



An approach towards a parameterised model for risk assessment of hydraulic fracturing operations

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The main ambition of the recently started research project FracRisk (funded within the EU Horizon 2020 programme) is the development of a comprehensive knowledge base and the formulation of scientific recommendations, which can contribute to efforts aimed at minimising the environmental footprint of shale gas production while addressing scientific and public concerns. Forward numerical modelling linked to a detailed risk and uncertainty assessment is applied for estimating the mechanical, hydromechanical, and geochemical consequences resulting from hydraulic fracturing. To capture a broad range of environmental risks, six exemplary scenarios focussing on different physical processes on different spatial and temporal scales are investigated. An approach regarding sources, pathways and targets is used for the quantification of the environmental impacts. A fundamental understanding of the potential risks is achieved by allowing for mutual feedback between the scenarios, identifying key parameters and processes. The coupling of the scenarios to a Polynomial chaos expansion (PCE) paves the way to an abstracted and parameterised model for risk assessment to be used both by regulators and contractors. This contribution at an early stage of the project will elaborate on the general workflow of implementing focussed scenarios into a PCE-based Monte-Carlo approach to parameter sensitivities, that will eventually be embedded into a FEP-based (features, events, processes) evaluation of risk and counteractive measures.