

# Impact of Vegetation on Dustiness Produced by Surface Coal Mine in North Bohemia.

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## Abstract

The contribution deals with a practical application of a CFD computation with real geometry. An assignment has come from Czech mining company (Severočeské doly) which wants to study the impacts of a mine extension on environment. In the neighbourhood of the mine lies a village highly affected by dust transport from the mine and the question is, how much can a vegetative barrier lessen the dust concentration.

The flow field and the concentrations are computed on 2D cuts with a real geometry for Bílina coal mine. An in-house CFD solver, based on finite volume method AUSM<sup>+</sup>up scheme, is used to compute the flow field. System of the RANS equations for viscous incompressible flow with variable density is used for description of the flows. The two equations turbulence model is used for the closure of this set of equations. Three effects of the vegetation should be considered: effect on the air flow, i.e. slowdown or deflection of the flow, influence on the turbulence levels inside and near the vegetation, and filtering of the particles present in the flow.

The transport equation for concentration of passive contaminant is solved. Petroff's model of the dust deposition on vegetation is employed. It reflect four main processes leading to particles deposition on the leaves: Brownian diffusion, interception, impaction and gravitational settling.

## References

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