Analysis of Dust Particles in Snow Cover in the Surroundings of the City of Ostrava: Particle Size Distribution, Zeta Potential and Heavy Metal Content

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Abstract : In this paper, snow samples containing dust particles from several sampling points around the city of Ostrava were analyzed. The pH values of sampled snow were measured and solid particles analyzed. Particle size, zeta potential and content of selected heavy metals were determined in solid particles. The pH values of most samples lay in the slightly acid region. Mean values of particle size ranged from 290.5 to 620.5 nm. Zeta potential values varied between -5 and -26.5 mV. The following heavy metal concentration ranges were found: copper 0.08-0.75 mg/g, lead 0.05-0.9 mg/g, manganese 0.45-5.9 mg/g and iron 25.7-280.46 mg/g. The highest values of copper and lead were found in the vicinity of busy crossroads, and on the contrary, the highest levels of manganese and iron were detected close to a large steelworks. The proportion between pH values, zeta potentials, particle sizes and heavy metal contents was established. Zeta potential decreased with rising pH values and, simultaneously, heavy metal content in solid particles increased. At the same time, higher metal content corresponded to lower particle size.

Keywords : dust, snow, zeta potential, particles size distribution, heavy metals
Conference Title : ICCEMS 2014 : International Conference on Chemical, Environment and Medical Sciences
Conference Location : Melbourne, Australia
Conference Dates : December 11-12, 2014