

# **MAGNETIC PARTICLES AS SOURCE MARKERS OF STEEL-WORKS CONTRIBUTION TO PM10 IN ATMOSPHERE AT INDUSTRIAL MONITORING SITE**

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Atmospheric particulate matter of anthropogenic origin contains significant portion of minerals with pronounced ferrimagnetic properties. These minerals, mostly (metal-substituted) iron oxides with typically spherical shape, can serve as tracers of industrial pollutants at the sites of PM10 collection. These particles can be detected and characterized with very high sensitivity. Furthermore, depending on the pollution sources and sampling site, concentration of these particles may show significant correlation with the total PM10 concentration and several heavy metals. Although this relationship has no general validity and is site-characteristic, fast and sensitive magnetic measurements can be used for monitoring purposes and/or source identification (e.g. in case of major steel works dominating the nearby monitoring site).

In this contribution, we will show results obtained on PM10 samples collected at industrial site, located close to major steel works. The data on PM10 concentration and concentration of ferrimagnetic phase are compared with wind direction and intensity. Our results show that daily variations in concentration of magnetic particles within PM10 at industrial site, observed over 1 week and normalized to weekly average, show pattern similar to that of PM10. However, while PM10 concentrations vary within  $\pm 25\%$  with respect to the weekly average, magnetic particles show much larger variations, from some 10% up to almost 300% of the weekly average. Using the wind diagrams, related to the sampling periods, magnetic data can be interpreted in terms of meteorological control of the contribution of industrial PM10, emitted by the steel works. While concentration of magnetic particles reached their maximum during the days with prevailing weak wind (no more than 2-3 m/s) blowing from the steel works, they were at the minimum level during the days with wind blowing towards the steel works. Even winds from the steel works, if moderate to strong ( $> 4$  m/s) caused decrease in concentration of magnetic particles, most probably due to “overblowing” effect. Similar results were obtained for both August and December 2007 sampling campaigns.

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