



## **Geophysics and clean development mechanisms (CDM) - Applications to coal fires**

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The largest hard coal resources worldwide are found in the coal belt through Northern China and Inner Mongolia. Because of still existing technological problems and a steeply rising demand of coal in this region the most coal fires occur. Once established, coal fires are difficult to extinguish, destroy large amounts of coal and are major challenge to the environment.

The Sino-German coal fire research initiative “Innovative technologies for exploration, extinction and monitoring of coal fires in Northern China” conducts field investigations, laboratory measurements and experiments as well as numerical modelling of coal fires in close co-operation with Chinese coal fire fighting departments.

A special task within this project is to help the Chinese partners to develop methodologies and project designs to extinguish coal fires under the frame of the Kyoto protocol. In practise, this task requires a robust method to estimate the CO<sub>2</sub> baseline of coal fires including fire detection and monitoring. In order to estimate the fire volume, fire propagation and the resulting CO<sub>2</sub> exhaust gas volume, different types of geophysical measurements are necessary as near surface temperature and gas measurements, ground penetrating radar etc.

Three different types of CO<sub>2</sub> exhaust gas estimations from coal fires are discussed: the energy approach, the volume approach and the direct approach. The energy approach highly depends on accurate near surface and gas temperature plus the gas flux data. The volume approach is based on radar and near surface geomagnetic surveying and monitoring. The direct approach relies on the exact knowledge of gas fluxes and volumes. All approaches need reference data as regional to local weather data and petrological parameters of the burning coal.

The approaches are evaluated for their use in CO<sub>2</sub> baseline estimations and thus for clean development mechanisms.