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# Undergound Coal Fire Extinction Model using Coupled Heat and Mass Transfer Model in Porous Media

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## Background

**Green house gases emission associated with natural hazard of underground coal seam fire has been recognized as a worldwide problem leading to global warming threat. Therefore, this work presented a model to study underground coal fire and the results will be devoted to strategic development of coal fire extinction technology within the framework of Sino-German Coal Fire Research Initiative. The work consists of both laboratory experiment and simulation. The model was developed according to recent situation in the investigated coal fire zone in North Cina.**

## Governing Equations

### The developed model consists of following coupled models:

- **Chemical reaction model**
- **Darcy Law model**
- **Coupled Convective and Conduction Transfer**
- **Coupled Convective and Diffusion Transfer**

## Simulation

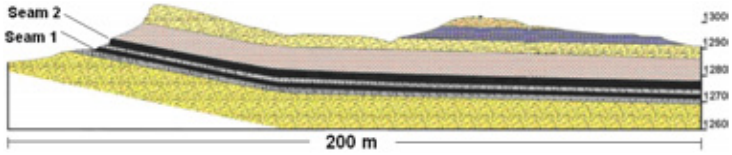


**Figure 1. Snapshot of the investigated coal seam**

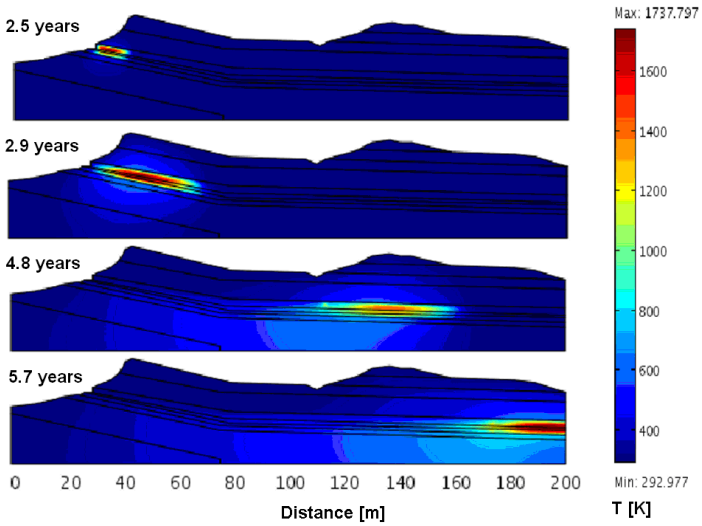


**Figure 2. Temperature profile during fire propagation in underground coal seam**

## Laboratory Experiment

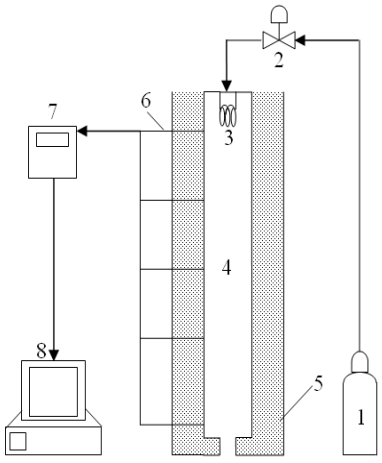


**Figure 3. Adiabatic vertical oven**

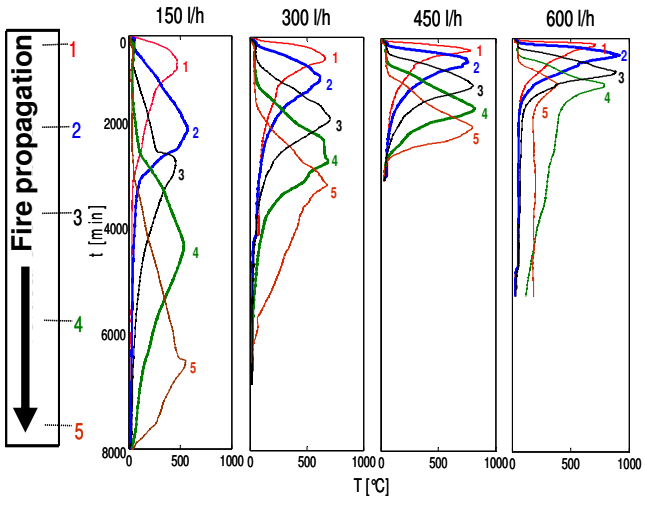


**Figure 4. Temperature profile of fire propagation at different air flowrates**

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