**Modeling Coal Fire related Radiative Energy Release by using TIR Satellite Data and Geo-Spatial Risk Assessment Strategies at a Regional Scale**

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Satellite remote sensing can make a significant contribution to coal fire detection and monitoring by periodical surveying of potentially and already affected coal fire areas. An adequate parameter for coal seam fire characterization, which can be derived from re-mote sensing data, is the coal fire related energy release (CFRE) that can be related through heat transfer models to the total power release of underground fires. Needed investigations comprise sensitivity analysis of the sensor systems used, representativeness of ground based measurements of coal fire temperatures and emissivity values of differ-ent surface materials. Current research focuses on estimation of atmospheric constitu-ents (water vapor and aerosols) by obtaining by independent information of sensor sys-tems providing atmospheric information, e.g. MODIS and model developments describ-ing the surface energy balance. Both aspects aim in a better estimation of the surface heating caused by solar radiation. This is a prerequisite to validate CFRE derived informa-tion.

Coal fire monitoring and risk assessment provide important input data for the delinea-tion of coal fire zones and planning of extinguishing activities. For distinguishing the probability of fire event, to support the authorities´decision making, risk assessment of underground coal fire development (UCFD) has been studied at a regional scale. The factors impacting on coal fire development were analyzed under three different aspects: i) coal composition and structure which can influence the direction of underground coal combustion; ii) topography and geology which determine the burning environment; and iii) climatic conditions and human activities which trigger combustion processes. Based on this analysis, a regional underground coal fire risk assessment (UCF-RA) index system has been established; it is predicated on the assumption that all indices contribute equally to coal fire risk. Data layers of 1 kmx1 km spatial resolution for each index were calculated and overlaid for the Xinjiang Uygur Autonomous Region, which has been selected as a validation area. Accuracy assessments have shown that the precision of the modeled results can be higher than 80% confidence level. The assessment results are seen as generally satisfying and thus, the methodologies can be used for monitoring and extinguishing of underground coal fires (UCFs) in Xinjiang in future.