Particulate matter (PM) air pollution is one of the most important topics in the field of environmental protection, and coal strip mining is a significant source of coarse atmospheric aerosol. In order to implement appropriate regulations to improve air quality, we need to identify the major sources of pollution. PM is usually measured in a ground-based manner and its dispersion is only modelled. Therefore, the objective of this study was to measure concentrations of coarse aerosol in the atmospheric boundary layer above the area of the coal strip mine through experimental airborne measurements and to estimate pollution contribution of mining to the surroundings.

Measurements were carried out from November 11 to November 26, 2012, at Vršany coal mine, Czech Republic. An electrically powered airship was used with a specially designed gondola carrying aerosol monitors DustTrak DRX and P-Trak. Temperature and relative humidity data were also recorded. Repeated flights were performed at several heights above mine edge level. PM_{1-10} and GPS data were recorded every second. Average airship velocity ranged from 6 to 7 ms^{-1}. Flight measurements were also compared to ground-based measurements of PM_{10} and meteorological data.

Weather during our measurements was characterised by low temperatures, high relative humidity and weak circulation. High concentrations of PM_{10} over 200 μgm^{-3} were observed some days but were not linked to wind direction from the mine towards the measurement station. PM_{1-10} peaked with 100 μgm^{-3} at the northern part of Vršany mine where coal mining occurred. Machines, transportation, drilling, and conveyor belt loading were identified as major sources of coarse particles.

Vertical profiling showed decreasing concentrations of coarse aerosol with increasing distance from the ground, and at 330 m above sea level there were almost no coarse particles detected. This implies a limited dispersal of coarse particles.

Overall, there was no significant effect found regarding contribution of mining activities to air pollution in the surroundings of the mine in terms of weather conditions present during our measurements. However, a summer campaign is needed for better description of other weather scenarios.