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Aspects and Strategies of Numerical Modelling of Underground Coal Fires

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Numerical modelling of underground coal fires has become a valuable tool even for practical fire extinction work. The approaches, methods and finally codes that are used depend on the targets that are aimed at by the particular modelling task. The most general one is to fully understand the processes that sustain or suppress the fire. Another purpose is to produce realistic data for regions that are not accessible (e . g. underneath a burning coal seam) or couldn't be investigated (e.g due to limited resources) to estimate the complete energy budget of the fire. Last but not least one would like to forecast the fire dynamics to predict the future damage or to assess the effectivenees of extinction work. These purposes require the consideration of all aspects with respect to thermal, hydraulic, mechanical and chemical (THMC) processes. At the moment there is no single code that completely covers all these aspects with every degree of complexity. Within the Sino-German project "Innovative Technologies for Exploration, Extinction and Monitoring of Coal Fires in North China" we apply existing codes with different foci with respect to THMC processes and try to combine all codes to one comprehensive model. Besides the sophisticated academic modelling approach we also pursue the concept of "Onsite" modelling to enable fire fighting personnel to perform simplified modelling tasks even by means of web-based applications.