Abstract

The boundary layer of the atmosphere is a layer of air with thickness about 1 km above the ground. Open-cast mining is one of activities that polutes the air in this layer. It generates particulate matter (PM) mostly in size of aerodynamic diameter 1 – 10 μm - coarse patricles. The companies that does the mining pays for their emissions due to the law. However, these emissions are not experimentraly measured, they are calculated from given equation consisting of factors like the size of mining area, etc. Some papers have shown significantly higher concentrations of Coarse particles (or PM10) in surroundings of the mine. Other papers have found out that the origin of these high concentrations didn't come from the mining activities but is caused due to the activities at the place of measuring or nearby. There aren't many papers that measure the PM concentrations in the air in the mining area. This thesis shows the results of airship measurements in the air layers of the open-cast mine and above them. The experimentral site was brown coal mine Bílina in the North of The Czech Republic in important mining area. The measurements took place in December 2017. For measuring the number and mass concentrations was used APS – Aerodynamic Particle Sizes Spektrometr by TSI which sorts out the data into different channels of particle sizes. The integration time was 1s and the airship collected the data about its location at the same frequency. Meteorological conditions were observed with two 3D anemometres located in two sides of the mine and collected data every minute. The results show, that the mass and number concentration of aerasol particles of Coarse fractions decrease with the height above the ground. The fraction PM1 doesn't. The urban areas nearby shows PM10 concentrations sometimes higher than the Czech limit (50 $\mu g \cdot m^{-3}$). It is possible that the mine contributes to this concentration but in another cases the concentrations in the surface level in the mine are lower than the concentrations in the urban areas. The wind conditions in the mining area are not unified, so that the mine doesn't behave like one large emission source.

Key words: aerosol, planetary boundary layer, air pollution