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## Physico-chemical characteristics of airborne particulate matter in and around a mechanised opencast coal mine – a case study

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Air pollution is a major risk to health in many developed and developing countries of the world. Most of the pulmonary diseases related to air pollution are generally directly or indirectly related to the respirable particulate matter (PM<sub>10</sub>). Further the health impacts depend on the physical and chemical characteristics of the particulate matter. Mining industries produce huge amount of dust by drilling, blasting, transportation, loading, unloading and mine fires. Now-a-days in India, coal mining is mainly done by opencast methods rather than underground, which generates huge quantities of respirable dust. This paper focuses on the physico-chemical characterisation of particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) in and around mechanized opencast coal mines of Talcher coalfields (Mahanadi Coalfield Limited), Odisha, India. The study was carried out for a period of one year from March 2015 to February 2016. The monitoring of particulate concentration reveals that the concentration of both PM<sub>10</sub> and PM<sub>2.5</sub> levels were far above the standard limit of NAAQS, 2009. The trace metal study by atomic absorption spectrophotometer (AAS) indicated the presence of Fe, Cu, Cr, Zn, Ni, Cd, Pb, As, Se and Hg in the samples. For the qualitative analysis, techniques like Fourier transform infrared (FTIR) spectroscopy, Scanning electron microscopy (SEM) and XRD were used. Source apportionment study of particulate matter was also carried out based on the characterization. Statistical analysis such as correlation analysis and Principle Component Analysis (PCA) was also carried out. Different studies on the particulate matter suggested that monitoring stations near the mining area were mainly affected by the emission from opencast coal mining and its associated activities.

### Biography

D P Tripathy is working as Professor in the Department of Mining Engineering at NIT, Rourkela since 2008. He obtained his BE (Mining Engg.) from VNIT, Nagpur; MTech from IT, BHU; and PhD from ISM, Dhanbad. He has published more than 180 research and technical papers in reputed international and national journals/conferences and authored 6 books. His areas of teaching and research interests are: environmental impact assessment and management, computer applications in mining industry, soft computing, mine planning and financial management. He is an Editorial Board Member and Reviewer of many international journals. He has been honored with MEAI-Bala Tandon Award 2014, Smt. Veena Roonwal Award of SGAT and Abel Wolman Award for Best Paper in IE(I), BBSR for 2014 and 2015 and Geomintech Excellence Award, 2015.

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