GeoBerlin 2023 – Geosciences Beyond Boundaries - Research, Society, Future

150th PGLA (BGR) Anniversary and 175th DGGV Anniversary

Call for Abstracts, Deadline: Wednesday, 3 May 2023

https://www.geoberlin2023.de/call-for-abstracts.html

Sessions about Water Resources

ID 129

1.23) Sustainable Groundwater Management to mitigate Water Scarcity: Innovative monitoring strategies, new modelling tools, and integrative management concepts

Engelhardt, Irina (1); Dietrich, Peter (2,3); Sauter, Martin (4,5)

1: TU Berlin, Germany;
2: Helmholtz-Zentrum für Umweltforschung, Germany;
3: University Tübingen, Germany;
4: Leibniz-Zentrum für Angewandte Geophysik, Germany;
5: University Göttingen, Germany

Keynote speaker: Prof. Georg Teutsch, Helmholtz-Zentrum für Umweltforschung, Germany "Scientifically based system solutions for climate mitigation and climate adaptation"

Groundwater is the world's most important freshwater resource. It is intensively used by humans and primary source for drinking water supply and irrigation, hence critical to the water-food-energy security nexus. Groundwater is sensitively affected by land-use change, population growth, and shifts in climate, which all alter groundwater recharge, water supply and demand. Especially dry regions face increased water stress and are expected to expand globally. Beside regions that already suffer from a water deficit, we observe new regions, such as catchments in Central Europe with continental climate, e.g. the German capital Berlin or the federal states Brandenburg and Saxony-Anhalt, begin to be subjected to water stress. For example, mean precipitation in Brandenburg decreased to rates characteristic for the Mediterranean region. Germany's hotspots for water stress are either intensively used for agricultural purposes or face severely land-use changes, e.g. from the discontinuation of lignite mining. Furthermore, often waste water and storm water are not wisely managed in these regions.
We invite contributions, which identify new management strategies for a sustainable use of groundwater. This implies adapted modelling techniques in complex geological environments. Modelling strategies shall focus on coupling climate models with hydrological models and/or soil water- and groundwater models, respectively. Furthermore, this also includes studies into groundwater quality changes. We invite contributions about appropriate observational field studies and developments of innovative monitoring technologies that ideally link real-time measured data with modelling analyses. Due to frequently associated data scarcity strategies addressing uncertainty and limited data availability are of interest for this session.

ID 131

1.24) Reclamation and transformation of post-mining landscapes: Biogeochemical processes, ecological and geochemical remediation strategies for open-cast mining lakes and sustainable water management

Hildmann, Christian (1); Nixdorf, Brigitte (2); Cremer, Nils (3); Schultze, Martin (4); Engelhardt, Irina (5)

1: Forschungsinstitut für Bergbaufolgelandschaften e.V., Germany;
2: BTU Cottbus-Senftenberg, Germany; 3: Erftverband, Germany;
4: Helmholtz-Zentrum für Umweltforschung, Germany; 5: TU Berlin, Germany

Keynote speaker: Dr. Javier Sanchez-Espana, Mine Waste and Environmental Geochemistry Research Group, Department of Geological Resources (IGME-CSIC)
"Geochemical and microbial processes controlling metal mobility affected by mine water (e.g. mine pit lakes, acid mine drainage)"

Following efforts in reducing global CO2 emission, a phase-out of opencast lignite mining has taken place already, especially in Europe, and can be expected to be intensified in the near future. After lignite mining had been discontinued, new large water surfaces will develop requiring specific engineering techniques and management concepts with respect to prevailing geological environmental and climatic conditions. New research investigations and governmental initiatives cover strategies to i) manage these lakes areas ecologically, ii) improve the lake water quality, or iii) use the surface water resources wisely for enhancing groundwater storage in downstream located catchments, river discharge, and protection of aquatic ecosystems. Beside these ecological, chemical, and hydrological challenges also a socially and ecologically responsible transformation of former mining areas is essential. Thus reuse of former open-cast mines for energy production or storage are conceivable among other uses such as tourism.
We invite contributions identifying monitoring, modelling and management strategies to enable a sustainable transformation of opencast mining lakes into aquatic ecosystems with good ecological potential. This requires improved understanding of the interactions between pit lakes and groundwater using adapted modelling techniques to assess biogeochemical processes at field scale. This also includes pilot-studies into engineering techniques for an ecological and geochemical remediation. We invite contributions about appropriate concepts for a reuse of open-cast mining water volumes for large-scale water storage in winter/autumn and release in summer periods. Contributions analysing strategies for open-cast lignite mining areas for energy storage or renewable energy production and the associated environmental impacts are invited