



Leopoldina
Nationale Akademie
der Wissenschaften



Sustainable Water Management in Mining and Post-Mining Landscapes

Workshop for Young Researchers in Ouro Preto, Minas Gerais, Brazil, October 1st to 5th, 2018

Introduction and Setting

Mining has a great potential to cause long-lasting environmental impacts, particularly on regional water resources. In many cases, environmental concerns and government regulations have contributed to reduce effects of mining on water and environment. However, compliance with and enforcement of government regulations differ worldwide. Moreover, the risk of mining accidents is always present. For instance, in 2015 the dam collapse of a settling basin belonging to an iron ore mine caused heavy pollution through the displaced mud (sediment from iron ore extraction) to the Rio Doce river in the Brazilian federal state of Minas Gerais. Until today, biotopes and human settlements affected by this catastrophe suffer under the caused pollution and its repercussions. In 2009 in Nachterstedt, a small town in the German state Saxony-Anhalt, three people died because parts of an inhabited settlement slipped into a flooded open-cast mining area. The reason for this accident was unexpected high pressure in ground water levels.

Therefore, it requires a sustainable water management in mining and post-mining landscapes to avoid water pollution and to cope with negative effects of mining activities. The German National Academy of Sciences Leopoldina, the Brazilian Academy of Sciences (ABC), the Centre for Water and Environmental Research at the University of Duisburg-Essen (ZWU), Germany, and the National Institute of Science and Technology on Mineral Resources, Water, and Biodiversity (INCT-Acqua), Brazil, bring together young researchers (mainly post-docs) to analyze this specific water management topic, in an international and interdisciplinary context. It is the third workshop of the joint German-Brazilian series "Water and Regional Development". The organizers kindly thank the Minas Gerais State Agency for Research and Development (FAPEMIG) for its generous financial support.

Young researchers are invited to address three main topics with relation to water and mining:

1) *Institutional Measures*

Which institutions and organizations have water management competences in mining and post-mining landscapes? Which competences are lacking? How does/should the communication between stakeholders take place? How to make in-house information of public institutions and private companies available for research and decision-making?

2) *Prevention and Restoration Measures*

How can we minimize the effects of mining on water bodies? Which prevention concepts and technologies are available? What is required to implement post-mining landscape restoration? Which are realistically achievable goals in terms of affected water bodies, ecosystems and expectations from society? What are the alternatives for tailings disposal and final pits?

3) *Control Measures*

Which tools are available to evaluate management and restoration measures? How can new technologies help to improve surveillance and accountability? When are measures considered to be successful and how to assess this optimally? How does the application of control and assessment measures differ from one stakeholder to the other? What needs to be improved?

Key Objectives

The workshop intends to (i) discuss the three sub-topics based on evidence from research, to (ii) summarize the results of the debates and to (iii) formulate practical recommendations to policy makers, industry and the wider public in Brazil and Germany. In this way, the workshop wants to (iv) promote international scientific debate and to (v) provide a platform for scientific advice to politics and society as well as for networking among early-career researchers.

Format

The workshop consists of **debates and writing sessions** as well as **field trips** in a mining area of Minas Gerais, Brazil.

- *Before the workshop* >>> Participants are asked to read some selected articles provided by the organizers, in order to gain an interdisciplinary view of the topic.
- *During the workshop* >>> Participants discuss the main topics both in group and plenary sessions. Invited guest speakers give external input to stimulate discussions. They also provide expertise in the area of formulating scientific policy advice. Rapporteurs moderate the sessions and coordinate the writing process for the findings from the debate and for the recommendations, summarized in the form of a compact policy report (max. 10-15 pages). The target is to prepare most of the report during the workshop.
- *After the workshop* >>> Participants finalize scientific texts of the report electronically. Academies take care of coordination, proofreading, layout, printing and distribution to selected stakeholders from politics, public administration, industry and science.

Participants

The participants of the workshop are mainly post-docs from Germany and Brazil. Some young researchers from North and South America will also join the event. In total, up to 25 young researchers will attend the workshop. They will cover various scientific fields, such as engineering, hydrogeology, ecological sciences and social sciences. The working language will be English.

Logistics

The Leopoldina and the ABC will cover the costs of travelling and accommodation for the participants. Further organizational information will follow in due course.

Scientific Coordinators

- Prof Peter Fritz, Member of Leopoldina, formerly Helmholtz Centre for Environmental Research, Leipzig, Germany
- Prof José Tundisi, Member of ABC, Engineering School of São Carlos, São Carlos, Brazil
- Prof. André Niemann, Centre for Water and Environmental Research at the University of Duisburg-Essen (ZWU), Germany
- Prof Virgínia Ciminelli, Member of ABC, Federal University of Minas Gerais, Belo Horizonte, Brazil

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