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Georg Agricola

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

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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
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Research Institute of Post-Mining



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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-Mining 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



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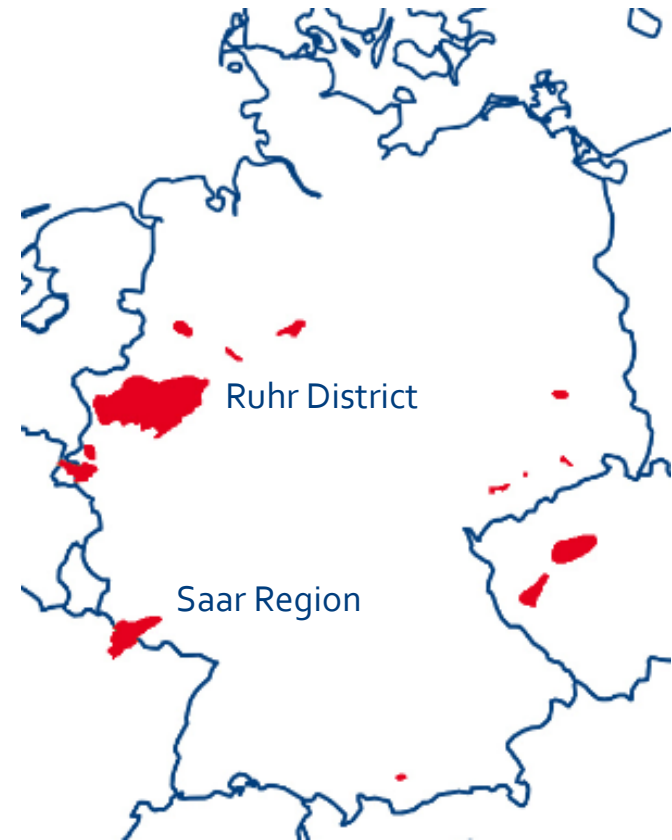
Research Focus



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- **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

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

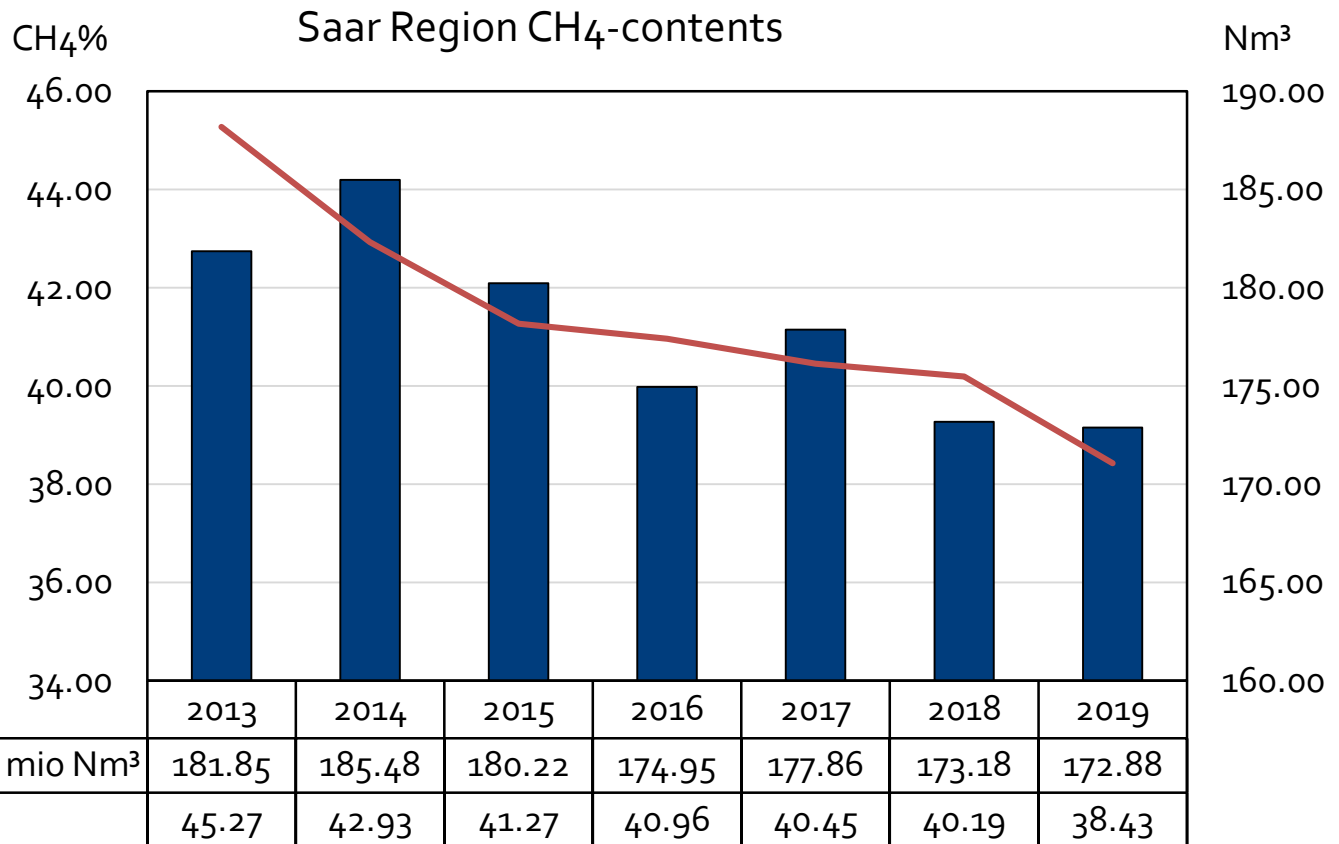


Source: <https://fzn.thga.de/2019/10/15/evaluierung-grubenwasseranstiegsprozesse/>

- 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





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



- Method:

Mine gas sampling at selected locations in the Ruhr and Saar area

Determination of the chemical and isotopic compositions of the mine gas

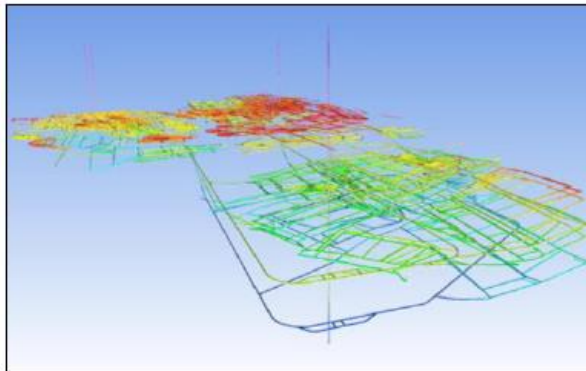
Determination of thermal or microbial gas origin



Source: <https://fzn.thga.de/forschung/projekt/auswirkungen-des-grubenwasseranstiegs-auf-die-methanausgasung-aus-den-steinkohlenbergwerken/> (2020/02/14)

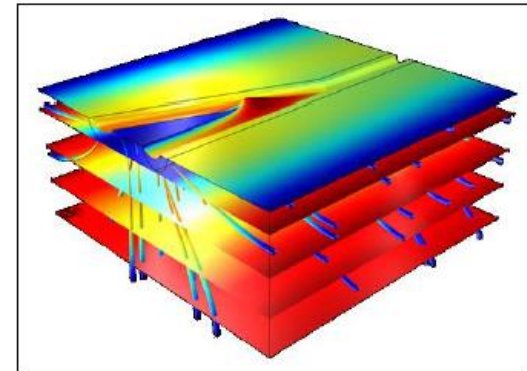
- 3 sampling campaigns at a total of 41 locations in the Ruhr and Saar area
- Development of a gas database
- Determination of a mine gas production rate in abandoned hard coal mines
- Development of an outgassing model regarding the mine water rebound

Analytical Model

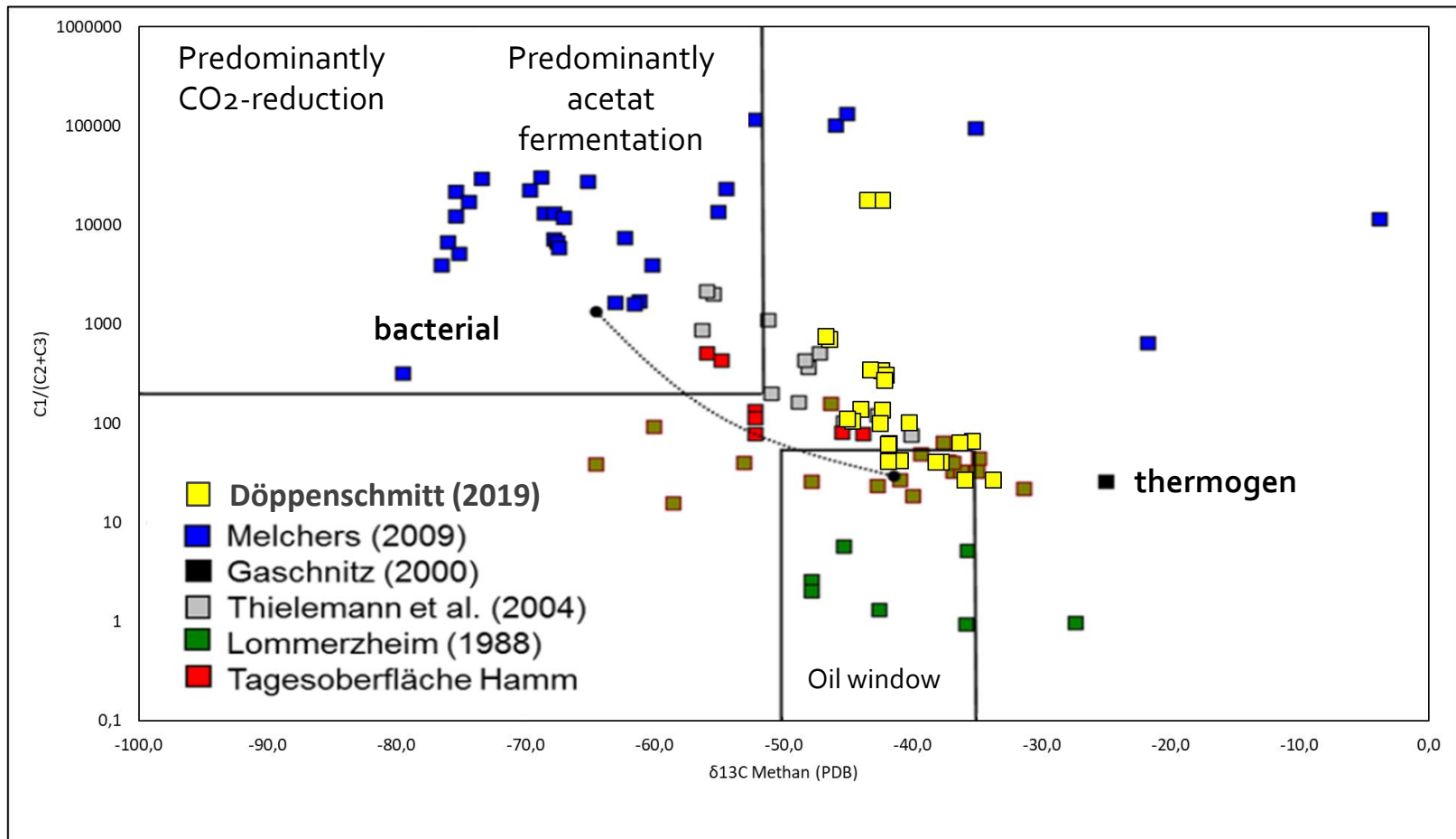


Flow parameters
←
Flow, resistance
Model coupling
→
Verification of
the model properties

Numerical Model



- First results:



- 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 CH₄ concentrations new technologies are needed to utilise methane

