Geophysical Research Abstracts,
Vol. 11, EGU2009-8106, 2009
EGU General Assembly 2009

The Mehrum Coalfire Test Field (MCTF)

M. Halisch, M. W. Wuttke, Ph. Hesse, J. Han, and W. Kessels
Leibniz-Institute for Applied Geophysics (LIAG), Stilleweg 2, D 30655 Hannover, Germany

Spontaneous self ignition of coal causes an immense emission of climate relevant gases and affects regional groundwater conditions in such a large scale, that it could not be even rough estimated. This problem occurs all over the world where coal is mined, stored or processed. Keeping these things and also global warming problems in mind, the extinction of such fires becomes a significant task for future climate and environmental protection. In the big arid coal mining belt of the northwest PR China the necessity of environmental as well as resource protection is now realized, leading to increased fire fighting activities. Mostly, the burning coal is partially removed, the surface is insufficiently sealed from oxygen and fire-zones are cooled with valuable fresh water. Such cooling of fire centers is often not sustainable because oxygen rich air may keep on penetrating through the soil surface and reach the cooled down coal which subsequently starts to burn again.

Within the Sino-German project “Innovative Technologies for Exploration, Extinction and Monitoring of Coal Fires in North China” numerical models are developed to simulate the propagation of underground coal fires in realistic scenarios. These models will be adapted to new data from lab and field experiments including multiphase transport and phase transition processes. The Mehrum test site is used to set up a small scale in situ coal fire experiment in order to validate and verify the codes as well as to better understand the coal fire genesis.

The experiment will be carried out under usage of two coal heaps with a total volume of about 1 m3. At the bottom, a layer of hydraulic conductive coarse gravel has been built in. Within this layer, a special ventilation system for air supplying has been embedded. The exact amount of led in air is measured by high resolution flow rate devices. The coal lies directly above the coarse gravel layer. The heating source is located in the lower forth of the coal layer. Positions of other sensors (temperature sensors, electrodes for geoelectrical measurements, gas probing tubes) are based on first numerical results. The coverage consists of a 10 cm to 15 cm strong layer of sand (middle to fine sand). Extinction of the fire by application of water with additives (e. g. salt) and its implication for the underground convection can finally be tested with these installations.