

Project Proposal

Frack₂O - Predicting water leachates from black shales

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Executive Summary

With increasing production of natural gas from unconventional resources, also public awareness as well as public concerns about flowback water composition have emerged. Quality and quantity of dissolved inorganic and organic compounds in flowback waters are mainly related to the applied additives in the hydraulic fracking fluid but also on the type of black shale that is the target formation. It is the aim of this project to deconvolute the relation between the composition of shales (organic and inorganic) and their respective water soluble fraction being mobilised with shale gas/shale oil production and to place the results in a predictive facies framework. In the lab we will perform extraction experiments where the water soluble fraction of a large variety of natural black shales is produced and analysed using different chromatographic and mass spectrometric methods (IC, ICP-MS, GC-MS, LC-OCD). Dissolved organic compounds in the water extracts will also be characterized using FT-ICR-MS for selected samples. Composition of the water soluble fraction of the respective black shales can be used to develop predictive tools on possible flowback water composition from untested black shales. In addition, produced waters from selected case studies will be analysed to test these predictive tools.

Goals:

- Development of predictive tools on the composition of the water soluble fraction of individual black shale samples based on routine geochemical proxies
- Detailed investigation of the inorganic and organic composition of the water soluble fraction from a high number of black shales

Samples:

- Black shales from different sedimentary basins and facies to be provided by GFZ and the sponsors
- Focus on well-documented case histories (bulk data and routine geochemistry)
- Produced waters from fracking supplied by sponsors

Deliverables:

- Database on experimental and analytical data of black shales and their water soluble fractions
- Framework for a predictive flowback model

Costs (€):

- 50,000 € per participant per year*
- Project duration: 3 years
- Minimum number of participants: 2

*7% VAT not included

Contact

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