Professional Development Workshop on Critical Raw Materials Content in Thermal Waters: Analysis and Assessment

University of Miskolc, Hungary
30 March 2023, A/2 building, ground floor, lecture room II

Time	Session	Session leader
9:30 – 9:45	Welcome and introduction of the BrineRIS project	Magdalena Worsa-Kozak (WUST), Norbert Szabó (UM)
9:45 – 10:15	Co-production of clean energy and metals from a single interlinked process - the CHPM concept	Éva Hartai (University of Miskolc)
10:15 – 10:45	Towards a better understanding of risks and benefits of geothermal fluid properties: Insights from the projects REFLECT and CRM geothermal *(online presentation)*	Simona Regenspurg (GFZ)
10:45 – 11:00	*coffee break*	
11:00 – 11:30	Hydrogeochemical research in the Institute of Water and Environmental Management, University of Miskolc	Márton Tóth (University of Miskolc)
11:30 – 12:00	Geological risk assessment in geothermal developments: how and why?	Imre Szilágyi (Eötvös Loránd University)
12:00 – 13:30	*Lunch break, lab visit*	
13:30 – 14:00	Remote, standoff and laboratory-based geological applications of laser induced breakdown spectroscopy	Gábor Galbács (University of Szeged)
14:00 – 14:30	Granite alteration as a source of high lithium content in the South Hungarian formation waters	Krisztián Jancsek (University of Szeged)
14:30 – 14:45	*Coffee break*	
14:45 – 15:15	Critical element potential of the geothermal project of Szeged	Tivadar M. Tóth, Félix Schubert, Gábor Bozsó (University of Szeged)
15:15 – 15:45	Smart Reservoir Laboratory(R) - an innovative tool to characterise reservoirs and assess the sustainability of extracting critical elements from reservoirs	Ferenc Fedor, Péter Koroncz (Geochem Kft.)
15:45 – 16:15	European geological analogies of Pusztaföldvár (Hungary) geothermal lithium anomaly	István Nagy-Kóródi, Róbert Auer (MOL)
19:00 – 22:00	*Workshop dinner (Miskolctapolca)*	

Field excursion of the professional development workshop *Friday, 31 March 2023, 8:30 – 16:00* *Meeting point: Cave Bath, Miskolctapolca, 8:30*
Site 1: Cave Bath and waterworks, Miskolctapolca 8:30 The Cave Bath of Miskolctapolca is unique in Europe, a bathing resort placed in a natural cave and above hot fountains. At this place, both thermal and cold karstic waters flow out from the Triassic limestone of the Bükk Mts. at the faulted boundary of its outcrop. The 30°C-temperatured water and the climate of the cave has curing power, especially in joint-case. The total solute concentration of the water does not reach 1000 mg/l, a threshold for medicinal water, so the guests can bath in it without time limit. (https://barlangfurdo.hu/en/cave-bath)
Site 2: Pannergy geothermal wells, Mályi 11:00 The Bükkalja region is characterized by the deeply buried continuation of the voluminous karstified Triassic limestone formations of the Bükk Mts. Thermal waters occur here in some natural springs and in wells (mostly aimed at hydrocarbon exploration) as well. These waters are utilized in spas, but also have a potential for energy supply. Geothermal input to the heating of the town Miskolc was started in 2013. The geothermal brine is coming from 1500–2300 m depth with 85-100°C temperature from the wells at Mályi and it is reinjected at Kistokaj. The heat capacity of the system is 60 MW. (https://pannergy.com/en/projects/miskolc/)
Lunch at Lillafüred 12:30
Site 3: Anna Cave and karst springs, Lillafüred 14:00 The popular holiday resort of the Bükk Mts. is famous for its several caves, springs, and waterfalls. Unlike most of the caves in limestone, Anna Cave originated in the travertine precipitated from the karst springs of the Szinva Creek since 150 – 200 thousand years ago; the travertine mound is still growing. The visitors can see fossilized and encrusted imprints of the vegetation. As the enclosed cavities were not connected originally, everywhere you will find the traces of artificial intervention. The Anna Spring, located in the closed area of the cave, provides a significant part of the drinking water supply of Miskolc. (https://www.bnpi.hu/en/reszletek/miskolc-lillafured-en-403611)
Expected arrival back to Miskolctapolca 16:00

- Participants of the workshop are expected to complete an online competency assessment and successful participants will receive a certificate.
- Places on the bus for the field excursion are limited, participants may be asked to use own vehicles.