Post-Mining Multi-Hazards evaluation for land-planning

PoMHaz

WP1: Coordination and dissemination

D5: Deliverable 1.5 - Dissemination report

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Glossary

DoA: Description of actions

DSS: Decision support System

QGIS: QGIS (Quantum Geographic Information System) is a free, open-source software that allows users to create, edit, visualize, analyze, and publish geospatial information.

Hazard: A process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption

MOOC: Massive Open Online Course

RFCS: Research Fund for Coal and Steel

1. Executive Summary

This deliverable is part of the POMHAZ project, Post-Mining Multi-Hazards evaluation for land-planning. The main objective of POMHAZ is to identify the interaction between the post-mining hazards for coalmines in Europe and to develop tools for facilitate the management of the post-mining hazards in coal region.

In the POMHAZ project, the present deliverable is part of the WP1 that is dedicated to the project coordination and dissemination to disseminate the findings of the project. Therefore, Deliverable 1.4, is directly related to Task 1.4 “Results dissemination”. This deliverable presents the global strategy related to disseminate project results, while deliverable 1.4 focuses only on the dissemination of the PoMHaz project results through publications, conferences and a final workshop.

Different actions were taken from the beginning of the project until the end of the project through different communication channels.

The partners of the project are from academia, research centres and mining companies. This consortium facilitated the dissemination and the exploitation of the project. Each partner tried to use all the communication paths for maximising this action.

The dissemination covered the communication, the publication and the participation to different dissemination events related to the topic of the project.

The development of specific websites allows presenting the PoMHaz project and the main results and tools developed during the project.

The scientific high-quality publications in journals, national and international conferences, shared the methodology for the assessment of multi-hazards.

The workshops, seminars with different stakeholders, mining authorities, managers, etc. were great events for disseminating and preparing the exploitation of the DSS tool.

The MOOC is also a great dissemination tool for students, but not only. This MOOC can be used in the future for explaining the importance of the multi-hazard assessments.

In summary, the partners engaged an important effort to share the results at national, European and international scales.

2. Description of PoMHaz?

The goal of PoMHaz is to improve methodological and practical knowledge for the assessment and management of multi-hazards, at the scale of a coal mining basin, through the active and continuous engagement of key stakeholders involved in or affected by post-mining activities.

PoMHaz is a project funded by the Research Fund for Coal and Steel programme. Figure 1 presents the structure of the project within the fifth work packages:

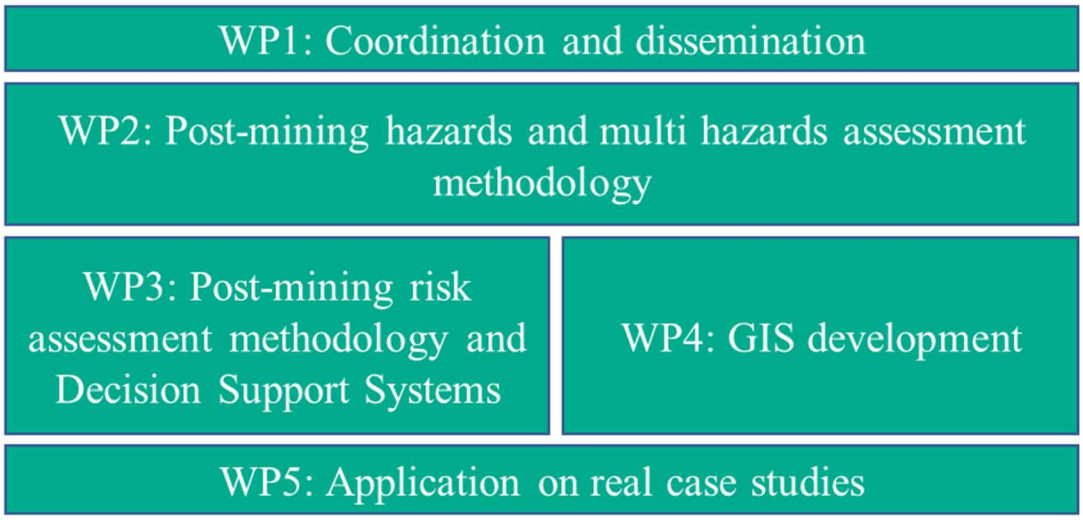

Figure 1: Structure of the POMHAZ project

The dissemination and the exploitation of the project results are one of the main targets of the project. The consortium of the project involves partners from academia, research centres and mining companies. Further information can be found under https://www.pomhaz-rfcs.eu. Four European countries are the partners of the project: France, Germany, Poland and Greece. The PoMHaz Consortium is presented below (Figure 2):

Figure 2: Partners of the project

3. Dissemination of the project

3.1 Description of the task 1.5: Results dissemination

Dissemination refers to the process of distributing or spreading information, ideas, or materials to a wide audience.

The coordinator and the partners are collectively in charge of the dissemination of the results of the project according to the DoA, described in the WP1 of the GA. The dissemination covers the communication, the publication and the participation to different dissemination events related to the topic of the project. Results were disseminated through traditional and new communication tools such as LinkedIn.

Partners paid important effort to share the main results through the most effective ways and to communicate the results into a large audience(s) e.g. social media, websites (national and project websites) conferences, traditional media, scientific and professional journals, also through workshops and through technical papers and articles published during and after completion of the project.

The partners engaged to publish the results of the project in scientific and professional journals. They also planned to participate in regional and European conferences.

The partners organised workshopsthat were used to disseminate the novel methodologies and techniques developed through the PoMHaz project in order to ensure the future and widespread dissemination and adoption of the proposed schemes.

Online Course (a MOOC) was developed, for which each partner teaches its content using blended learning (Videoclip, slides, reading material and set of questions for self-evaluation).

The objective of PoMHaz is to share the results and to increase the visibility of the risk assessment management in the post-mining area.

Figure 3: Share objective for increasing the visibility of the PoMHaz project

3.2 Websites

3.2.1 Project website

A specific website for the project: https://www.pomhaz-rfcs.eu/ is one of the dissemination tools. In a context of the PomHaz project, dissemination involves sharing important messages, reports, data, or findings with partners, engineers, stakeholders, clients, or the public the results of the PomHaz project via very attractive website (Figure 4Figure 4).

The website of PomHaz project was created by the coordinator (Ineris) from the beginning of the project to share the information through three folders: communication, publication and report to increase the feasibility of the project. It updated continuously allowing for external wide audiences to have the opportunity to learn about the project.

The website presents not only the results of PoMHaz but also all the useful information about the hazards and risk associated with the post-mining land management.

The website presents also the European projects and main national and internation events related to multi-risks.

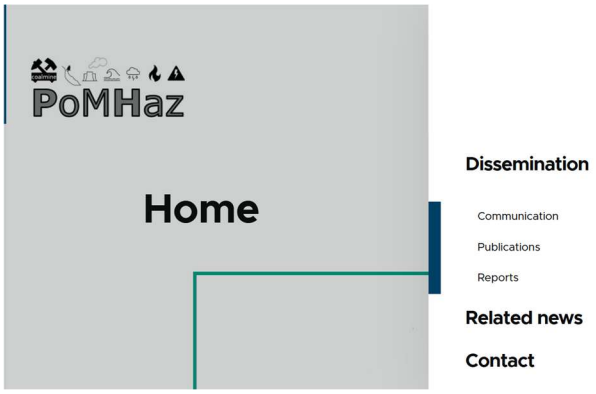

Figure 4: Website of the PoMhaz project, access to the dissemination page

All the public documents and publications can be downloaded from the website.

The website offers the possibility to communicate with the coordinator for specific questions related to the project and the results.

3.2.2 DSS website

The DSS is the main tool developed during the PoMHaZ project. Additionally, to the project website, a website was developed for the DSS tool https://dss.fzn.thga.de/.

The DSS presents also the PoMHaZ project and the definition of the mining hazards, case study, etc.

The website allows also friendly use of the DSS by the potential end users. Different documents also are accessible using the DSS. Certain documents can be uploaded from the site.

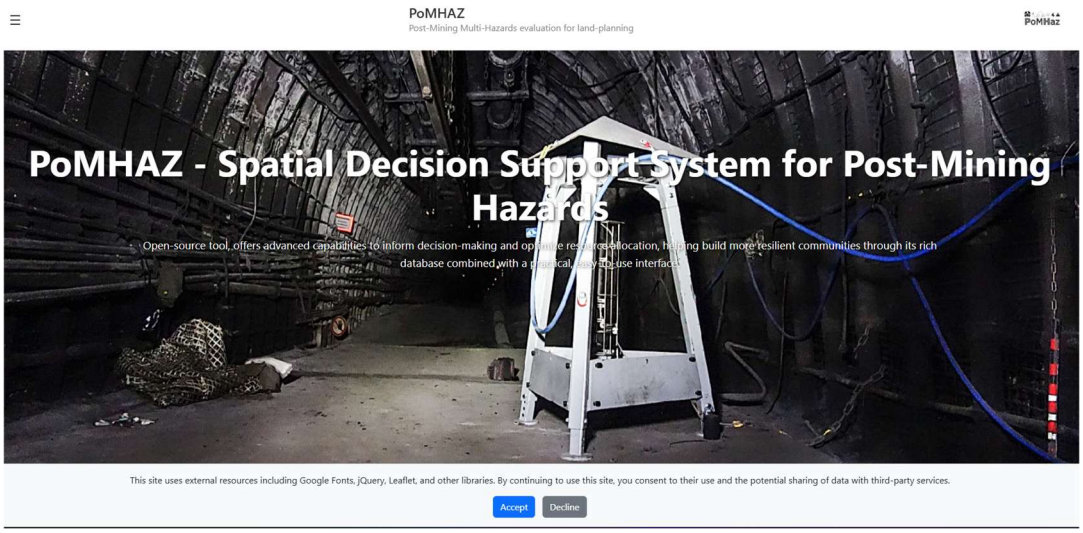

Figure 5: DSS website

Certain partners also use their website to disseminate the project:

https://www.ineris.fr/fr/ineris/actualites/gestion-apres-mine-ineris-coordinateur-projet-europeen-pomhaz
https://gig.eu/en/pomhaz
https://fzn.thga.de/forschung/pomhaz/

3.3 Large wide and public dissemination

3.3.1 Workshops

Table below presents the workshops organized by the partners in the different countries: Poland, Germany, France and Greece. 7 workshops were organized with mainly mining authorities, risk assessment experts, engineers, etc.

The workshops had three objectives:

- Presenting the PoMHZ project objectives and structure,
- Presenting the main progress of the project,
- And finally, the DSS tool for multi-hazard analysis

Table 1: List of workshops

Country	kind of event	Lead Beneficiary	language	Location	Date	Topics	Audience
Poland	a joint workshop for Sosnowiec and Piekary Śląskie	GIG	polish	Katowice	June 2025	DSS	Representatives of the cities and other stakeholders
Poland	workshop for Walbrzych (Silesia)	GIG	polish	Walbrzych	May 2025	DSS	Representatives of the cities and other stakeholders
Poland	PoMHaz session during conference	GIG	english	Jaworze	November 2025	MHI DSS/GIS Application of methodology on case studies	scientific audience
Germany	workshop	DMT-THGA	german	Bochum	June 2025	Risk factors risk analysis land planning land management How to use DSS? share views with audience	stakeholders mining authorities mining companies cities, etc.
Greece	workshop	CERTH	greek	Athens	June 2025	under discussion: risks, DSS, GIS application of case studies	local community, including engineers, energy sector officers, researchers in mining and renewable energy, professors from the School of Mining and Metallurgical Engineering of NTUA, as well as master's and undergraduate students
France	technical meeting with post-mining organisations	Ineris	french	Paris	October 2025	Multihazard interaction, MHI, DSS, GIS	Ministry and mining local authorities in charge of the post-mining risk management, GEODERIS, public expert organization in post-mining risk and Ineris
France	Ineris meeting	Ineris	french	online	October 2025	Multihazard interaction, MHI, DSS, GIS	Ineris risk experts

Figure 6. Illustrations of the workshops

3.3.2 Media

One of the communication tools developed in the project is a video for presenting the project, objectives, and the main post-mining hazards and the potential interactions. The video used very simple words to reach large audience.

pomhaz-rfcs.eu/sites/default/files/2023-12/POMHAZ_V7_SStitresGB2.mp4

Communications about the project by all the partners to maximize the impact:
- (WSPÓLNIE DLA NAUKI | Spółka Restrukturyzacji Kopalń S.A. (srk.com.pl)
- Gestion de l'après-mine : l'Ineris coordinateur du projet européen POMHAZ | Ineris)

3.3.3 Newsletters

PoMHaz newsletter has a crucial role in maintaining a direct link with its target audience to share essential information, updates, or even educational content specifically curated for their subscribers. The coordinator with the help of the partners published 2 newsletters during the life of the project (Figure 7). The structure of the newsletter as following:

- about the project: a rapid introduction of the project.
- the structure of the project.
- the partners of the project.
- the progress of the project.
- the main results, illustrated by figures and tables.
- the list of the dissemination actions (publication, conferences, etc.).

The original version was written in English, and translated to Polish, Greek and German.

On the basis of information presented in newsletters, the Polish version of roll-up was developed. It is used during project promotion (e.g. seminars, meetings) and workshops with partner city representatives.

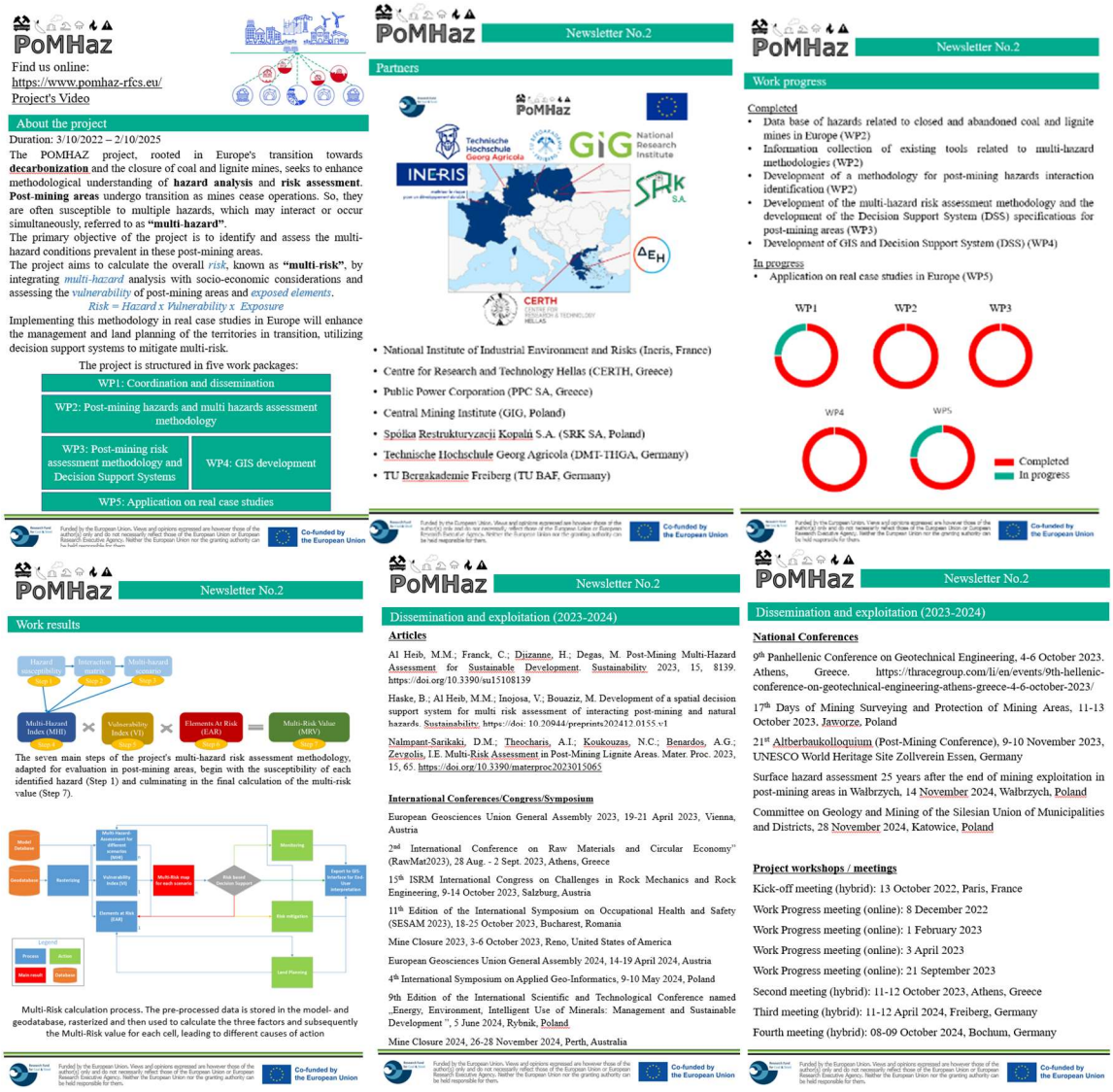

Figure 7: Example of a PoMHaz Newsletter

3.4 Post-Mining Hazards MOOC

One of the important dissemination efforts is preparing a MOOC (Massive Open Online Course). The MOOC is open for all potential persons that would like to know about post-mining hazards and the assessment of multi-hazard. In a MOOC, thousands—or even hundreds of thousands—of people can join the same course at the same time. There is no limit on how many learners can participate.

The TUB-Freiberg designed a great MOOC based on the PoMHaz works done by all of the partners.

Who is this course for?

- Students, engineers, professionals, and non-professionals
- Anyone interested in understanding or managing post-mining hazards
- Suitable for both beginners and advanced GIS users

The MOOC is structured through 4 modulus and 6 videos very well illustrated allowing to learn step by step workflow, from hazard and multi-hazard assessment to the using of the DSS tool with application on concrete case studies, prepared by the partners of the projects. Each video about 30 min based on slides. The videos are supported by reports and documents with complete explanations and details about the subjects treated in the MOOC.

In short, the MOOC offers:

- Blended learning with 6 instructional videos (≈30 min each)
- Clear documentation
- Practical guidance through:
- Understanding mining hazards
- Managing and analyzing spatial data
- Using open-source GIS tools
- Building decision-making tools (DSS).

The four modules of the MOOC are:

Module 1: Understanding the postmining hazards (2 parts) (INERIS, France; PPC, Greece). From this module, we can learn:

- The post mining hazards: subsidence, water contamination, erosion
- How mining safety protocols work and why they matter
- Case study-based insight into post-mining hazard assessment in Greece.

Module 2: Evaluating the multi-hazard risk methodological framework (CERTH, Greece), we can learn:

- What are the methods for assessing post-mining -hazards and their interactions: semi-quantitative multi-hazard methodologies?
- How to create multi-risk maps based on semi-quantitative multi-hazard methodology?

Module 3: Managing Spatial Data & Using Open-Source GIS Tools (TUBAF, Germany). we can learn:

- How mining hazard data is stored and managed in databases
- The use of PostgreSQL and PostGIS for handling spatial data
- How to create maps and analyze environmental risks using QGIS.

Module 4: Building a Decision Support System (DSS) for Mining Hazards (2 parts). (THGA, Germany). We can learn:

- How to design a DSS that helps stakeholders assess mining hazards
- How to connect a GIS database with a web-based interface
- Basics of Flask (a lightweight Python web framework).

The MOOC is hosted by the OPAL platform at TU Bergakademie Freiberg, accessible, well-structured, and easy to follow for all participants (Figure 8).

Link: POMHAZ MOOC - OPAL
https://bildungsportal.sachsen.de/opal/wicket/bookmarkable/de.bps.olat.gui.page.content.LearningResourcePage/;jsessionid=2D86E1DAD0D14DA46EDB83C9C484369F.opalN11?0&par=activateEditor&target=50820939778.

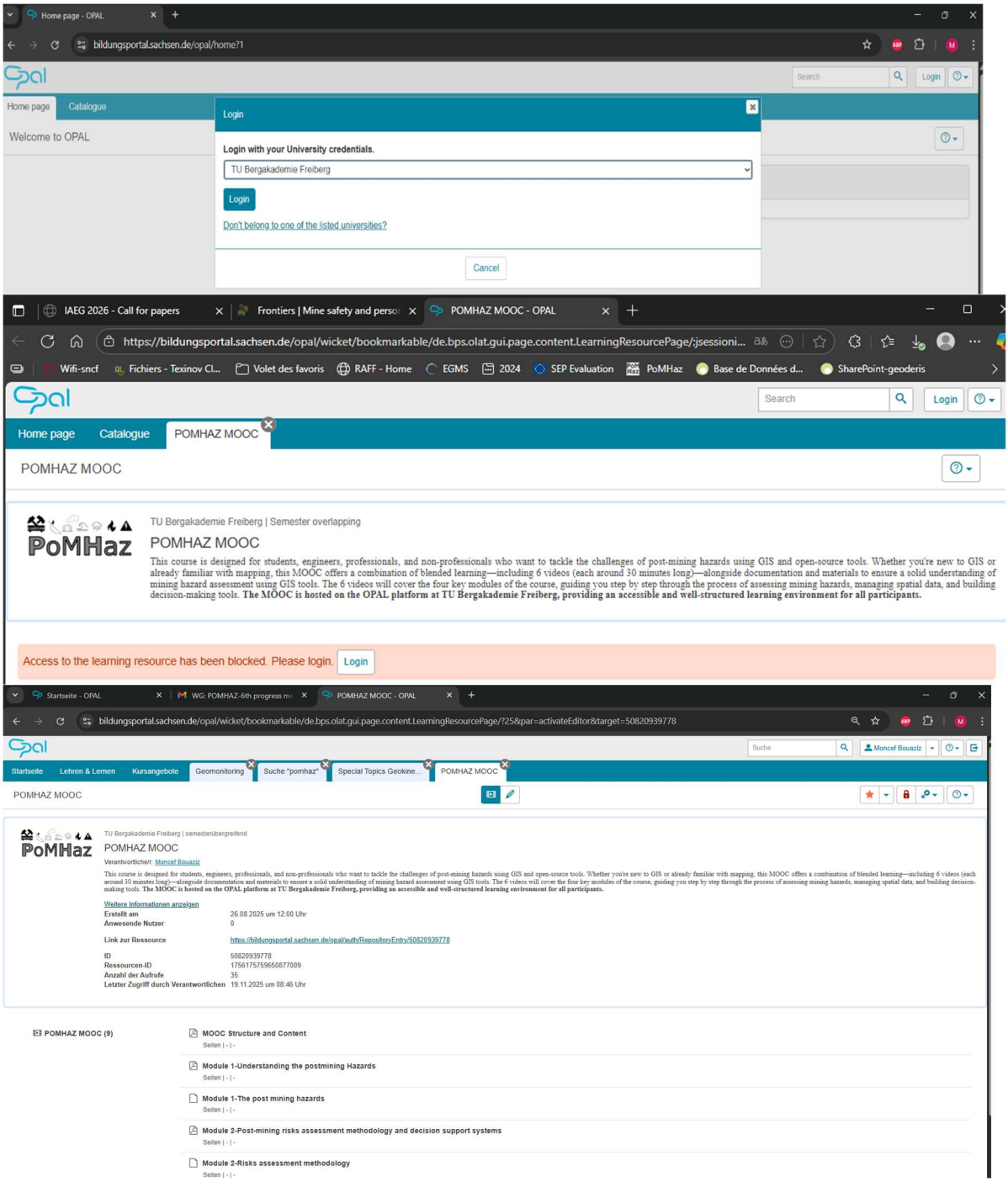

Figure 8: Presentation of the POST-Mining MOOC developed by the partners of the PoMHaz project

3.5 Publications

The partners also work in the different kinds of publications through local, national, European and international conferences.

3.5.1 *National conferences*

Uncertainty of geotechnical parameters in heterogeneous spoil deposits of fine grained soil materials from lignite mines" (https://zenodo.org/doi/10.5281/zenodo.10007297). 9th Panhellenic Conference on Geotechnical Engineering, 4-6 October 2023. Athens, Greece

17th Days of Mining Surveying and Protection of Mining Areas, 11-13 October 2023, Jaworze, Poland

21st Altberbaukolloquium (Post-Mining Conference), 9-10 November, UNESCO World Heritage Site Zollverein Essen, Germany. Presentation (Haske): „Ganzheitliches Risikomanagement für europäische Nachbergbauregionen – Das Projekt PoMHaZ“

Nachbergbauzeit 2025, in Bochum, Germany, on 20 March 2025. Presentation (Haske): „Entwicklung und Evaluierung eines interaktiven Tools zur Multigefahrenanalyse in europäischen Nachbergbau-Regionen“ and poster (Inojosa): „Framework combining Prototype SpatialDecisionSupport System withRemote Sensing analysis“

9th Edition of the International Scientific and Technological Conference "Energy, Environment, Intelligent Use of Minerals: Management and Sustainable Development", in Rybnik, Poland, on 5 June 2024

Izabela Chmielewska, Stefan Czerwiński, Andrzej Chmiela: Nuklidy promieniotwórcze w wodach pochodzących z podziemnych zakładów górniczych (Radionuclides in waters from underground coal mines), published in: Systemy Wspomagania w Inżynierii Produkcji, 2024, vol.13(2), pp:145-153, abstract in English;

Sandra Nowak, Małgorzata Wysocka, Stefan Czerwiński, Andrzej Chmiela: Wielokryterialna analiza czynników kształtujących ryzyko radonowe na terenach górniczych (Multi-criteria analysis of factors forming radon risk in mining areas), published in: Systemy Wspomagania w Inżynierii Produkcji, 2024, vol.13(2), pp:135-144, abstract in English.

Bouaziz Moncef, Haske Benjamin, Al Heib Marwan, Benndorf Joerg. Geographic Information System-Driven Decision Support System for Assessing Multiple Hazards in Post-Mining. 4th International Symposium on Applied Geoinformatics on 9-10 May 2024.

Inojosa, V. Framework Combining Remote Sensing Analysis with Prototype Spatial Decision Support System to Address Multi-Hazard Challenges in Post-Mining Sites. Case of Study: Southern Ruhr Area. Master Thesis, University of Stuttgart, Stuttgart, Germany, 2024

Wissenschaftstag FZN 2/2023, 6 June 2023 at THGA, Bochum, Germany. Presentation (Haske, THGA): „Ganzheitliches, interdisziplinäres Risikomanagement für europäische Nachbergbauregionen – Das Projekt PoMHaZ“

Wissenschaftstag FZN 2/2024, 21 October 2024 at THGA, Bochum, Germany. Presentation (Inojosa, THGA): „POMHAZ -Development of Spatial Decision Support System“

Nalmpant-Sarikaki, D.M.; Theocharis, A.I.; Koukouzas, N.C.; Benardos, A.G.; Zevgolis, I.E. Multi-Risk Assessment in Post-Mining Lignite Areas. Mater. Proc. 2023, 15, 65. https://doi.org/10.3390/materproc2023015065

27th April 2023, Katowice, Seminar of the Commission for the Protection of Mining Areas of the Polish Academy of Sciences, Katowice Branch; presentation of the main objectives of the project POMHAZ (M. Wysocka).

11-13th October 2023, Jaworze, Poland, XVII Days of Mine Surveying and Protection of Mining Areas, Presentation Project POMHAZ - new tools to support urban development in post-mining areas (A.Kowalski).

14th November 2024. A seminar entitled ‘Surface hazard assessment 25 years after the end of mining exploitation in post-mining areas in Wałbrzych’ was held in Wałbrzych. The presentation, entitled Comprehensive assessment of risks in post-mining areas for the purposes of spatial planning, as presented (presented by Wysocka).

28th November 2024. at the Conference Centre of the Theological Faculty of the University of Silesia in Katowice, a meeting of the Committee on Geology and Mining of the Silesian Union of Municipalities and Districts was held with the participation of representatives of the Central Mining Institute - State Research Institute. The meeting was devoted to a presentation of the PoMHaz project on comprehensive assessment of hazards in post-mining areas in the context of spatial planning (presented by Gruchlik and Wysocka).

11th April 2025, Katowice, Seminar of the Commission for the Protection of Mining Areas of the Polish Academy of Sciences. K Niedbalska presented progress of POMHAZ project and the GSS tool.

15th June 2025, Katowice GIG-PIB, Postgraduate course ‘Adaptation of mines to perform new functions - legal, technical, social and environmental considerations’. Thematic block: Groundwater and mine water management in active and closing mines. K. Niedbalska presented

Haske B, Inojosa V, (2025). Development and evaluation of an interactive tool for multi-hazard analysis in European Post-mining regions. MINING REPORT 2025. https://mining-report.de/wp-content/uploads/_pda/2025/08/MRG_2504_Multigefahrenanalyse_Haske_Inojosa_250813.pdf

3.5.2 *European conferences*

Wysocka M.; Bonczyk M.; Chmiela A.; Gajdzik M.; Morawski A.: The POMHAZ project – new ideas for the development of towns in post-mining areas. Final project conference "The potential of abandoned mine workings in the EU"., 11-12 May 2023, Ostrava, Czech Republic.

9th Edition of the International Scientific and Technological Conference "Energy, Environment, Intelligent Use of Minerals: Management and Sustainable Development", in Rybnik, Poland, on 5 June 2024:

Izabela Chmielewska, Stefan Czerwiński, Andrzej Chmiela: Nuklidy promieniotwórcze w wodach pochodzących z podziemnych zakładów górniczych (Radionuclides in waters from underground coal mines), published in: Systemy Wspomagania w Inżynierii Produkcji, 2024, vol.13(2), pp:145-153, abstract in English;

Sandra Nowak, Małgorzata Wysocka, Stefan Czerwiński, Andrzej Chmiela: Wielokryterialna analiza czynników kształtujących ryzyko radonowe na terenach górniczych (Multi-criteria analysis of factors forming radon risk in mining areas), published in: Systemy Wspomagania w Inżynierii Produkcji, 2024, vol.13(2), pp:135-144, abstract in English.

Nalmpant-Sarikaki, D.M.; Theocharis, A.I.; Koukouzas, N.C.; Benardos, A.G.; Zevgolis, I.E. Multi-Risk Assessment Post-Mining Lignite 2nd International Conference on Raw Materials and Circular Economy" (RawMat2023), 28 Aug. - 2 Sept. 2023, Athens, Greece. https://doi.org/10.3390/materproc2023015065.

15th ISRM International Congress on Challenges in Rock Mechanics and Rock Engineering, 9-14 October 2023, Salzburg, Austria

11th Edition of the International Symposium on Occupational Health and Safety (SESAM 2023), 18-25 October 2023, Bucharest, Romania

9th Panhellenic Conference on Geotechnical Engineering, 4-6 October 2023. Athens, Greece. https://thracegroup.com/li/en/events/9th-hellenic-conference-on-geotechnical-engineering-athens-greece-4-6-october-2023/

17th Days of Mining Surveying and Protection of Mining Areas, 11-13 October 2023, Jaworze, Poland

Surface hazard assessment 25 years after the end of mining exploitation in post-mining areas in Wałbrzych, 14 November 2024, Wałbrzych, Poland

Committee on Geology and Mining of the Silesian Union of Municipalities and Districts, 28 November 2024, Katowice, Poland

2nd International Conference on Raw Materials and Circular Economy" (RawMat2023), 28 Aug. - 2 Sept. 2023, Athens, Greece

15th ISRM International Congress on Challenges in Rock Mechanics and Rock Engineering, 9-14 October 2023, Salzburg, Austria

11th Edition of the International Symposium on Occupational Health and Safety (SESAM 2023), 18-25 October 2023, Bucharest, Romania

EGU General Assembly 2024 on 14-19 April 2024

XVII International Science and Technology Conference "New challenges for engineering surveying in civil engineering and environmental monitoring", May 22-23 2025, Warsaw - Józefosław, Poland. Presentation (Inojosa): "Framework combining Prototype Spatial Decision Support System with Remote Sensing analysis".

A GIS-Based Decision Support System for Multi-Hazard Assessment in Post-Mining Regions. https://doi.org/10.5194/egusphere-egu24-3065.

3.5.3 *International conferences*

16th International Conference on Mine Closure, 2023, 3-6 October 2023, Reno, Nevada, USA

European Geosciences Union General Assembly 2023, 19-21 April 2023, Vienna, Austria

2nd International Conference on Raw Materials and Circular Economy" (RawMat2023), 28 Aug. - 2 Sept. 2023, Athens, Greece

15th ISRM International Congress on Challenges in Rock Mechanics and Rock Engineering, 9-14 October 2023, Salzburg, Austria

11th Edition of the International Symposium on Occupational Health and Safety (SESAM 2023), 18-25 October 2023, Bucharest, Romania

Mine Closure 2023, 3-6 October 2023, Reno, United States of America

European Geosciences Union General Assembly 2024, 14-19 April 2024, Austria

4th International Symposium on Applied Geo-Informatics, 9-10 May 2024, Poland

9th Edition of the International Scientific and Technological Conference named „Energy, Environment, Intelligent Use of Minerals: Management and Sustainable Development", 5 June 2024, Rybnik, Poland

Multi-hazard index for assessing the interaction of post mining hazards. Mine Closure 2024, 26-28 November 2024, Perth, Australia.

16th October 2024. Dr Bartosz Apanowicz presented the project's achievements and prospects to date in a lecture at a Canadian University of New Brunswick, Canadian Centre for Geodetic Engineering, Department of Geodesy and Geomatics Engineering. The lecture was listened to by 10 students, and around 20 university staff. In addition, people from outside the university were able to connect online.

3.6 Journals

Mikroutsikos, A., Theocharis, A.I., Koukouzas, N.C., Zevgolis, I.E. (2024). Slope stability of reclaimed coal mines through a new water filling index, Journal of Rock Mechanics and Geotechnical Engineering, 16(3): 828-839, https://doi.org/10.1016/j.jrmge.2023.08.022

Papagiannis, A., Theocharis, A.I., Koukouzas, N.C., Zevgolis, I.E. (2024). Effect of ground improvement on settlement problems of lignite spoil heaps using numerical modelling, International Journal of Geosynthetics and Ground Engineering, 10, 75, https://doi.org/10.1007/s40891-024-00586-8

Theocharis, A.I., Zevgolis, I.E., Roumpos, C. Koukouzas, N.C. (2024). Probability distributions of geotechnical properties for heterogeneous lignite mine spoils, International Journal of Geotechnical Engineering, 18(5), 528-536, https://doi.org/10.1080/19386362.2024.2398328

Dafni M. Nalmpant-Sarikaki, Alexandros I. Theocharis, Nalmpant-Sarikaki, D, Nikolaos C. Koukouzas, and Ioannis E. Zevgolis. A Framework for Effective Multi-Hazard Risk Assessment in Post-Mining Areas. Safety on February 2025. https://doi.org/10.3390/safety11010018

Benjamin Haske, Marwan Al Heib, Vinicius Inojosa and Moncef Bouaziz. Spatial Decision Support System for Multi-Risk Assessment of Post-Mining Hazards. https://doi.org/10.3390/mining5010017

Marwan Al Heib, Christian Franck, Hippolyte Djizanne and Marie Degas. Post-Mining Multi-Hazard Assessment for Sustainable Development. Sustainability 2023. https://ineris.hal.science/ineris-04161209. Journals Sustainability Volume 15 Issue 10 10.3390/su15108139.

Marwan Al Heib, Christian Franck. A methodology for multi-hazard interaction assessment of abandoned mines. Journal of Industrial Safety. Volume 1, Issue 2, December 2024, 100018. https://doi.org/10.1016/j.jinse.2024.100018.

Dafni M. Nalmpant-Sarikaki, Alexandros Theocharis, Nikolaos Koukouzas, Ioannis E. Zevgolis A comparative analysis of semi-quantitative multi-hazard methodologies with an application to a post-mining area. May 2025, Natural Hazards, 121(10):12327-12352, DOI: 10.1007/s11069-025-07282-4.

Haske, B., Inojosa, V. (2025): “Development and evaluation of an interactive tool for multi-hazard analysis in European post-mining regions”, MINING REPORT Glückauf, August 2025, Germany.

3.7 These and master’s degrees

A PhD student from the National Technical University of Athens collaborated with CERTH during the project and has part of her doctoral research connected to the PoMHaZ activities. The PhD thesis, titled “Multi-hazard analysis and multi-risk assessment in post-mining areas”, focuses on methodological approaches for assessing multi-hazard and multi-risk conditions in post-mining areas. The PhD work is ongoing and is expected to be completed during the year 2026. This thesis is a very important contribution for the scientific community not only in Europe but also over the world.

A master’s thesis from the University of Stuttgart in collaboration with Technische Hochschule Georg Agricola University (THGA) was conducted at the Research Center of Post- in Bochum. The work developed a prototype framework combining the PoMHaZ Spatial Decision Support System (sDSS) with remote sensing methods for monitoring ground-movement hazards in post-mining environments. The framework integrates multi-hazard approach, exposed elements at risk and social vulnerability indicators to generate multi-risk maps and possible monitoring hotspots. Ground deformation is quantified using Time Series Interferometric Synthetic Aperture Radar providing an average velocity map and displacement time series for the Southern Ruhr Area (2017-2024). This thesis delivers an operational concept for combining Remote Sensing techniques with decision-support tools for post-mining risk management within the PoMHaZ project.

3.8 Social media: Linkedin

15 communications were posted by the partners for presenting the main activities of the projects. The figures below showing some of them.

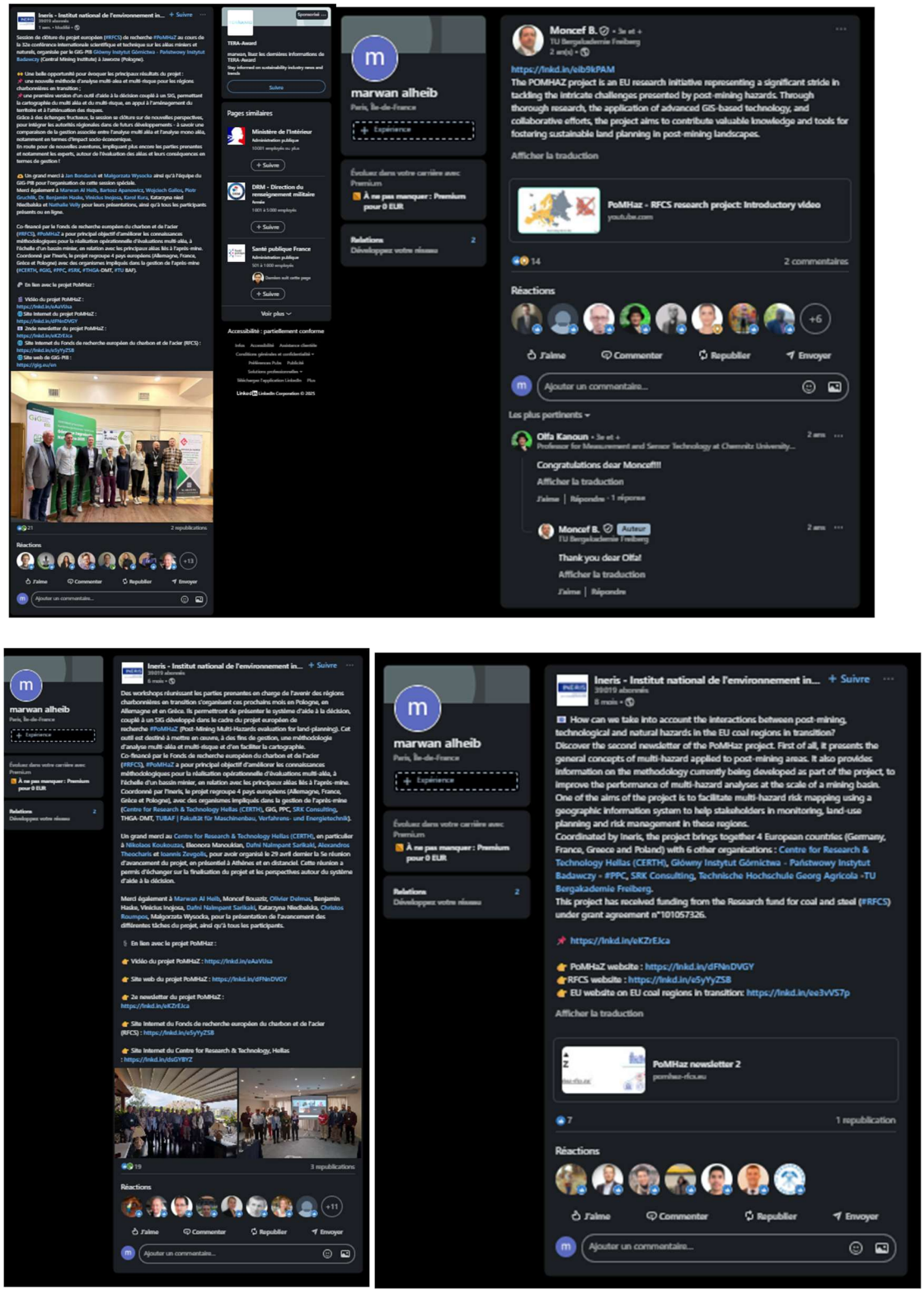

Figure 9: Examples of communication using LinkedIn social media

3.9 Lectures and seminars

GIG-PIB contributed to the destination by giving a lecture during the internship of Bartosz Apanowicz (GIG-PIB), at the University of New Brunswick (UNB), Canadian Centre for Geodetic Engineering, Department of Geodesy and Geomatics Engineering (Canada), 16 October 2024, in addition to UNB students and researchers, the audience included other interns and visiting staff from outside Canada.

In order to better promote the project among people from academia, administration and local stakeholders, 11 meetings and lectures were held in Germany and Poland. Discussions following the meetings allowed for an understanding of the needs of the audience and potential users of the DSS tool, and, as a result, possible amendments and additions to the system.

The following Table presents the titles of posters and proceedings from listed above seminars and other dissemination events.

Table 2: List of posters and proceedings

	Authors	Title	The form of dissemination	Year of the event
NATIONAL CONFERENCES AND EVENTS				
5	Wysocka M.	The main objectives of the project PoMHaz	Presentation for the members of the branch of Polish Academy of Sciences	2023
6	Haske B.	Ganzheitliches, interdisziplinäres Risikomanagement für europäische Nachbergbauregionen – Das Projekt PoMHaZ	Presentation on Wissenschaftstag FZN 2/2023 at THGA, Bochum, Germany	2023
7	Wysocka M.	Comprehensive assessment of risks in post-mining areas for the purposes of spatial planning	Presentation for stakeholders in Wałbrzych	2024
8	Gruchlik P., Wysocka M.	Comprehensive assessment of hazards in post-mining areas in the context of spatial planning	Presentation for geologists and urban planners, the members of Silesian Union of Municipalities and Districts	2024
9	Niedbalska K.	The progress of POMHAZ project and the GSS tool	Presentation for the members of the branch of Polish Academy of Sciences	2025
10	Niedbalska K.	Groundwater and mine water management in active and closing mines	Lecture for post-graduate students	2025
11	Haske B. Inojosa V.	Entwicklung und Evaluierung eines interaktiven Tools zur Multigefahrenanalyse in europäischen Nachbergbau-Regionen Framework combining Prototype Spatial Decision Support System withRemote Sensing analysis	Presentation Poster Nachbergbauzeit 2025, in Bochum, Germany,	2025

3.10 Coal Regions in transition platform

The coordinator shared the results of PoMHaz with EU coal regions in transition. The EU is committed to supporting coal regions to ensure that the clean energy transition is fair and no region is left behind. The coordinator organised two specific meetings for showing the structure of the project and the DSS as a tool for assessing the multi-hazard risk for coal regions.

4. Conclusion

The dissemination of the project was a main task for the coordinator and all the partners of the project.

Different actions were taken from the beginning of the project until the end of the project through different communication channels.

The dissemination covered the communication, the publication and the participation to different dissemination events related to the topic of the project.

The development of specific websites allows presenting the PoMHaz project and the main results and tools developed during the project.

The scientific high-quality publications in journals, national and international conferences, shared the methodology for the assessment of multi-hazards.

The workshops, seminars with different stakeholders, mining authorities, managers, etc. were great events for disseminating and preparing the exploitation of the DSS tool.

The MOOC is also a great dissemination tool for students, but not only. This MOOC can be used in the future for explaining the importance of the multi-hazard assessments.

In summary, the partners engaged an important effort to share the results at national, European and international scales.

What is PoMHaz?

The goal of PoMHaz is to improve methodological and practical knowledge for the assessment and management of multi-hazards, at the scale of a coal mining basin, through the active and continuous engagement of key stakeholders involved in or affected by post-mining activities.

PoMHaz is a project funded by the Research Fund for Coal and Steel programme.

Further information can be found under https://www.pomhaz-rfcs.eu.

For feedback on the PoMHaz project or the published deliverables, please contact contact@pomhaz-rfcs.eu.

The PoMHaz Consortium

Public Power Corporation

Technische Hochschule Georg Agricola

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maîtriser le risque pour un développement durable

GIG National Research Institute

CERTH
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