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Magnetic monitoring of PM filters from Air Monitoring Stations during the COVID-19 lockdown in Rome, Italy (March 10th - May 18th, 2020)

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An extensive survey of the magnetic properties of PM filters from selected air monitoring stations in Rome and other localities in Latium Region (Sacco Valley, Civitavecchia, Fiumicino) was conducted for outlining the impact of the lockdown measures on air quality.

The magnetic measurements highlighted a relevant content of magnetic minerals, mostly attributable to traffic related sources, on the filters from two stations in Rome and two stations from the urban areas of Civitavecchia and Fiumicino.

The PM filters from the Sacco Valley showed reduced concentrations of magnetic minerals, compared to Rome, however higher than the Castel Di Guido and Civitavecchia Sant'Agostino control stations.

The daily PM concentration data did not generally correlate with the mass susceptibility data, indicating that PM was often dominated by non-ferromagnetic contents, presumably due to wind-driven natural dusts, as stressed by the frequent anticorrelation between mass magnetic susceptibility and PM concentration.

In Magnagrecia air quality station, Rome, the average values of the concentration depending magnetic parameters resulted about a half of those measured in 2005 on the filters from the same station.

From the Day plot, the filters with higher magnetic susceptibility values showed relatively coarse magnetite-like particles as the main magnetic minerals, ascribable to non-exhaust PM emissions from brakes.

This study confirmed that the interpretation of PM concentration during the lockdown is not straightforward and depends on many factors, such as natural inputs, resuspension and local conditions; anyway, magnetic analyses confirmed to be a valuable tool in PM source apportionment and concentration data interpretation.