RESEARCH AREA & EXCELLENCE

Environmental geosciences, environmental and organic geochemistry.
- Biogeochemical cycles
- Waste materials from mining and smelting operations
- Exobiology and organics in the environment
- Analysis of geomaterials

Mission
To obtain better knowledge of the biogeochemical processes in the Earth’s environments.

KNOW-HOW & TECHNOLOGIES

Content of Research
- How chemical elements are cycled in the environment
- How the environment can be affected by the disposal of mining and smelting waste
- What is the behaviour of organic compounds in the environmental compartments

Main Capabilities
Focus on all kinds of surface processes related to the biogeochemical cycling of elements (especially on metals and metalloids released from anthropogenic sources), interactions between environmental compartments (soil, water, atmosphere, waste materials)

EXPECTATIONS & OFFERS

Offers
We can offer our experience, knowledge and advanced analytical technique to suggest solutions to current problems in actual environmental geochemistry.
- Improvement of analytical techniques in geosciences, testing certified reference materials (CRMs)
- Understanding the mechanisms of release of metals and metalloids from waste materials from mining and smelting
- Suggestions of possible remediation of contaminated environment
- Application of Raman spectrometry techniques in organic geochemistry

Requirements
We are looking for cooperation with academic partners as well as public and private organizations in the fields of geosciences relating to the actual environmental problems.

KEY RESEARCH EQUIPMENT

ICP techniques: ICP MS, LA ICP MS, ICP OES
Other instrumental equipment: FAAS, Eltra CS 530 TS, TC and CS 500 TIC, AMA 254 Hg analyser, HPLC, ED XRF, Raman microspectrometry, XRD, EDS SEM
PARTNERSHIPS & COLLABORATIONS


Main Projects
• Impact of ore mining and processing on the environment in Namibia: Modelling pollutant migration in soil, plants and groundwater, 2012–2014, Czech Science Foundation
• Stabilization of metals/metalloids in contaminated soil using a novel synthetic manganese oxide: A comparison with other stabilization amendments, 2011–2014, Czech Science Foundation
• Detection of exobiological markers using Raman spectroscopy as a key method, 2010–2014, Czech Science Foundation
• Reactivity of anthropogenic metal-bearing geomaterials in soils, 2013–2017, Czech Science Foundation
• Arsenic speciation in mining wastes – case studies in systems dominated by ferric sulfo-arsenates, 2013–2015, Czech Science Foundation
• Biogeochemical transformations of arsenic in circum-neutral soils and streambed sediments at the Mokrsko gold deposit, 2010–2012, Czech Science Foundation

ACHIEVEMENTS

Regular publication of papers in international ISI-ranked journals | Testing of certified reference materials | Elucidation of the mechanism of release of metals and metalloids to the environment