

Magnetic Methods for the Source Apportionment of PM

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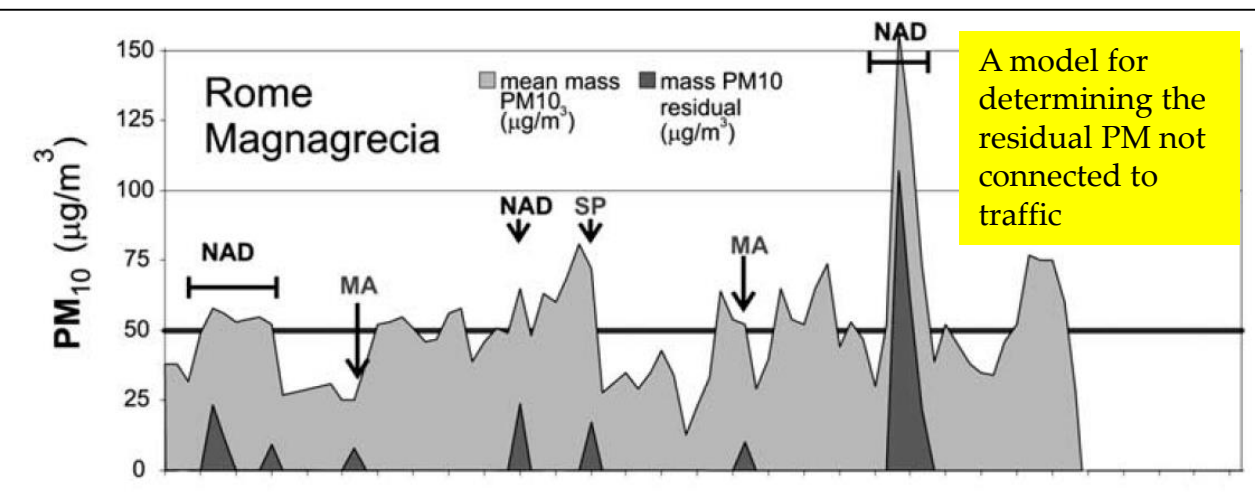
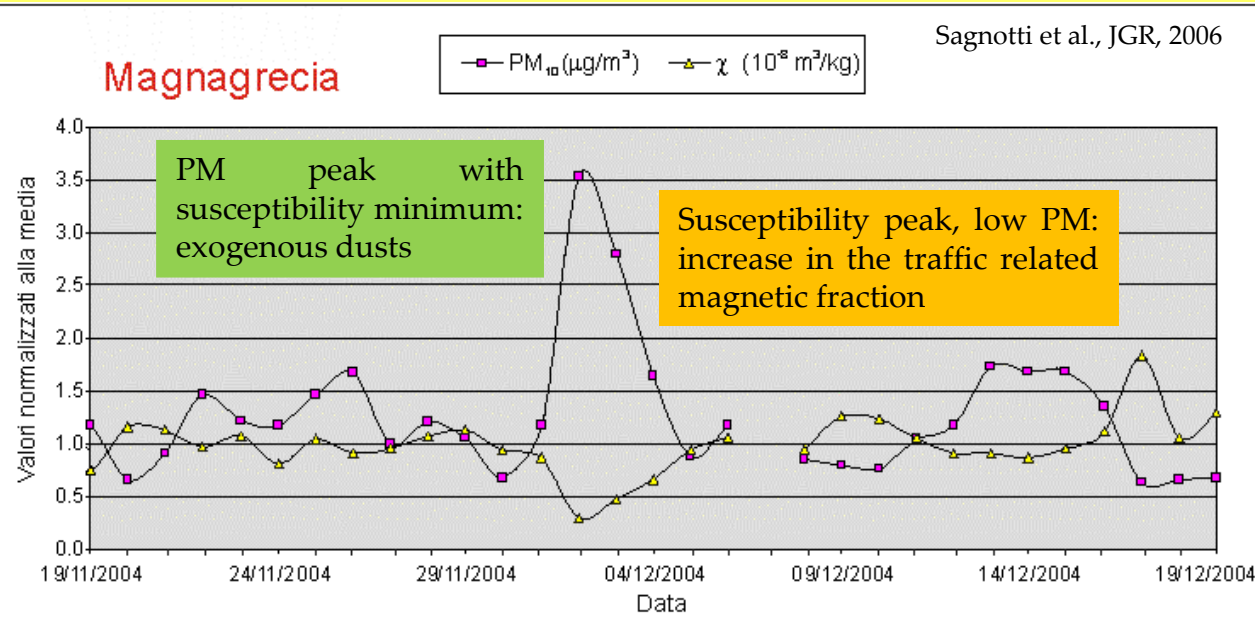


ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA 

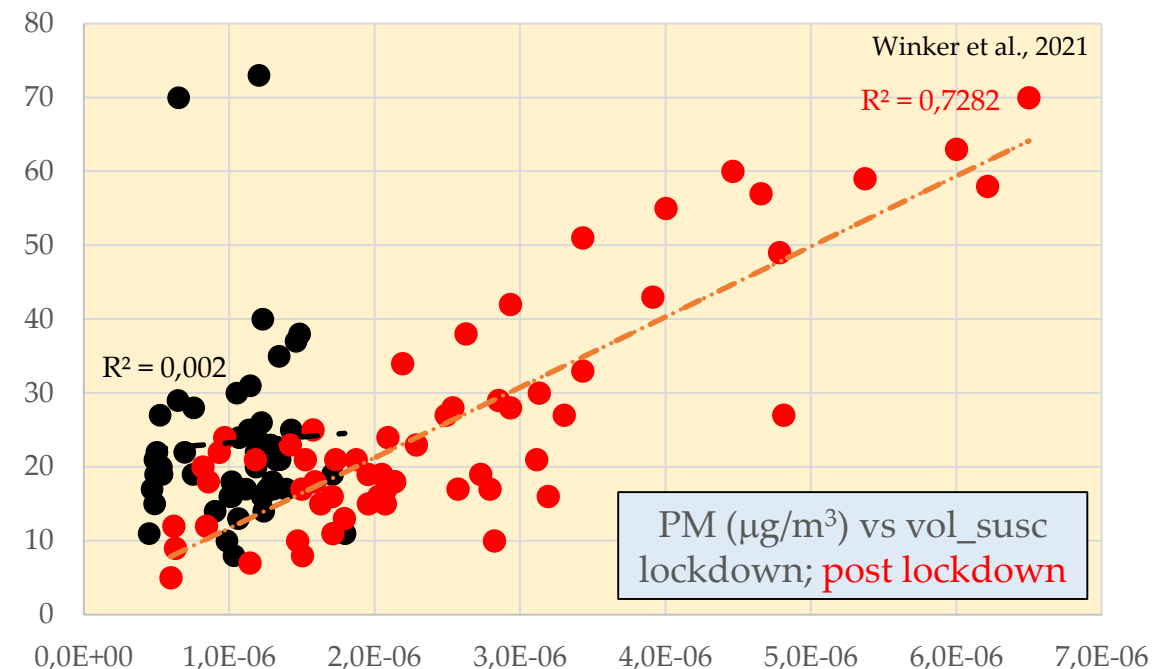
• SCIENTIFIC RATIONALE

Thematic area: Cal-Val (air quality)

- Anthropogenic airborne particulate matter may contain relevant concentration of magnetic particles
- Rock magnetism methods can be applied to the validation and source apportionment of PM
- Magnetic analyses can contribute to data integration between air and ground-based observations



Magnetic measurements for understanding the impact of lockdown measures on the abundance and composition of PM₁₀ traffic related dusts.

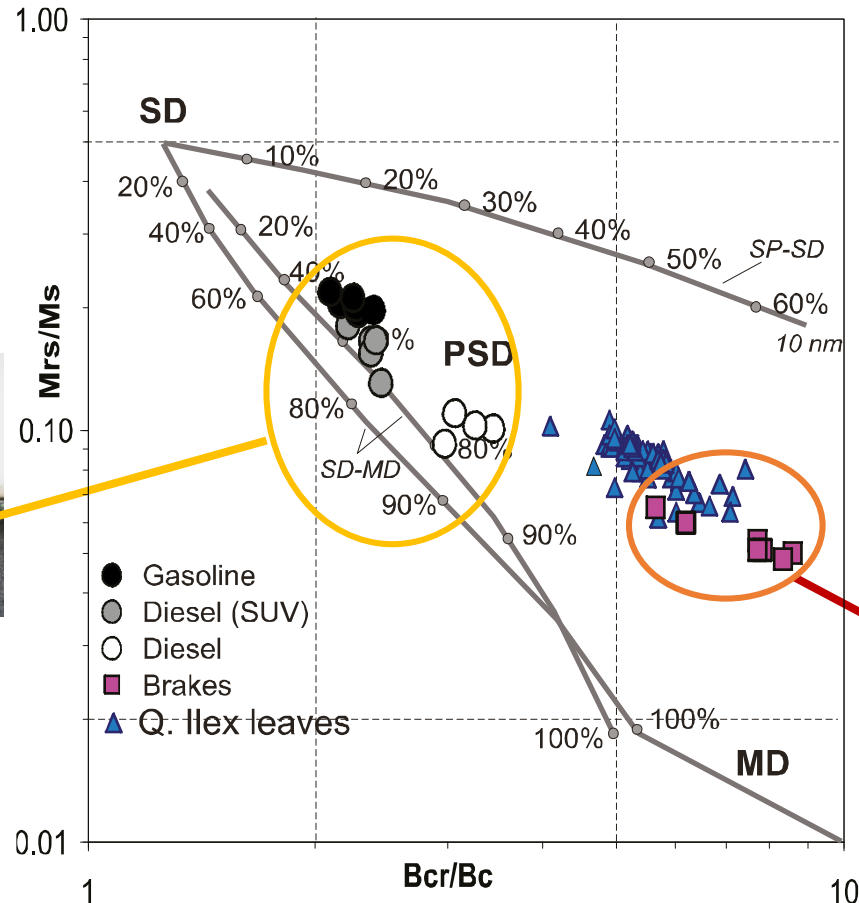


Extending to the ground the satellite observations of PM (local variabilities, natural and anthropogenic sources...)

• SCIENTIFIC RATIONALE

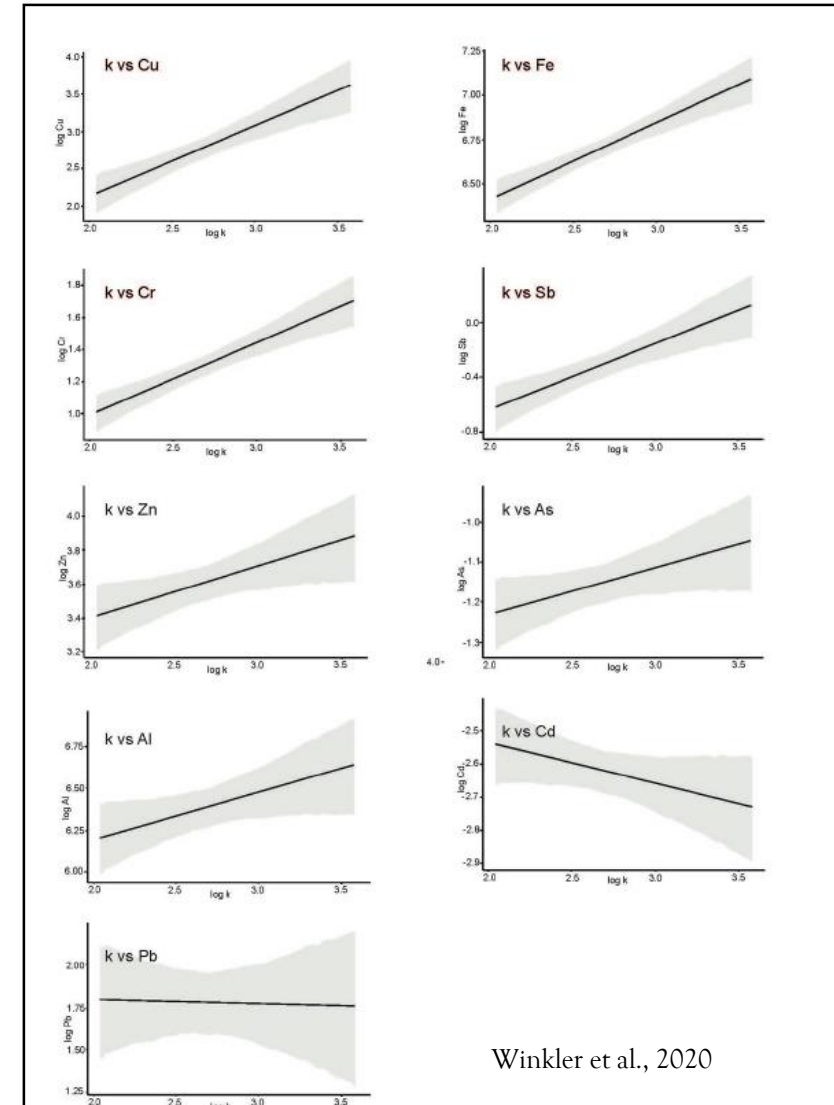
Thematic area: Cal-Val (air quality)

Magnetic properties are a proxy of trace metals, and they can be used for discriminating exhaust and non exhaust emissions according to their grainsize



Sagnotti et al., 2009

Sagnotti et al., 2009

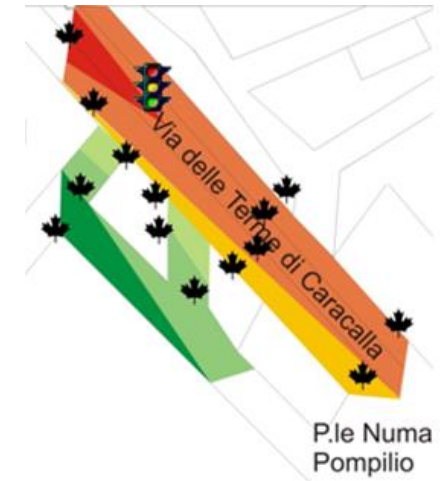
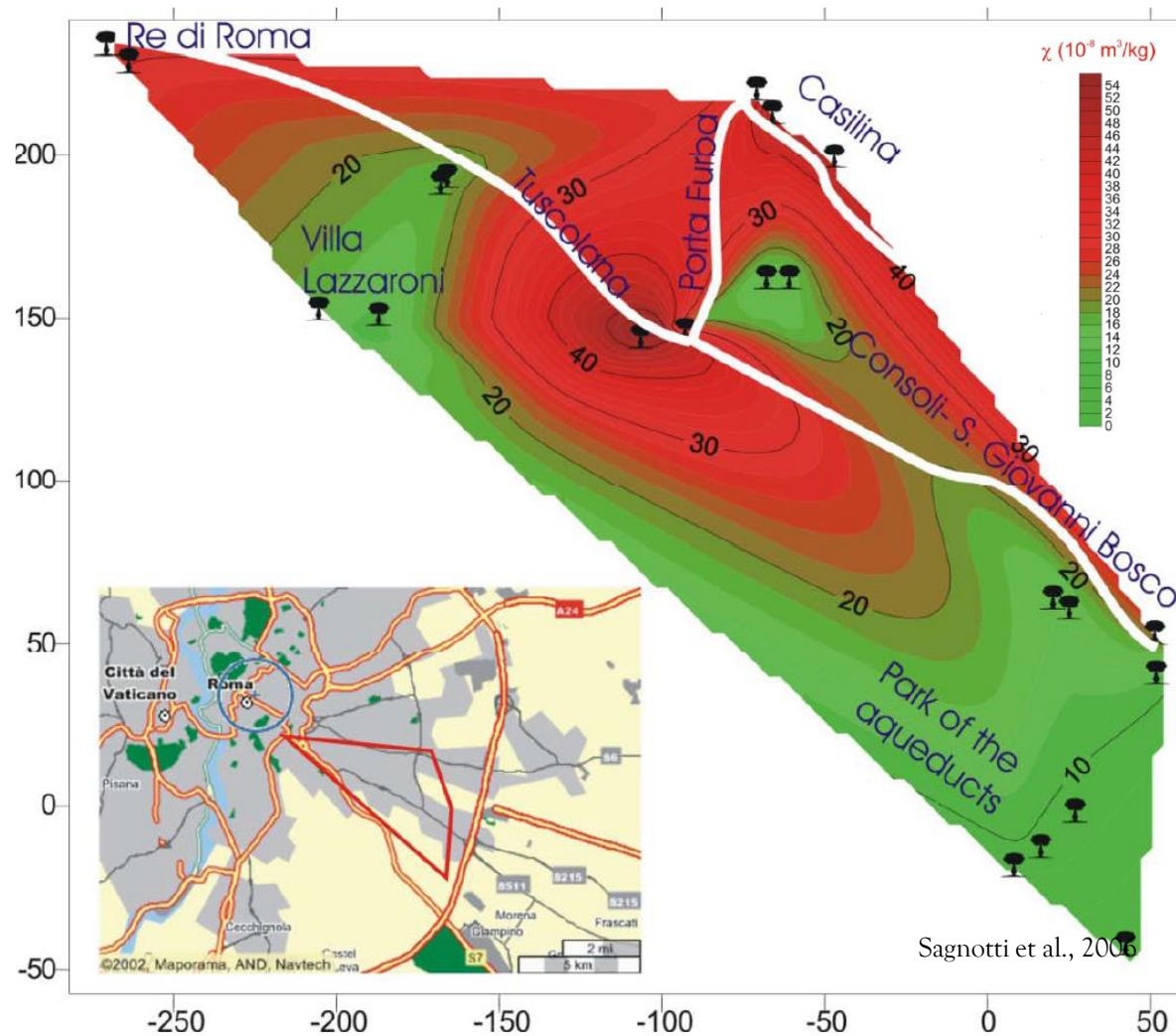
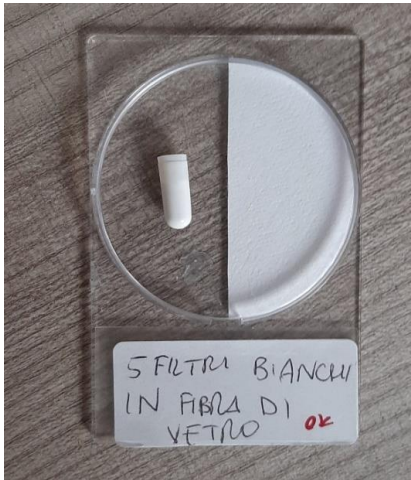


Discrimination of traffic emissions according to hysteresis properties

Correlation between magnetic susceptibility and heavy metals

• OBSERVATIONAL INFRASTRUCTURE

Ground and air based



Ground based (lichens and leaves) and air based (PM10 filters) magnetic measurements applied to different urban contexts: arsons and traffic

- TECHNOLOGICAL LABORATORIES



The paleomagnetic laboratory: magnetically shielded room and the instruments for measuring hysteresis and susceptibility properties



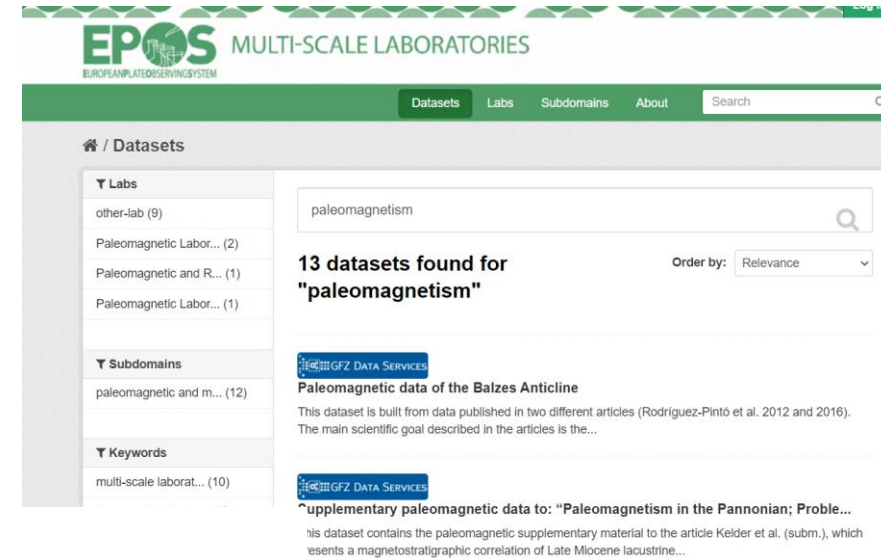
• INFRASTRUCTURE FOR DATA MANAGEMENT

Local storage (few Mb)

<https://epos-msl.uu.nl/dataset?q=paleomagnetism>

<https://www2.earthref.org/MagIC>

<https://data.ingv.it/>



Magnetism Information Consortium (MagIC)

Promoting information technology infrastructures for the international paleomagnetic, geomagnetic and rock magnetic community.

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Mag-NetZ

MagNetZ (Magnetic NetworkZ) is a biweekly online seminar organized by **Greig Paterson** and **Anita Di Chiara**. The seminars cover topics in the geomagnetism, paleomagnetism, rock magnetism, archeomagnetism, and environmental magnetism (all things magnetic). Visit the [website](#) for info on all the **speakers**, their **abstracts**, as well as links to the **YouTube** videos, **ERDA** entries, **citable DOIs**.



2021 MagIC Workshop

• PRODUCTS AVAILABLE

- **Type:** susceptibility measurements (by mass and volume, hysteresis properties (concentration dependent and not, correlations with third party chemical and morphoscopic analyses)
 - **Spatial:** any scale (depending on the selection of samples/sampling)
 - **Temporal coverage:** daily (PM filters), monthly (transplanted lichens), seasonal (leaves), multiannual (native lichens)
 - **Refresh time:** depending on aims and projects
 - **Availability:** on demand, research based
-
- Future technical developments: susceptibility sensors inside PM automated stations

• CURRENT DISTRIBUTION OF PRODUCTS

- Papers
- Meetings
- Social platforms
- Scientific and Technical reports and agreements

• PROGRAMS/PROJECTS OF REFERENCE

- Pianeta Dinamico
- Agreement with ARPA Lazio
- EPOS

• TEAM AND AFFILIATIONS

- INGV paleomagnetism laboratory staff
- ARPA Lazio
- Università di Siena
- Accademia Nazionale dei Lincei, Roma
- Università La Sapienza, Roma
- CNR