptions of Etna came with the work of Sartorius von Waltershausen, with the realization between 1836 and 1843 of the first geological map of the volcano at a 1:50,000 scale. In this long history of the representations of eruptions, begun in the 17th century, Sartorius' cartography finally overcomes the problem of rendering these events in space by inserting the notion of history in the map. What now remained for those engaged in mapping the volcano was to solve the issue of defining the "time" of Etna's historical lava flows. This would be tackled only at the end of the 20th century with a multidisciplinary approach comprising stratigraphy, historiographical studies and the dating of the lavas. In this frame, the present state of the knowledge of the flank eruptions occurred on Etna in the past 2500 year evidenced that during the Greek-Roman, Medieval epochs up to the 17th century flank eruptions involved commonly the middle-lower slopes impacting mainly the south sector of the volcano with the location of the eruptive fissure sometimes below 1000 m of altitude. This eruptive behavior of the volcano has been radically modified following the occurrence of the large 1669 eruptions since the opening of the fissure was mainly concentrated in the upper-middle slopes between 1600 m and 2500 m a.s.l.



Emilia Poli Marchese

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University of Catania

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Education

1959-1962- She stayed abroad, by qualified international research Centers (in Germany and France), where she specialized in Geobotany and particularly in Phytosociology and Vegetation mapping.

1958- Undergraduate Degree in Natural Sciences, University of Catania.

Career and Academic positions

since 2010-retired Professor of Catania University;

1975-2009 - Chair Professor of Botany, University of Catania;

1973-1975- Help-Assistant to the Chair of Botany, Catania University;

1971-maturity at the Chair of Botany; 1967- free Professor in Phytosociology;

1965-1974 -Associate Professor of Botany, Geobotany and Ecology, Catania University;

1959-1973- Assistant professor of Botany, Catania University;

1988-1994 and 2006-2008 -Head of two different specialized Degree Courses, University of Catania;

1997-2009- Head of the Biology and Plant Ecology Laboratory of CRIBECUM Center, Catania University;

1987-2000 -Head of the Institute of Biology and Plant Ecology, University of Catania, which she founded; 1979-2017 -Scientific head of the Nuova Gussonea Mt. Etna botanical Garden, which she founded.

Teaching activity

1963-2009 -Official lectures in various under-graduate, post-graduate and PhD courses of Catania University including: Botany, Ecology, Landscape ecology, Geobotany, Biodiversity and Plant Phylogeny.

She read scientific talks by official invitation in Italy and abroad: Germany, France, Japan, Poland, USA.

Research interests

In Botany and particularly in Geobotany, Phytosociology, Ecology, Vegetation mapping, with particular interest in the Plant life on the volcanoes: Etna and other active volcanoes.

In application problems as: Forestry, Recovery of abandoned areas, Territorial planning, Environmental Conservation and Management of natural resources, artistic and historical Heritage Conservation. **Research experiences** - She also carried out field researches on plant life abroad: Japan (1963), on Fujiyama and other Japanese volcanoes; USA (1996-2008, 1 month each year) to study

forest areas; Spain (2010) to study plant life on the volcano Pico del Teide of Tenerife (Canary Islands).

Publications and services

Her scientific production is of about 300 papers on national and international Journals. Many papers concern the plant life of volcanic areas and mostly of Mt. Etna; some papers aimed at application problems. The scientific publications include 2 books and 11 Vegetation maps at various scale, some of which are application maps. She organized and directed 12 research teams and projects, working in field on projects agreed by Government Organizations. She has organized 7 several national and international Congresses.

Award and honors

She is called by the European Commission as "*Expert*" to evaluate European research projects (1999, 2002 ad ensuing years); She was (2002) and she is on the Expert List of the Ministry of University and Scientific Research (MIUR).

She is an elected member of the "Société de Biogéographie" of Paris and of other scientific associations and she is also a member of the referee group of various international scientific Journals.

Official external Assignments for problems regarding the safeguard and management of the territory and by: National Research Council – CNR (1975) ; University of Catania (1970-1996 etc.); Government of the Sicily Region (1981, 1985, 1988, 1993-1994); Mt. Etna natural park (1987-1992, 1993-2000 and 2003-2009, 2010, 2012-2013); different Law Courts (as CTU): 1979-1980, 1984, 1988, 2005, 2009-2011; different Public Bodies, etc.

Plant life on Mt. Etna, a trip around the map of the Etnean vegetation

Emilia Poli Marchese & Giuseppe Patti

The plant life on an active volcano as Mt. Etna is made up of different elements which diversify according to the varying of volcanic soil, climate and human activity.

The changes in plant life according to the altitude are caused, above all, by varying of climatic factors and allow to recognise vegetation belts on the slopes of the volcano, each characterised by very specific types of the vegetation.

Their distribution on the slopes of the volcano is shown on the Map of vegetation of Mt. Etna, on a scale of 1:50,000, drawn up by us (Poli Marchese and Patti, 2000).

Basal-Mediterranean belt

This belt extends from sea level up to 1,000-1,200 m a.s.l. and sometimes up to 1,400-1,500 m. Along the rocky coast there is a narrow belt of halophytic vegetation.

After leaving this zone the plant landscape is largely characterized by cultivated areas. Citrus field prevail down, up to 300-400 m a.s.l. Above there are principally vineyards, olive and almond groves, orchards and pistachio and hazel-nut groves. This landscape, heavily influenced by man, has long replaced the natural vegetation made up by the forests or scrub-forests with wild olive tree, on the lower slopes, and by olm oak (*Quercus ilex*) forests at higher altitudes. Just few pieces of these forests are still present; they can be found up to over 1,200 m a.s.l.

At higher altitudes there is a belt mostly characterised by deciduous oak forests, where the *Quercus pubescens* s.l. oak species is dominant; in some areas these forests have been partially replaced by chestnut woods or orchards and vineyards. Next to these forests, or in their place, there are also forests of larch pines (*Pinus laricio*).

Mountain-Mediterranean belt

Above the deciduous oak forests and up to the higher limit of forests (1,800-1,900 m a.s.l. and up to 2,300 m a.s.l.), there is the beech (*Fagus sylvatica*) belt. It is fragmentary distributed due to volcanic activity, climatic conditions and human disturbance. In some areas the beech is accompanied or replaced by the larch pines (*Pinus laricio*) or by the birch (*Betula aetnensis*), endemic species of Mt. Etna.

High-Mediterranean belt

Above the tree line the plant life is characterized by a thorn pillows species (*Astragalus siculus*), endemic of Mt. Etna and well adapted to the local climate conditions. The thorn pillows shelter herbaceous species, some of which are endemic. This vegetation is exclusive of the Etna volcano. At 2400-2450 m a.s.l. and up to 2900-3000 m the vegetation is made up by very few and almost all endemic species; they are widespread in a discontinuous way. At 3000-3050 m a.s.l. and up to the top of Mt. Etna (3350 m) there is only the “volcanic desert”, where the plant life is totally absent.



Diane Carrer

Earth Science and Life Science Teacher

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EDUCATION

- 2013 - 2014 **University of Lyon “Claude Bernard - Lyon 1” ,Lyon, France.** Intensive courses to prepare the competitive exam (called “agrégation”) to become a teacher in Life and Earth Sciences.
- 2011 - 2013 **University of Nice Sophia- Antipolis, Sciences Department, Valrose Campus.** Intensive courses to prepare the competitive exam to become a teacher (CAPES), in Life and Earth Sciences.
- 2009 - 2010 **Toulouse Tech Engineering school «Institut National Polytechnique”** ENSEEIHT-ENSIACET-ENSAT. Third year of engineering school and Master’s degree in Environmental Sciences, Hydrology, Hydrochemistry.
- 2009 **Lincoln University, New Zealand:** Water and Soil Sciences, Environmental Sciences, Hydrology, depollution techniques.
- 2007 – 2009 **Engineering School in Toulouse « Ecole Nationale Supérieure Agronomique de Toulouse »**
- 2005 - 2007 **Masséna High School : Intensive courses to prepare the competitive exams to enter engineering schools.** Biology, Geology , Chemistry, Physics and Mathematics ; called CPGE in France (“BCPST-Veto”)

CAREER

- 2014 - 2018 **Teacher at the Henri Matisse High School , and International High School in Valbonne.** Responsible for various classes: 9th grades, 10th grades, 11th grades, 12th grades , Courses in pedagogy and didactics
- 2010 – 2011 **Engineer responsible for the set-up of the Environmental Management System , to pass the standard ISO 14 001 (in a Motorways company).** Environmental Impact Statement (EIS) and risk assessment on water pollution, air pollution, and soil pollution.
- 2010 **Disposal and recycling of clinkers from household waste incineration. Study on an industrial process.** Project management, work on sizing of the Eddy current separators, Optimization, Research and Development.
- 2009 **Internship in a research laboratory on plant physiology.** Study of various strategies and mechanisms involved in plant defense against the herbivorous, and Darwinian evolution study .

RESEARCH INTERESTS

Educational programs on Seismology, geology at school, hydrology, astronomy, outreach in geology and biology.

PUBLICATIONS AND SERVICES

- Participation to the EGU GIFT 2015 (focused on mineral resources) and presenting a poster intitled “ **Adopt a Mermaid” participative science and seismology at school**, and EGU 2018 presenting a hands-on activity focused on meteorites and craters impacts.
- Participation to several educational workshops focused on seismology, **InSIGHT** and SEIS with NASA, CNES, IPGP, Geoazur lab, and French National Education representatives to elaborate an educational program sharing data with schools all around the world.
- Participation to the first **Insegnaci Etna** in Acireale, Catania, Sicily, presenting Seismo Box and hands on activities on seismology at school.
- Part of the Organization Committee for **IESO International Earth Sciences Olympiads**, in Sophia Antipolis, August 2017, with Jean-Luc Berenguer’s team.



Fabrice Mourau

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Edumed.unice.fr ; www.eauxsouterraines.eu

EDUCATION

1999 Maîtrise de biologie des populations et des écosystèmes / UJF-Grenoble (France)
1998 Maîtrise de biologie cellulaire et physiologie, mention biologie générale/ UJF-Grenoble (France)

CAREER

2001 : Science teacher, collège de Jarrie (Isère, France)
2002-2019 : Science teacher (Geology and Biologie), collège Pierre de Coubertin (Le Luc, France)

RESEARCH INTERESTS

- Teaching Earth sciences, in particular in the fields of:
 - karst hydrogeology
 - seismology
- Developing innovative educational methods using IT and field work

PUBLICATIONS AND SERVICES

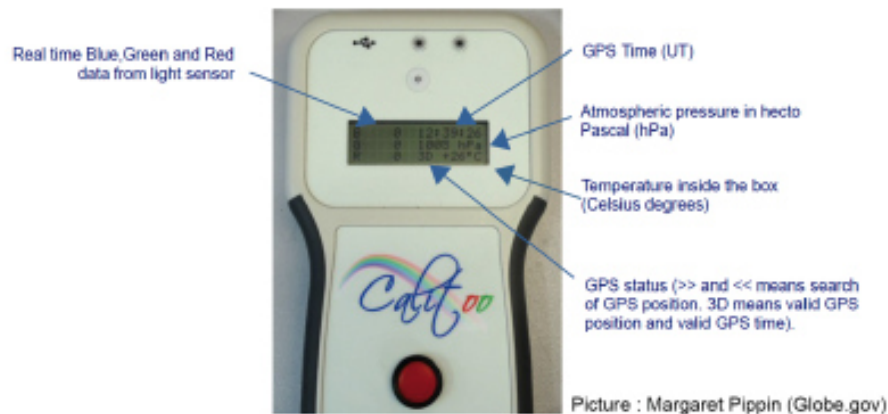
- Studying the hydrogeological functioning of karst in Mediterranean climatic environment as support for an educational project (Régaie de Néoules cave, Var, SE France); Arfib B. et Mourau F.; Karstologia n°66, 2015.
- Eaux souterraines, un dispositif éducatif autour du karst, Arfib B., Mourau F. Lamarque T. et Laty L. ; Spelunca n°145, 2017
- Impact event ; Mourau F. et Guicheteau D. ; website insight.oca.eu

Atelier CALITOO/CALITOO workshop

Résumé :

Le CALITOO est un photomètre adapté à une utilisation de terrain par un public scolaire. Il est conçu pour étudier les aérosols en suspension dans l'atmosphère qu'ils caractérisent en fonction de leur taille : fumées, embruns, sable ou cendres volcaniques... Le fonctionnement de l'instrument est basé sur une mesure de l'épaisseur optique de l'atmosphère à 3 longueurs d'ondes : 465 nm (Bleu), 540 nm (Vert) et 615 nm (Rouge). L'atelier débutera par une courte présentation de l'instrument et de son mode de fonctionnement. Nous réaliserons en salle une manipulation permettant de comprendre le fonctionnement du Calitoo, puis nous le mettrons en œuvre afin de déterminer les conditions atmosphériques le jour de l'atelier. Les résultats seront traités directement sous forme graphique à la main et sur un logiciel dédié. Enfin, nous présenterons la page dédiée au CALITOO sur le site EDUMED qui permet de partager les mesures avec les membres du réseau.

Figure 1 : Le CALITOO intègre 3 capteurs en plus du photomètre : un GPS, un thermomètre et un baromètre. The CALITOO integrates 3 sensors in addition to the photometer: a GPS, a thermometer and a barometer. Il CALITOOO integra, oltre al fotometro, 3 sensori: un GPS, un termometro e un barometro.



Picture : Margaret Pippin (Globe.gov)

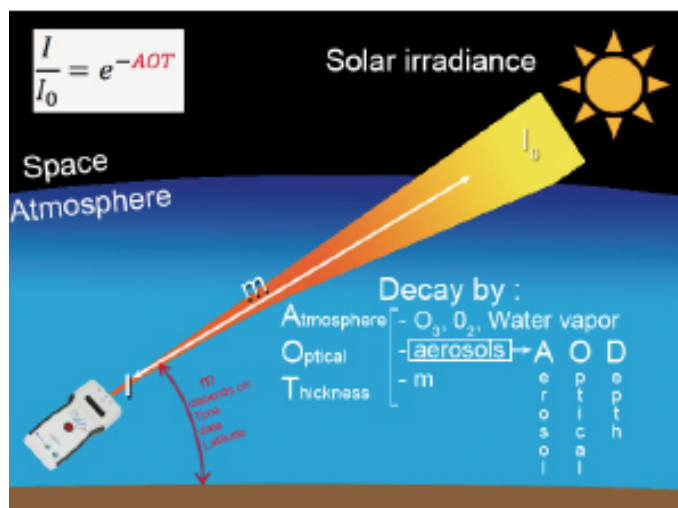


Figure 2 : Le CALITOO calcule la partie de l'épaisseur optique de l'atmosphère (AOT) liée aux aérosols, notée AOD : Aerosol Optical Depth. CALITOOO measures the part of the optical thickness of the atmosphere (AOT) related to aerosols, known as AOD: Aerosol Optical Depth. CALITOOO misura la parte dello spessore ottico dell'atmosfera (AOT) relativa agli aerosol, nota come AOD: Aerosol Optical Depth.

Abstract :

The CALITOO is a photometer adapted for use in the field by a school audience. It is designed to study aerosols suspended in the atmosphere that they characterize according to their size: smoke, sea spray, sand dust or volcanic ashes... The principle of the measurement is based on the optical thickness of the atmosphere in 3 wavelengths: 465 nm (Blue), 540 nm (Green) and 615 nm (Red). The workshop will begin with a short presentation of the instrument and how it works. We will perform a manipulation in the room to understand how the CALITOO works, then we will use it to determine the atmospheric conditions on the day of the workshop. The results will be processed directly in graphical form by hand, then on a dedicated software. Finally, we will present the webpage dedicated to CALITOO on the EDUMED website, which allows us to share measurements with network members.

Astratto :

Il CALITOO è un fotometro adattato per l'uso sul campo da parte di un pubblico scolastico. È progettato per studiare gli aerosol sospesi nell'atmosfera che caratterizzano in base alle loro dimensioni: fumo, spray marino, polvere di sabbia o ceneri vulcaniche..... Il principio di misura si basa sullo spessore ottico dell'atmosfera a 3 lunghezze d'onda: 465 nm (blu), 540 nm (verde) e 615 nm (rosso). Il workshop inizierà con una breve presentazione dello strumento e del suo funzionamento. Eseguiamo una manipolazione nella stanza per capire come funziona il CALITOO, poi lo useremo per determinare le condizioni atmosferiche del giorno del workshop. I risultati saranno elaborati direttamente in forma grafica a mano, poi su un software dedicato. Infine, presenteremo la pagina web dedicata a CALITOO sul sito EDUMED, che ci permette di condividere le misure con i membri della rete.

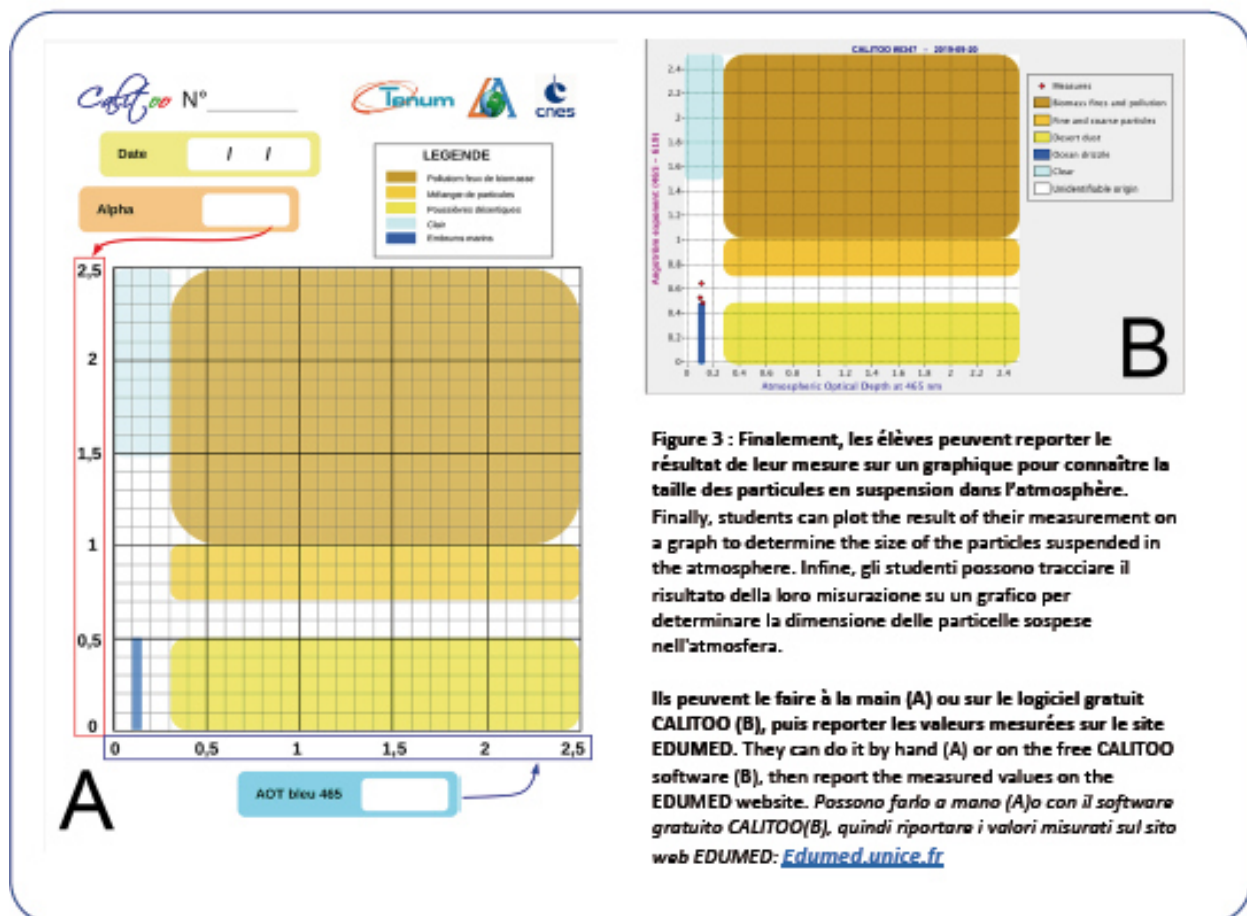


Figure 3 : Finalement, les élèves peuvent reporter le résultat de leur mesure sur un graphique pour connaître la taille des particules en suspension dans l'atmosphère.

Finally, students can plot the result of their measurement on a graph to determine the size of the particles suspended in the atmosphere. Infine, gli studenti possono tracciare il risultato della loro misurazione su un grafico per determinare la dimensione delle particelle sospese nell'atmosfera.

Ils peuvent le faire à la main (A) ou sur le logiciel gratuit CALITOO (B), puis reporter les valeurs mesurées sur le site EDUMED. They can do it by hand (A) or on the free CALITOO software (B), then report the measured values on the EDUMED website. *Passano farlo a mano (A) o con il software gratuito CALITOO(B), quindi riportare i valori misurati sul sito web EDUMED: [Edumed.unice.fr](http://edumed.unice.fr)*



Jean-Luc Berenguer

Geoazur Laboratory (University Côte d'Azur)
250 rue Einstein – 06560 Valbonne – France
Science teacher
berenguer@unice.fr

Executive board, supervision students, teaching, committee memberships :

Education & Outreach team – UMR Geoazur, University Côte d'Azur
IESO 2017 FRANCE - Organization Committee Leader (2017)
EduMed Observatory project leader - University Côte d'Azur (since 2017)
InSight Education project leader in France (since 2016)
EGU Committee of Education member (since 2003)
IGEO Senior Council (since 2018)
French educational seismological network leader (since 1996)

Most relevant publications :

- Berenguer J.-L.** et al., Tuned into the Earth from the school EduSismo: French educational seismological network, Bull. Soc. Géol. de France, 184, 183, 10.2113/gssgfbull.184.1-2.183, 2013.
- Bigot-Cormier F., **Berenguer J.-L.** , How Students Can Experience Science and become Researchers: Tracking MERMAID Floats in the Oceans, Seis. Res. Letters., 88 , 10.1785/0220160121 , 2017
- Lognonné, P., Banerdt, W.B., Giardini, D. et al, SEIS: Insight's Seismic Experiment for Internal Structure of Mars, Space Sci Rev (2019) 215: 12. <https://doi.org/10.1007/s11214-018-0574-6>
- Berenguer J.-L.** et al., Schools Tuned In to Mars with InSight space mission, Poster session, AGU 2018
- Berenguer J.-L.**, Virieux J., How to teach natural hazards in school: Raising awareness on earthquake hazard, Office for Official Publications of the European Communities, 2008
- Berenguer J.-L.**, Ferry H., Pascucci F., Book, 'Le cahier du sismo', CRDP Nice, 2010

Activité Sismo

Résumé : Le réseau InsegnaciETNA comprend plusieurs stations sismologiques à vocation éducatives installées tout autour de l'ETNA.

Ces stations complètent des données fournies par les stations de recherche de plusieurs réseaux internationaux.

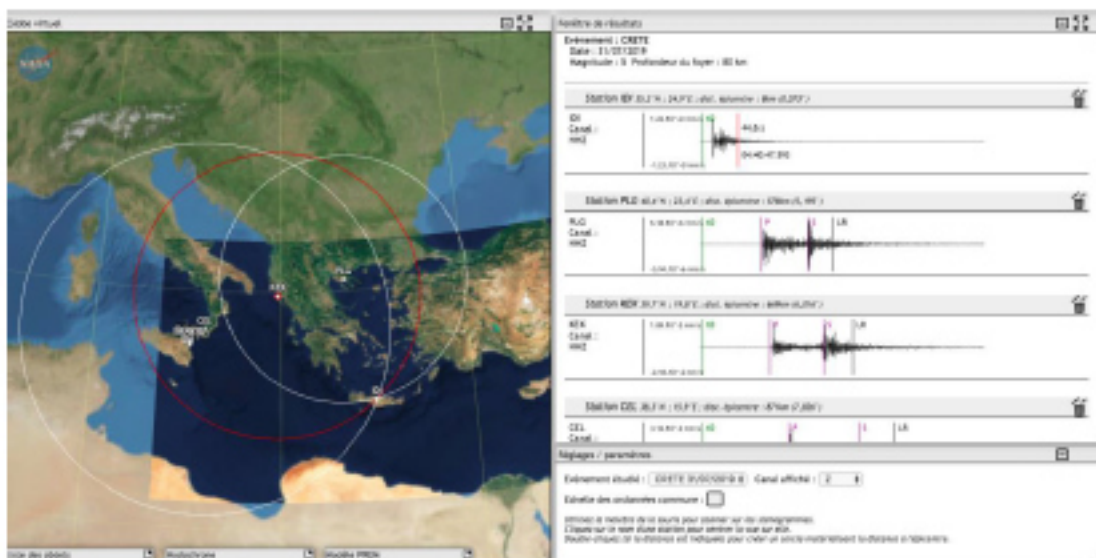
A travers quelques exemples de séismes locaux, régionaux ou mondiaux, on essaiera de retrouver les grandes discontinuités profondes et les principales notions de la structure interne du globe, à différentes échelles.

La sismicité locale nous intéressera plus particulièrement du fait de la présence du volcan Etna et des nombreuses failles qui le recoupe, en surface.

Nous utiliserons un nouveau logiciel éducatif et gratuit ; Tectoglob 3D ainsi que les bases de données EdumedObs, consultables en ligne ici :

Logiciel (Gratuit) Tectoglob 3D : <http://philippe.cosentino.free.fr/productions/tectoglob3d/>

Base de Données EDUMED : <http://edumed.unice.fr/fr>



Exemple d'un séisme étudié dans le bassin méditerranéen (Crète, 31/07/2019)
Example of an earthquake studied in the Mediterranean basin (Crete, 31/07/2019)
Esempio di terremoto studiato nel Mar Mediterraneo (Crete, 31/07/2019)

Seismo Hands-on Activity

Abstract: The InsegnaciETNA network includes several seismological stations for educational purposes located around ETNA.

These stations complement data provided by the research stations of several international networks.

Through a few examples of local, regional or global earthquakes, we will try to find the major deep discontinuities and the main notions of the internal structure of the globe, at different scales.

Local seismicity will be of particular interest to us because of the presence of the Etna volcano and the many faults that intersect it on the surface.

We will use a new educational and free software; Tectoglob 3D as well as the EdumedObs databases, which can be consulted online here:

Software (Free) Tectoglob 3D: <http://philippe.cosentino.free.fr/productions/tectoglob3d/>
 EDUMED Database: <http://edumed.unice.fr/fr>

Attività didattica Sismo

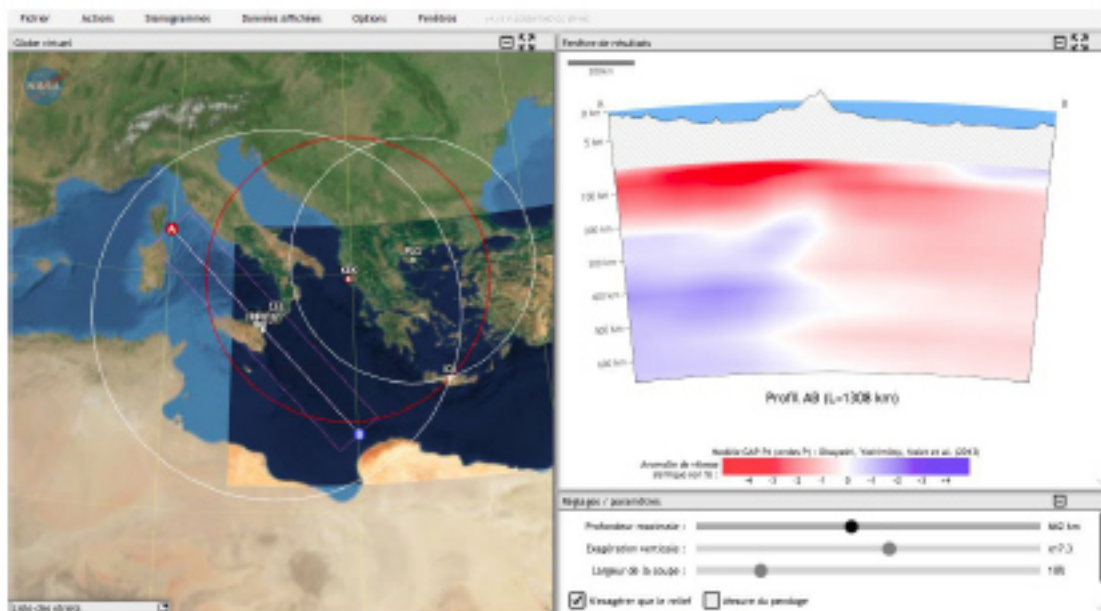
Riassunto: La rete InsegnaciETNA comprende diverse stazioni sismologiche a scopo didattico situate intorno all'ETNA.

Queste stazioni integrano i dati forniti dalle stazioni di ricerca di diverse reti internazionali. Attraverso alcuni esempi di terremoti locali, regionali o globali, cercheremo di trovare le principali discontinuità profonde e le nozioni principali della struttura interna del globo, a diverse scale.

La sismicità locale sarà per noi di particolare interesse per la presenza del vulcano Etna e per le numerose faglie che lo intersecano in superficie.

Utilizzeremo un nuovo software didattico e libero; Tectoglob 3D e i database di EdumedObs, che possono essere consultati online qui:

Software (gratuito) Tectoglob 3D: <http://philippe.cosentino.free.fr/productions/tectoglob3d/>
 Banca dati EDUMED: <http://edumed.unice.fr/fr>



Exemple d'un séisme étudié dans le bassin méditerranéen (Crète, 31/07/2019), coupe tomographique
Example of an earthquake studied in the Mediterranean basin (Crete, 31/07/2019), tomographic section
Esempio di terremoto studiato nel Mar Mediterraneo (Creta, 31/07/2019), tomografia

Atelier Hydrogéologie/Hydrogeology workshop

Résumé :

Soumis à des contraintes démographiques et climatiques croissantes, les enjeux liés à l'eau et à l'atmosphère revêtent désormais une importance stratégique majeure. Cette constatation est encore plus vraie au sein du bassin méditerranéen que les modèles voient comme un hot-spot du dérèglement climatique. Les relations entre atmosphère, lithosphère et hydrosphère déterminent à la fois le régime des cours d'eau et la quantité d'eau disponible pour les Hommes. C'est cette dualité entre le risque et la ressource que nous enseignons aux élèves à travers une démarche scientifique basée sur l'observation de terrain et l'acquisition automatique de données grâce à des sondes installées en rivière et en milieu souterrain karstique. Nous utilisons les sondes Ultra-Sensus pour réaliser un suivi du fonctionnement des eaux souterraines et des cours d'eau d'une région donnée. D'un point de vue méthodologique, les élèves sont impliqués dans toute la chaîne d'acquisition de la donnée : de l'instrumentation à l'exploitation des résultats. En couplant ces séries temporelles aux observations météorologiques, ils explorent le fonctionnement du système hydrographique à proximité de leur école. Durant l'atelier proposé pendant le séminaire *Insegnaci Etna*, Nous ferons une démonstration en salle du fonctionnement des instruments et du traitement de la donnée brute. Nous montrerons également comment l'observatoire EDUMED gère une flotte de sondes mises à disposition des établissements scolaires.



Figure 1: Un élève manipule une sonde installée en zone épinoyée. A pupil manipulates a sensor installed in the epiphreatic zone. *Uno studente manipola un sensore installato nella zona epifreatica.*



Figure 2: Instrumentation d'une rivière (l'Huveaune) pour les collèges de Saint-Zacharie, Trets et Aubagne. Sensor installed on a river (Huveaune) for the middle schools of Saint-Zacharie, Trets and Aubagne. *Sensore installato su un fiume (Huveaune) per le scuole di Saint-Zacharie, Trets e Aubagne.*

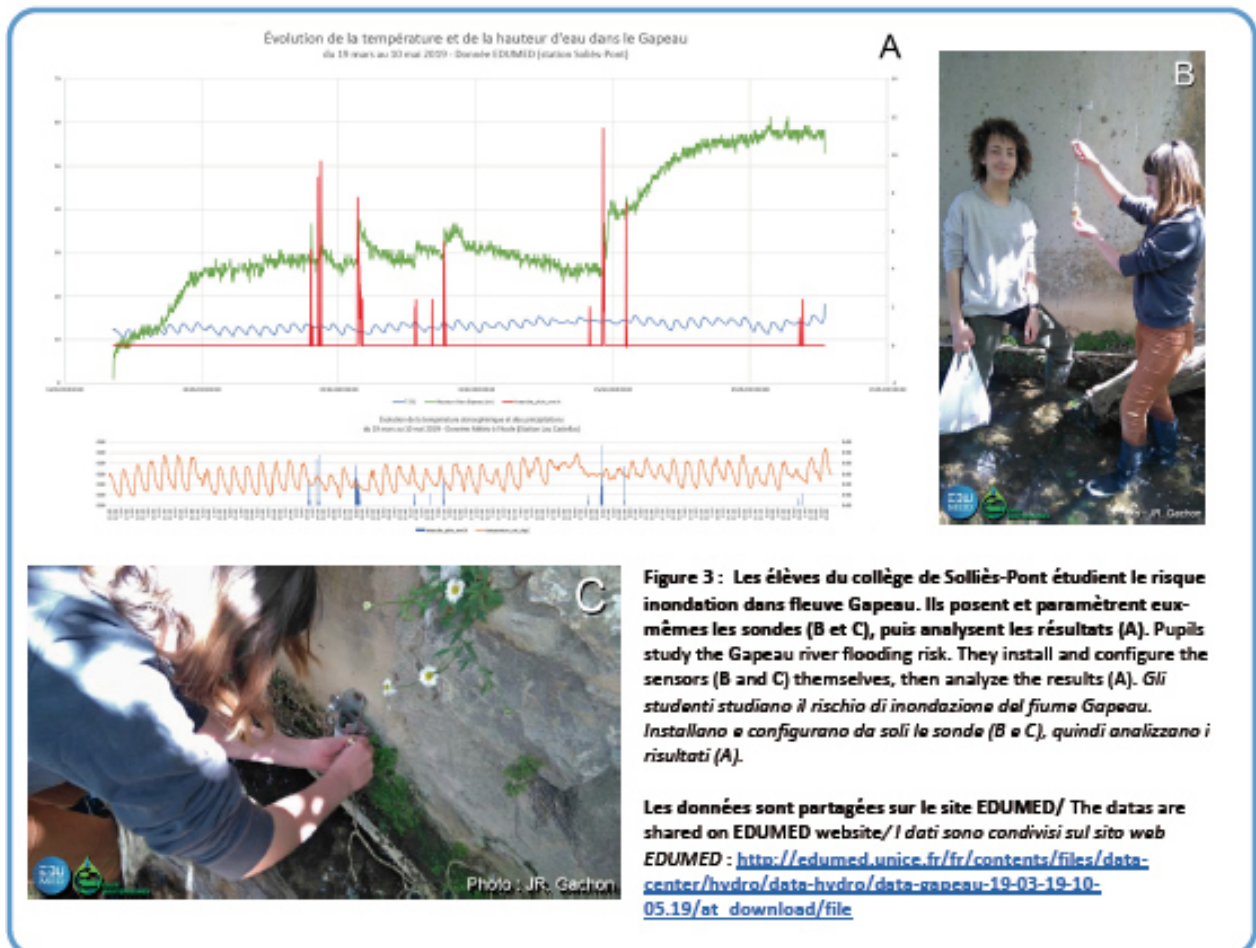
Abstract:

With increasing demographic and climatic constraints, water and atmospheric issues are now of major strategic importance. This observation is even more true in the Mediterranean basin, which models see as a hot spot for climate change. The relationships between the atmosphere, the lithosphere and the hydrosphere determine both the regime of rivers and the amount of water available for humans. It is this duality between risk and resource that we teach to students through a scientific approach based on field work and automatic data acquisition using sensors installed in rivers and underground karstic environments.

We use Ultra-Sensus sensors to monitor groundwater and rivers water levels in an area. From a methodological point of view, students are involved in the entire data acquisition chain: from probe installation to the exploitation of results. By linking these time series to meteorological observations, they explore the functioning of the hydrographic system near their school. During the workshop proposed during the *Insegnaci Etna* seminar, we will demonstrate in the room how the instruments work and how to process the raw data. We will also show how the EDUMED observatory manages a fleet of sensors made available to schools.

Astratto :

Con l'aumento dei vincoli demografici e climatici, le questioni idriche e atmosferiche rivestono oggi una grande importanza strategica. Questa osservazione è ancora più vera nel bacino del Mediterraneo, che i modelli vedono come un punto di riferimento per i cambiamenti climatici. Le relazioni tra l'atmosfera, la litosfera e l'idrosfera determinano sia il regime dei fiumi che la quantità di acqua disponibile per l'uomo. E' questa dualità tra rischio e risorsa che insegniamo agli studenti attraverso un approccio scientifico basato sull'osservazione sul campo e l'acquisizione automatica dei dati tramite sonde installate in fiumi e ambienti carsici sotterranei. Utilizziamo le sonde Ultra-Sensus per monitorare il funzionamento delle acque sotterranee e dei corsi d'acqua in una data regione. Da un punto di vista metodologico, gli studenti sono coinvolti in tutta la catena di acquisizione dei dati: dalla strumentazione alla valorizzazione dei risultati. Collegando queste serie temporali alle osservazioni meteorologiche, esplorano il funzionamento del sistema idrografico nei pressi della loro scuola. Durante il workshop proposto durante il seminario *Insegnaci Etna*, mostreremo in sala come funzionano gli strumenti e come elaborare i dati grezzi. Mostreremo anche come l'osservatorio EDUMED gestisce una flotta di sonde messe a disposizione delle scuole.





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EDUCATION

2015 MSc in Geo-information Sciences at Wageningen University, The Netherlands

2012 BSc in Environmental Sciences at Autonoma University of Madrid, Spain

CAREER

2018 – present Remote Sensing Project Scientist for RSAC c/o ESA-ESRIN, Italy

2015 -2018 Remote Sensing Analyst at Airbus, United Kingdom

AREAS OF INTERESTS

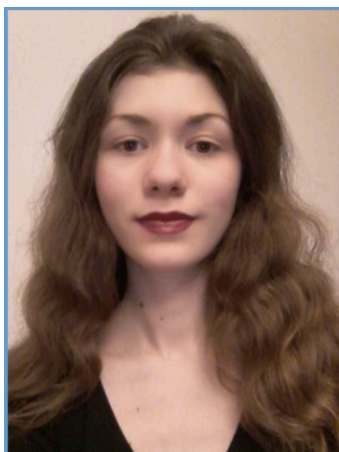
Land applications of Remote Sensing, Education and Capacity Building

Remote Sensing Project Scientist

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RSAC c/o ESA-ESRIN

Education and Capacity Building are essential components of ESA's mission. In a context where society is confronted with new global challenges (e.g. environment, energy) and where traditional science education is no longer effective, ESA has developed various tools and resources that target students from an early age (primary and secondary education) and use the context of space to make the teaching and learning of STEM subjects more attractive. In accordance with this, ESA also supports the development of school teachers through series of training sessions. The objective of the session will be to give an overview of the tools and resources ESA makes available to teachers, and to give them hands-on experience through various practical examples that they can later on use in their curriculum.



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FORMATION

Master d'Antiquité méditerranéenne École Pratique des Hautes Etudes – Sorbonne, Paris (Depuis octobre 2017)

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Classe préparatoire littéraire, Lycée Henri IV, Paris (Septembre 2014- Juin 2016)

2016 : Admissible au concours de l'Ecole Normale Supérieure de Paris

Bac L mention Très Bien, Lycée Henri IV, Paris (Juin 2014)

2013: 5ème accessit de version grecque au Concours Général

EXPERIENCES PROFESSIONNELLES

• **Correctrice** de copies de bacs blancs et d'oraux blancs | Depuis octobre 2018
Les cours européens, Paris

• **Stagiaire** | Septembre-décembre 2018
Service de presse des **Éditions Perrin**, Paris

• **Rédactrice d'articles culturels** | janvier 2017 – juin 2018
Juste1question.fr, Paris

• **Assistante à la coopération numérique nationale** (Juillet 2016)
Bibliothèque nationale de France, Paris

• **Rédactrice de procédures** (Juillet 2015) **Natixis Coficiné**, Paris

Some myths about Etna from Pindar to pseudo-Virgil

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Etna and Vesuvius are the two volcanoes that were best known in Antiquity. During the Roman Republic and Empire, it explains itself by the proximity of the two volcanoes. As for the Greek Antiquity, it seems to be mostly because of the fascination for the important activity of the volcanoes. Etna is described in various literary contexts and it shows the curiosity of the Ancients for its geological activity.

I will firstly try to expose the vocabulary used to describe Etna and its activity: there is no word meaning volcano neither in Ancient Greek nor in Latin. The specificity of it is therefore expressed through metaphors, stock phrases, and a very significant will to insist on its amazing characteristics.

I will then present the way Etna is referred to in Homer epics and how Vergil re-uses this reference but also changes the vision that they were conveying. Though Mount Etna in the *Odyssey* is mostly associated with danger and with the unknown, it becomes a liveable place in the *Aeneid*.

Finally, I will try to summarise one of the most important surviving text we have about Etna : *Aetna*, a scientific Latin poem written between 55 b.C and 79 a.C., whose genesis is as mysterious as the object that it describes.

L'Etna e il Vesuvio sono i due vulcani che sono stati meglio conosciuti dagli Antichi. Durante l'epoca della repubblica romana e poi dell'Imperio, si spiega dalla prossimità dei due vulcani da Roma. Per quanto riguarda l'Antichità greca, sembra che sia dovuto soprattutto al fascino per l'importante attività dei vulcani. L'Etna è dipinto in contesti letterari vari, che dimostrano la curiosità degli Antichi per la sua attività geologica.

Proverò prima di analizzare il vocabolario con il quale l'Etna è descritto : non c'è una parola che significa « vulcano » né in Greco né in latino. La specificità dell'Etna si esprime dunque via metafore, espressione, e una volontà molto sensibile di insistere sulle caratteristiche del vulcano.

In seguito presenterò la maniera con la quale l'Etna si inserisce nell'epica di Omero e come il tema sia stato ripreso da Vergilio, che tuttavia cambia la visione che gli era attaccata. Mentre nell'Odissea l'Etna è associato al pericolo e al sconosciuto, diventa un posto dove si può vivere nell'Eneide.

Per concludere, riassumerò uno dei più importanti testi che ci sia rimasto a proposito dell'Etna : *Aetna*, un poema latino scientifico che è stato scritto fra 55 b.C. e 79 d.C.. La sua composizione e il suo autore sono misteriosi quasi come l'oggetto del poema.