AMM project development in the Saar region

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Workshop: Post-Mining Perspectives: Capture and Use of Abandoned Mine Methane and Mine Reclamation and Revitalization of Post Mining Areas

26.02.2020
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Our mining roots

1816  Foundation as mining school
1998  University of Applied Sciences
2007  Decision to phase out hard coal mining in Germany
2012  Focus on Post-mining
2015  Foundation of the Research Institute of Post-Mining
2016  200 years
       Technische Hochschule Georg Agricola
Guiding idea

The Research Institute of Post-mining offers independent, competent and sustainable solutions for the different post-mining tasks.

Mission

The Research Institute of Post-Ming develops the scientific basis for a sustainable mine water ascent in the coal mine regions at the rivers Ruhr, Saar and in the city of Ibbenbueren (Northern part of Germany).

Moreover, it is the major institution in knowledge management and transfer with regard to post-mining activities.
Research Focus

• **Mine water rebound in the coal mine regions Ruhr, Saar and in Ibbenbueren**
  • Characterisation of water-drainage adits
  • Density stratification in mine water bodies
  • Evaluation of mine water rebound processes
  • Separation of contaminants

• **Monitoring concepts**
  • Development of a mine water monitoring system
  • Innovative, satellite-bound monitoring of abandoned mines
  • Mineberry: Monitoring of former mine shafts

• **Reuse of former mine sites**
  • RE-ACTIVATE
Saar Region

- 2,569.69 km²
- 990,000 inhabitants (385 inhabitants/m²)
- Hard coal mining from 1429 – 2012

Source: https://fzn.thga.de/2019/10/15/evaluierung-grubenwasseranstiegsprozesse/
Historical facts

- Hard coal production:
  - 1990: 9.7 Mio. t
  - 2000: 5.7 Mio. t
  - 2010: 1.3 Mio. t

- AMM
  - since 1970s mine gas infrastructure for energy generation
  - 110 km mine gas network
  - Heat for 21,700 households
  - Electricity for 234,500 households
  - 13 CHP plants are currently in operation
**Saar Region CH₄-contents**

<table>
<thead>
<tr>
<th>Year</th>
<th>Extracted gas in mio Nm³</th>
<th>Average CH₄%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>181.85</td>
<td>45.27</td>
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<tr>
<td>2014</td>
<td>185.48</td>
<td>42.93</td>
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<td>2015</td>
<td>180.22</td>
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<tr>
<td>2016</td>
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<td>2017</td>
<td>177.86</td>
<td>40.45</td>
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<tr>
<td>2018</td>
<td>173.18</td>
<td>40.19</td>
</tr>
<tr>
<td>2019</td>
<td>172.88</td>
<td>38.43</td>
</tr>
</tbody>
</table>
Project: Methane emissions from abandoned hard coal mines

- **Objectives:**
  Spatial-temporal simulation of the degassing process depending on the mine water rebound
  Characterization and description of the expected methane quantities as well as the possible migration pathways to the surface and thus potentially gas-endangered areas

- **Project duration:**
  July 2018 – June 2021

- **Project partners:**
  Technical University Clausthal
  Federal Institute for Geosciences and Natural Resources
  Steag New Energies GmbH
  Mine Authority Saarland
Project: Methane emissions from abandoned hard coal mines

- **Method:**
  - Mine gas sampling at selected locations in the Ruhr and Saar area
  - Determination of the chemical and isotopic compositions of the mine gas
  - Determination of thermal or microbial gas origin

Project: Methane emissions from abandoned hard coal mines

- 3 sampling campaigns at a total of 41 locations in the Ruhr and Saar area
- Development of a gas database
- Determination of a mine gas production rate in abandoned hard coal mines
- Development of an outgassing model regarding the mine water rebound

Analytical Model

Numerical Model

Flow parameters
Flow, resistance
Model coupling
Verification of the model properties
Project: Methane emissions from abandoned hard coal mines

- **First results:**

![Graph showing methane emissions from different processes](image-url)
• AMM potential high, interesting prospects
• Continuous analyses of impact of mine water rising on methane degassing
• Thermogen-generated methane replaced by bacterial methane
• For decreasing CH$_4$ concentrations new technologies are needed to utilise methane
Thank you for your attention

Glückauf

www.nachbergbau.org