



Particulate matter in mines and mining environments (PARMAT)

Mining consists of a long chain of actions starting from exploring suitable mineral deposits, building up the mine infrastructure and finally initiating and conducting the production. Every step has own environmental concerns. Besides the environmentally adverse effects, mine production may affect nearby population and pollute the working environment. The main categories of particles in mines are mineral dust (coarse particles), combustion products of explosives and diesel engine emissions (fine particles). Both mineral dust and diesel engine emissions have serious health concerns. In this project we focus on different issues in mining environments, which help in making the future mines more sustainable and environmentally sound.

The objectives of PARMAT are

- (1) to develop an inexpensive particulate matter (PM) sensor which is able to detect both coarse and fine particle fractions of PM. Sensor has ability for wireless communication and networking and in this project we will demonstrate that a PM sensor network can be used for better control of PM levels in different mine types.
- (2) to conduct new chemical characterization of particulate matter using high time-resolution instruments. This enables detection of combustion products of explosives, PM emissions of diesel engines (fuel, lubricating oil) and secondary particle formation from emissions' gaseous precursors.
- (3) to measure particle optical properties to estimate potential albedo changes of surfaces due to particle deposition and subsequent glacier melting.

The consortium consists of research teams whose expertise is completing each other, and who already have successful and long-term cooperation. Finnish Meteorological Institute (FMI) has long experience on characterization of atmospheric aerosol, and is contributing this project by online chemical characterization skills. Tampere University of Technology (TUT) is experienced of measurement and instrument development for aerosols and characterization of particles from vehicular engine emissions. Centro Mario Molina Chile (CMMCh) and University of Santiago de Chile (USACH) teams have long experience of studies on atmospheric photochemical processes and characterization of pollutants in air of industrial areas. The participating groups have already long collaboration in various projects focusing on particle characterization in emissions and in ambient air.

Researchers working in the group + their titles or tasks

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