



Q 3/4 2021
Newsletter

MINEHERITAGE



Last update: 06.12.2021

MineHeritage's Grand Finale!

The MineHeritage project, sponsored by EIT and EIT RM, is now reaching its final stage with many goals achieved and others surpassed, thanks to the outstanding work of all Consortium Partners. MineHeritage counts now with a vast database of Historical Mining sites across Europe, all available in our [website map](https://mineheritage-project.eu/minemap) (<https://mineheritage-project.eu/minemap>), where you can find their location, directions to each mine's website and a small quiz to help you discover each site. The project also counts until now with 40 booklets and 26 videos (still growing) freely available for all at our [projects website](https://mineheritage-project.eu) (<https://mineheritage-project.eu>). You find also an overview on our booklets, videos and 3D-models on pg.3 and 4 of this Newsletter. Furthermore, the website already includes the [MineHeritage Game](https://mineheritage-project.eu/game) where you can now have fun and test your knowledge about the European mining history (<https://mineheritage-project.eu/game>). MineHeritage's application for mobile devices is also ready and will soon be available for download in the Play Store and Apple Store. With the application you will have access to all project's information, the game and popular science materials produced everywhere you go! Stay tuned for its release.

We invite you to discover our sixth and final newsletter and distribute it among your contacts. You can also follow our activities through our Website and social networks for a more interactive experience with the MineHeritage concept.

Consortium:



UNIVERSITÀ
DEGLI STUDI
DI PADOVA



Consiglio Nazionale
delle Ricerche



TAL
TECH



This activity has received funding from the European Institute of Innovation and Technology (EIT), a body of the European Union, under the Horizon 2020, the EU Framework Programme for Research and Innovation



Final Meeting, 23rd and 24th November 2021, Porto, Portugal

The Consortium met in person for the MineHeritage's Final Meeting on the 23rd and 24th of November in Porto, Portugal. The meeting was organized by INESC-TEC and was included as a Satellite Event in the Raw Materials Week 2021, being transmitted live in our MineHeritage's YouTube channel, where 77 people were able to follow our work online. If you missed it, you can still rewatch all presentation on our [YouTube-Channel](#). The first day allowed each partner to present their contributions to this year's project activities and it ended with the social dinner allowing for a healthy discussion of the project's outputs and contributions to the dissemination of this Cultural Heritage.



The second day counted with a technical visit to the Roman Gold Mines of Valongo, an historical mining site included in MineHeritage's database, and a visit to INESC TEC research facilities.





From all over Europe: Our 26 videos and our 40 booklets

[Industrial stroll along the Ourthe River](#)



[Ourthe Valley](#)

[Metal hunting in the heart of the fiery city](#)

[Sovinjak-Minjera](#)

[Rude- Samobor](#)

[Trgovska Gora](#)

[Radoboj](#)



[Rude](#)

[Trgovska gora](#)

[Radoboj](#)

[Phosphorite Mining in Estonia](#)

[Aidu open cast mine](#)



[Aidu oile shale open cast](#)

[Rummu quarry](#)

[Estonian Mining Museum , Piusa Caves](#)

[Outukumpu](#)



[Möhkö - Värtsilä](#)

[Outokumpu Keretti Mine](#)

[The medieval silver mines of Brandes-en-Oisans - France](#)

[La Mine d'Argent de l'Argentière l'Abessée](#)

[Grand Filon Mine](#)



[Raymond Auzias-Turenne: From Grenoble to Klondike](#)

[Brandes Mine](#)

[The Upper Harz Water Management System \(Kids Version\)](#)

[Emperor-Wilhelm-Shaft](#)

[Oberharzer Wasserregal](#)



[Mining Museums in the Harz](#)

[Emperor-Wilhelm-Shaft in Clausthal](#)

[500 years Right of Mining](#)

[Upper Harz Water Regale around Clausthal](#)

[Ancient metallurgy in the Alps](#)

[ADVENTURE CALLS in Agordo, Belluno](#)

[Galleria Henry](#)

[Porto Flavia](#)



[Laveria La Marmora](#)

[San Silvestro](#)

[Argentaria Ecomuseum](#)

[Pozzo Baccarini](#)

[Servette Mine](#)

[Porto Flavia](#)

[Tarnowskie Gory](#)

[Złoty Stok](#)



[Tarnowskie Góry](#)

[Kopalnia Żłota w Złotym Stoku](#)

[Krzemionki prehistoric flint mines](#)

[Aljustrel Mine](#)

[3D Mapping of the Ancient Aveleira Mine | Tibães Mine](#)



[Valongo Mine](#)

[São Domingos Mine](#)

[Lousal Mine](#)

[Tibães Mine](#)

[Aljustrel Mine](#)

[Baňa Starovšechsvätých](#)



[Starovšechsvätých Mine](#)

[Ľubietová Mining City](#)

[Tharsis](#)

[Riotinto Mining Park](#)

[Las Médulas](#)



[Tharsis Mine](#)

[Las Médulas Cultural Park](#)

[Marcelo Jorissen Mine](#)

[Cabárceno Wildlife Park](#)

[Linares Park](#)

[Almadén Mine](#)

[Rio Tinto Mining Park](#)

[La Union Mining Park](#)

Stay tuned... more are up to come

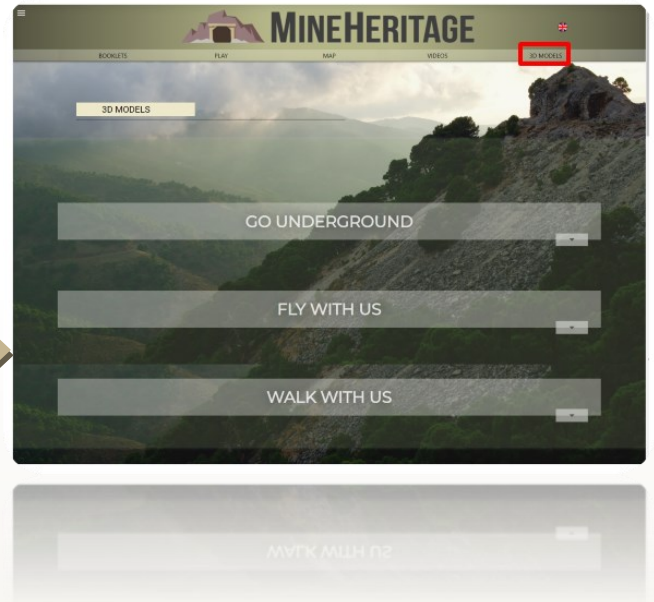




Our 8 Geovisualizations:

More than 6 billion points of MineHeritage
(total: 6.393.213.372)

Directly available on our MineHeritage Website
in the 3D Models Menu, enabling exploration
and perception of the studied sites.



Or directly access by clicking the links

Tibães Mine



Mina de Tibães

[GeoTec System - Main tunnel](#)

100.000.530 points

[GeoTec System - Secondary tunnel](#)

99.999.858 points

[UAV - Stairway and Enclosure](#)

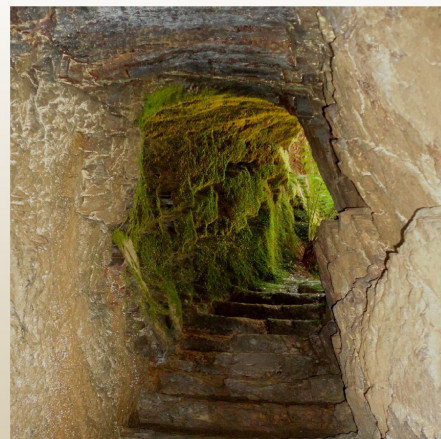
19.774.640 points

[FARO Laser Scan - Stairway and Chapel](#)

1.105.824.076 points

Valongo Mine

Fojo das Pombas



Mina de Valongo

Fojo das Pombas

[FARO Laser Scan – Fojo das pombas](#)

1.433.526.511 points

[FARO Laser Scan – Gallery G1](#)

1.095.141.160 points

[FARO Laser Scan – Gallery G1 and Fojo das pombas](#)

2.528.667.671 points

[UAV – Fojo das pombas](#)

10.278.926 points



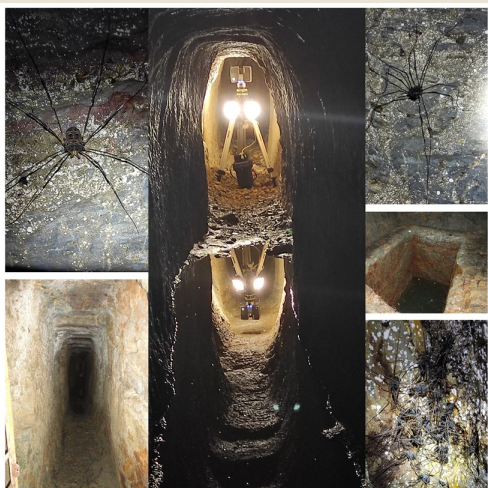
Mine Heritage Field work

MineHeritage Site 3 [MH3] - Gallery G1/Stairway i Mine, Valongo

The third MineHeritage site is located in Valongo (NW Portugal), which is one the numerous galleries available in the underground Roman gold mines (considered one of the biggest). This last MineHeritage site has shown to be a challenging and extreme underground environment, not only because of its interesting geological features, but also due to a unique biodiversity.



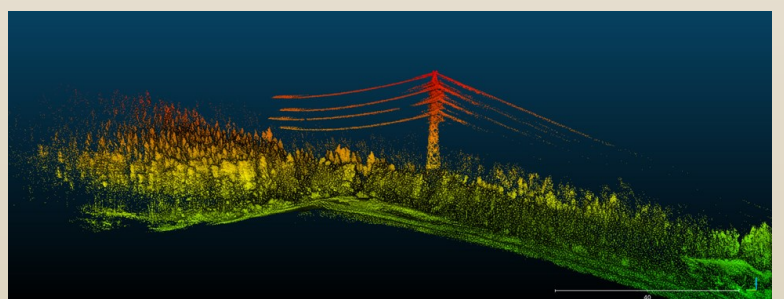
The images show the field work that took place in Gallery G1 throughout the several missions made and a few interesting examples of the represented biodiversity, inside the underground environment.



10/21: Another Mission to Valongo

Using the knowledge acquired in the MineHeritage project regarding sensory fusion (IMU/GPS) with LiDAR + Vision, it was possible to carry out a mission for 3D reconstruction of electrical assets. The work developed in this mission and the data obtained will be analysed for scientific publication purposes, as well as to explore new approaches to detect electrical assets.

The images bellow show several aspects of the field work carried out in the surrounding area of Valongo Mines with the UAV system by INESCCTEC, and some examples of the outputs and data acquired.





Mine Heritage Field work

UNIZG-RGNF @ Samobor and Rude

On the 22nd September 2021 the employees of the Department for mineralogy, petrology and mineral resources (University of Zagreb, the faculty of Mining, Geology and Petroleum Engineering) were hosted in the St. Barbara mine. The field trip in Rude, location of the mine and one of the Croatian Mine Heritage spots, was organized together with KUD Oštrc, the local association focused on promotion of mining and cultural heritage of Rude.

Prior the departure participants were invited to review materials for the this MineHeritage “star locality” as well as for all the remaining locations selected and studied within the MineHeritage project in Croatia.

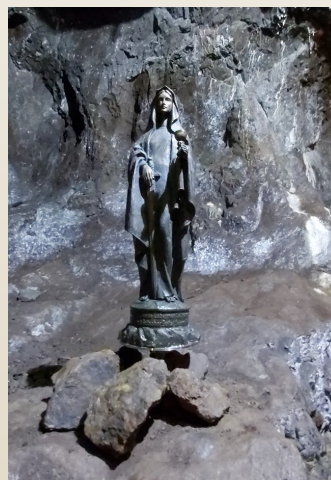
Eighteen attendees enjoyed visit to the town of Samobor where they could taste the famous Kremšnita cake. Light walk to the Samobor Castle followed, where short story telling on Black Queen, who used copper from Rude to make gold, took part. Finally, the field trip relocated to Rude where we took a guided tour in St. Barbara's mine and enjoyed „Greblica“ miner's cake afterwards.



Gathering and gearing-up prior entering the mine



The miner's nativity scene with a close-up



St. Barbara with miner's surnames engraved in pedestal



Narrow path probably carved by dwarfs

MineHeritage @ European Researchers' Night 24.09.21

CNR @ Basilicata:

MineHeritage activities have been disseminated In the framework of the European Researcher Night 2021- SuperScienceMe in Basilicata with a poster presentation.



MINEHERITAGE EIT - KIC Raw Materials Educational project: "Tracing and learning from ancient materials and mining technologies (Mine Heritage)"

MineHeritage intends to show society the importance of RM through an historical approach. Using Europe as a common foreground. Through the history of mining we will show the importance of RM in the development of Europe, European Culture and Society.

Objectives

- Disseminate history and knowledge transfer among society members on the importance of raw materials (RM) through an historical approach.
- Set up of routes (E.U., JRC, and local routes) through RM that have been explored and traded through time.
- Using Europe as a common foreground, where RM have been explored and traded through time we will show that technological developments increased the demand for certain RM linking regions to social development of local and Europe.
- Through the history of mining we will show the importance of RM in the development of Europe, European Culture and Society.

Partners

Call n. 181111
Type of Action: Research and Innovation Action
Activity: Innovation-Exp
Duration: 36 months
Start Date: 2019-01-01
Estimated Project Costs: 6007-50 k€
Requested EU Contribution: 1007-50 k€
Contact: Prof. Paolo Virga
pv@pml.unict.it

<https://mineheritage-project.eu>

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 101019111

FCT NOVA @ Lisboa:

FCT NOVA participated in this year's European Researchers' Night on the 24th September with an in-person MineHeritage activity. The event activities attracted more than 2000 participants of all ages, filling the streets and interacting with the different demonstrators.



NOITE EUROPEIA DOS INVESTIGADORES
European Researchers' Night SciCli
ciência para o clima



CNR @ Igleasias:

MineHeritage activities have been disseminated In the framework of the European Researcher Night 2021- SHARPER in IGLEASIAS (organizing Lab & visit for children and Workshop for citizens)




NOTTE EUROPEA DEI RICERCATORI
EUROPEAN RESEARCHERS' NIGHT

La ricerca è collaborazione e condivisione di linguaggi che creano ponti inaspettati. È scavo in profondità nelle mire della conoscenza. Ricercatori e fotografi riflettono sull'incontro tra parole e immagini e sull'esplorazione delle possibilità del sapere tra visibile e invisibile, luce e buio.

SHARPER
CONSIGLIO NAZIONALE DELLE RICERCHE

CONSIGLIO NAZIONALE DELLE RICERCHE
MUSEO DELL'ARTE MINERARIA
SCHOOL
MINEHERITAGE
LINGUAGGI DELLA BIRRA
ASSOCIAZIONE

Igleasias - 24 settembre 2021
Museo dell'Arte Mineraria
via Roma 47 - Igleasias

h 15.30 - 17
LABORATORIO
Sud chiama nord: fotografie scotoseopra per bambini e bambine da 6 a 10 anni con visita guidata al museo
a cura di: Cristina Memes, Silvestro Celiguri, Sara Laurenti e Vittorio Tullì (CNR)
Alessio Zampieri (Rim-milano)

h 18 - 19.30
INCONTRO
Ricerca, parole e immagini fra scavo e edittoesolo
Relazione: i fotografi Vittorio Tullì (CNR) e Denis Cideli commenta l'antropologia Paola Alessi introduce e modera Cristina Memes (CNR)

Nel museo è visibile l'esposizione 4.40M km: suolo e sottosuolo. My-Disland color
In occasione dell'evento sarà proiettato il cortometraggio: Rite of Passage di Alessio Zampieri

Evento gratuito con prenotazione obbligatoria e ingresso con green pass per info e prenotazione epimmg@icra.it oppure mg@scienzeconsul.it - tel. 0781 1835191
I posti sono limitati

www.museoartemineraria.it

Evento finanziato dal programma di Supporto "MUSEO EUROPEO DEL RICERCATORE"
Progetto finanziato dalla Commissione Europea nell'ambito del progetto Europeo del Ricercatore - 2019-10-15/2020-10-15/2020-10-15



Selected Dissemination activities

29.07.2021 @ CNR

2nd event of "Il Progetto Mine Heritage, una piattaforma Europea di conoscenza e comprensione"

Second event "has been held July 29, 2021 in the framework of the XIII edition of Italian days of Mines. The student Miran Baricic present an overview of the project and he focused on the discussion on promotional video of Galleria Henry. Dott. Massimiliano Manis (associazione Mineraria Sarda) ,Dott. ssa Laura Cappelli (Comune di Buggerru) , Carlo Plaisant (Direttore dei lavori di recupero della Galleria Henry) and Jorma Ferino (represent the SJM Tech that realize the video about Galleria Henry) participate to the event with about 50 other persons.



A.M.S. 1896 LIVE. Appuntamento di divulgazione a cura dell'ASSOCIAZIONE MINERARIA SARDA N°05/2021

"Il Progetto Mine Heritage, una piattaforma Europea di conoscenza e comprensione"

Galleria Henry
https://youtu.be/8kx0Jj_zwMM

RELAZIONI ED INTERVENTI

Laura Cappelli, Sindaco di Buggerru
 Miran Baricic, CNR, Istituto di Struttura della Materia
 Jorma Ferino, SJM Tech – Tecnologie digitali per il Patrimonio Culturale
 Carlo Plaisant, Direttore dei Lavori di recupero della Galleria Henry

Giovedì 29 LUGLIO 2021 - ORE 17:00
DIRETTA FACEBOOK
<https://www.facebook.com/ams1896/>
<https://www.youtube.com/channel/UCQ6nzsj7gJstHrMYzGIG1w>

Moderatore : Massimiliano Manis, Consiglio di Presidenza AMS
<http://www.associazioneminerariasarda.it/> | <https://www.facebook.com/ams1896/> | <https://www.youtube.com/channel/UCQ6nzsj7gJstHrMYzGIG1w>

04.09.2021 @ CUT

Montanhistorisches Kolloquium „500 years Mining Rights“

On the 4th of September, 140 persons attended the "Montanhistorisches Kolloquium" in Sankt Andreasberg. A full-day event on mine heritage in the mining town of Sankt Andreasberg. 10 presentations were focusing on the different aspects of the concession of mining rights in the Harz region. The topic was based on the five-hundredth anniversary of the concession of mining rights in that region. After ten interesting presentations and fruitful discussions, the day ended with a celebration at the Grube Samson – a mine that is part of the world heritage. Besides the scientific proceedings, the major finding of the presentation is presented to the wider public within the first booklet of the Clausthal University of Technology for 2021. The booklet was advertised as well during the conference.

Montanhistorisches Kolloquium

"DIE ÖRTER DA SICH BERGWERCK ERÄUGET, SONDERLICH PRIVILEGIEN..."

10 spannende Fachvorträge über den Aufschwung des Montanwesens im 16. Jahrhundert!

4. SEPTEMBER 2021
10-17 UHR
IM FESTSAAL DES KURHAUSES SANKT ANDREASBERG

Anmeldungen bis zum 25. August an:
 lbbitu-clausthal.de
 Teilnahmegebühr 20,- €
 Tagungsband 20,- €
 Informationen zur Veranstaltung erhalten Sie im Bergwerksmuseum Grube Samson
 Tel.: +49 5582 1249
 info@grube-samson.de



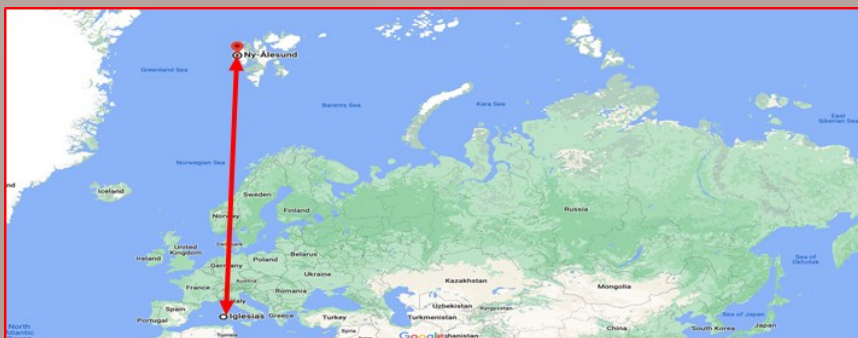


Selected Dissemination activities

07.08.-24.09.2021 @ CNR:

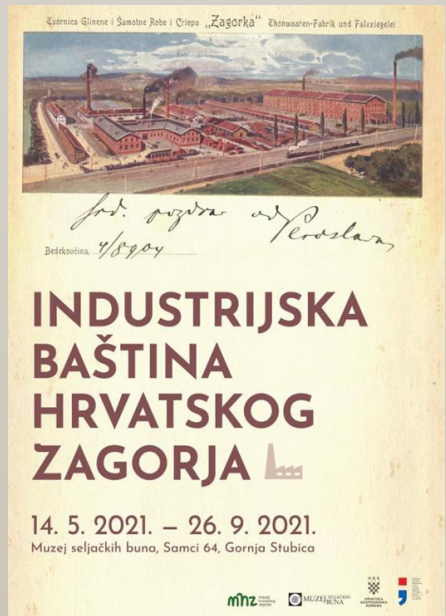
4404 km soil and sub-soil

From August 7 to September 24, an exhibition of photos “4404 km soil and sub-soil” organized by Cristina Marras, Vittorio Tulli, Silvestro Caligiuri, Sara Laureti and Davide Peddis was performed within the “MUSEO ARTE MINERARIA”. It reached 300 visitors.



Until 26.09.2021 @ UNIZG-RGNF: Industrial Heritage Exhibition

Exhibition on industrial heritage of the Zagorje county in Croatia was closed on 26th of September. Despite problems with Covid-19, there were more than 5 thousand visitors. In the frame of the exhibition, significant part was devoted to mining heritage. UNIZG-RGNF MineHeritage team helped in preparation of the exhibition and MineHeritage QR code and brochures were part of exhibition.



21.10.2021 @ CNR: Science festival in Genova

Prof. Davide Peddis and Dott. Cristina Marras talk about the connections among Mine Sites in Sulcis Iglesiente and Svalbard Island enlarging boundaries of MineHeritage Projects towards 50 participants.

Festival della Scienza
Genova, 21 ottobre - 1 novembre 2021

Mappe

Home | Il Festival | Programma | Programma scuole | Sponsor

Home > Programma > Dalla Sardegna alle Isole Svalbard

Dalla Sardegna alle Isole Svalbard

Un viaggio di 4.404 km tra suolo e sottosuolo

Conversazione con *Cristina Marras, Davide Peddis*

Quando: 24 ottobre, ore 15:00

Dove: Palazzo Ducale, Archivio Storico del Comune piazza G. Matteotti, 10 loggiato minore

Età consigliata: Da 16 anni

Tipologia e disciplina: Conversazione, Scienza e società

Per partecipare in presenza

Acquisto preferenziale biglietti e prenotazioni direttamente dal sito o telefonicamente chiamando Tel 010-8934340

Maggiori informazioni alla pagina [Info Utili](#)

- Ingresso: Biglietti Festival
- Prenotazione consigliata
- Prenotazione singola: 0,5 Euro





Selected Dissemination activities

25.-27.11.2021 @ CNR: Iglesias Festival Scienza

Dott. Paolo Dambruoso, give a talk about Raw Materials, also in connection with the problem related to sulcis iglesiente territory, within the Iglesias science festival. The event was joined by 100 persons.

IGLESIAS Festival Scienza
V edizione
25 - 27 novembre 2021

Giovedì 25 novembre 2021, ore 09:00 - 10:00

GIOCHI DA TAVOLA... PERIODICA IL PUZZLE DEI CRITICAL RAW MATERIALS
a cura di Paolo Dambruoso

Assegnare una struttura molecolare ad una sostanza pura è un problema che tipicamente appartiene a tormentoni chimici. I medici, su un altro fronte, controllano lo stato della nostra salute attraverso esami di diagnostica per immagini. Dopo l'idrogeno, l'elio è il secondo elemento più diffuso nell'universo. Sul pianeta Terra, però, l'elio è un elemento molto raro. Tale elemento è presente nell'atmosfera terrestre in concentrazioni non superiori a 5 parti per milione. Da dove viene l'elio che usiamo sulla Terra? Quanto ne produciamo? E cosa ce ne facciamo?

Durante la ore notturne, o negli spazi poco illuminati, abbiamo necessità di luce artificiale. Dapprima fu il lume a petrolio, poi la lampadina ad incandescenza, poi quella a fluorescenza, ed ora i LED. Questa evoluzione dei dispositivi per l'illuminazione.

Nella tavola periodica le terre rare sono un po' in disparte, un po' in evidenza, lì in basso tutte insieme. In realtà si tratta di metalli, e non sono effettivamente rari. La terra rara meno comune è quasi 200 volte più abbondante dell'oro, ed una manciata di terriccio raccolto nel vostro cortile probabilmente ne contiene un po', magari poche parti per milione. Sono invece rari i giacimenti abbastanza grandi e concentrati da consentire l'attività estrattiva.

Strutture chimiche, diognosi, silio, terre rare, lampadine? Sono le tessere disordinate gettate sul tavolo senza ordine né logica apparente. Le rimetteremo insieme, trasformando uno scenario confuso ed incoerente, in un quadro d'insieme ordinato ed interpretabile. Scopriranno come una parola di troppo a Washington, ed una frase non detta in Cina minaccino il buio nel resto del mondo, e come la possibilità di controllare lo stato della nostra salute dipenda da un giacimento di gas naturale in Algeria o Qatar.

PER INFORMAZIONI: info@scienzeiscuola.it
tel: +39 0781 1836191



02.12.2021 @ INESC TEC: BIOREM final Workshop

André Dias, one of the researchers involved in MineHeritage Project, was one of the Speakers of the Final Workshop of the project BIOREM - Bioremediation of hydrocarbon pollutants by autochthonous microorganisms in aquatic environment, organized by CIIMAR (Interdisciplinary Centre of Marine and Environmental Research). This workshop was held on 2nd December in an online format. The researcher presented the main results of "UAV for In-Situ Spill Mitigation" which involved the aerial robotic systems developed by the Centre for Robotics and Autonomous Systems of INESC TEC, showing the potential of these technologies. INESC TEC was represented in this Final Workshop.

BIOREM
FINAL WORKSHOP | 2 DECEMBER 2021
ONLINE EVENT

PROGRAM

- 10000 Overview of the BIOREM Project | Ana Paula Macha - CIIMAR
- 10001 A Generalized Library of Native Microorganisms for Bioremediation of Oil Spills | Maria Luiza Ribeiro - CIIMAR
- 10002 Simplified Bioreactor Apparatus for Bioremediation of Hydrocarbons in Seawater | António Pereira - CIIMAR
- 10003 Microorganisms for Bioremediation of Crude Oil and Maritime Fuels: The Part of Lactobacillus Case Study | Maria Paula Tommaso - CIIMAR
- 10004 UAV for In-Situ Spill Mitigation | André Dias - INESC TEC
- 10005 Demonstration Activities of the BIOREM Project | Maria Paula Tommaso - CIIMAR
- 10006 Discussion and Final Remarks | Ana Paula Macha - CIIMAR
- 10007 Closing session

Logos: CIIMAR, INESC TEC, COMPETE 2020, FCT, EIT RawMaterials



Contacts

- André Dias (INESC TEC)
andree.dias@inesctec.pt

Thank You !!

Logos: CIIMAR, INESC TEC, COMPETE 2020, FCT, EIT RawMaterials

Participant list on the right: Rafaela Perdigão (CIIMA...), Paula Lima, ANDRÉ DIAS, Maria Paula Tommaso, Margá Almeida (CIIMAR), Ana Paula Macha (CIIMA...)

03.12.2021 @ FCTNOVA: VI RawMaterials@Schools European Conference

In a synergy action between two EIT Raw Materials projects, MineHeritage was presented by the Project Coordinator with an interactive webinar framed in the IV RawMaterials@Schools European Conference activities, allowing for the dissemination of MineHeritage and its outputs among the younger members of the society.





Publications

@UNIZG-RGNF

"Croatian Geoheritage Sites with the Best-Case Study Analyses Regarding Former Mining and Petroleum Activities"

in *Geoheritage* (2021) 13: 95, <https://doi.org/10.1007/s12371-021-00620-5>

Authors: Zlatko Briševac, Ana Maričić & Vladislav Brkić

Abstract:

The revitalization and protection of industrial and natural heritage is an important part of the cultural identity of a society that respects its history and wants to build a prosperous and sustainable future. This paper describes four selected case studies of the successful revitalization and presentation of mining, geology, and petroleum heritage in the Republic of Croatia: a former quarry (Rupnica), two metal mines (St. Barbara Mine and Zrinski Mine) and one site of petroleum heritage (Peklenica and Selnica Petroleum Heritage Park). For revitalization strategy of selected areas, SWOT analysis and TOWS matrix were performed. Sub-strategy ranking was done through five key principles of geotourism. The strong and weak points of revitalized projects are indicated, as well as recommendations for the realisation of future geoheritage projects. This paper describes how a currently poor-mining country, which is intensively developing tourism, can protect, present, and promote its former industrial heritage, which is related to geoheritage. One of the main goals is to encourage all stakeholders to promote industrial heritage based on a simplified form of the mentioned analysis method and matrix.

@POLSL

"Historical Outline of Iron Mining and Production in the Area of Present-Day Poland"

in *Minerals* 2021, 11(10), 1136; <https://doi.org/10.3390/min11101136> .

Authors: Paweł Wrona, Zenon Róžański, Grzegorz Pach, Adam P. Niewiadomski, and João Pedro Veiga

Abstract:

The article presents the history of iron ore mining and production in present-day Poland and takes into account mining and production techniques and the influence of mining on the development of the surrounding areas. Examples of development are presented for the most important iron ore mining centers established since the period of the so-called Roman influences—Lower Silesia in the region of Tarchalice and the Świętokrzyskie region in the area of Góry Świętokrzyskie (Świętokrzyskie Mountains). The oldest traces of underground iron ore mining in Poland date back to the 7th–5th century B.C., and iron production dates back from the 1st century B.C. in the Częstochowa region where economically significant iron ore exploitation started in the 14th century and lasted until the 20th century. Studies showed that the development of iron ore mining in today's Poland was associated with significant events in the country's history, for example, with the expansion of a network of fortified castles in Silesia or with the industrial revolution. In each case, the increase in iron production resulted in the development and growth of the surrounding areas.

Check out more sites and information



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[YouTube](#)

or send an E-Mail to the Coordinator jpv@fct.unl.pt