

Aerosol size distribution and composition near Bucharest during May 2010

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Outline

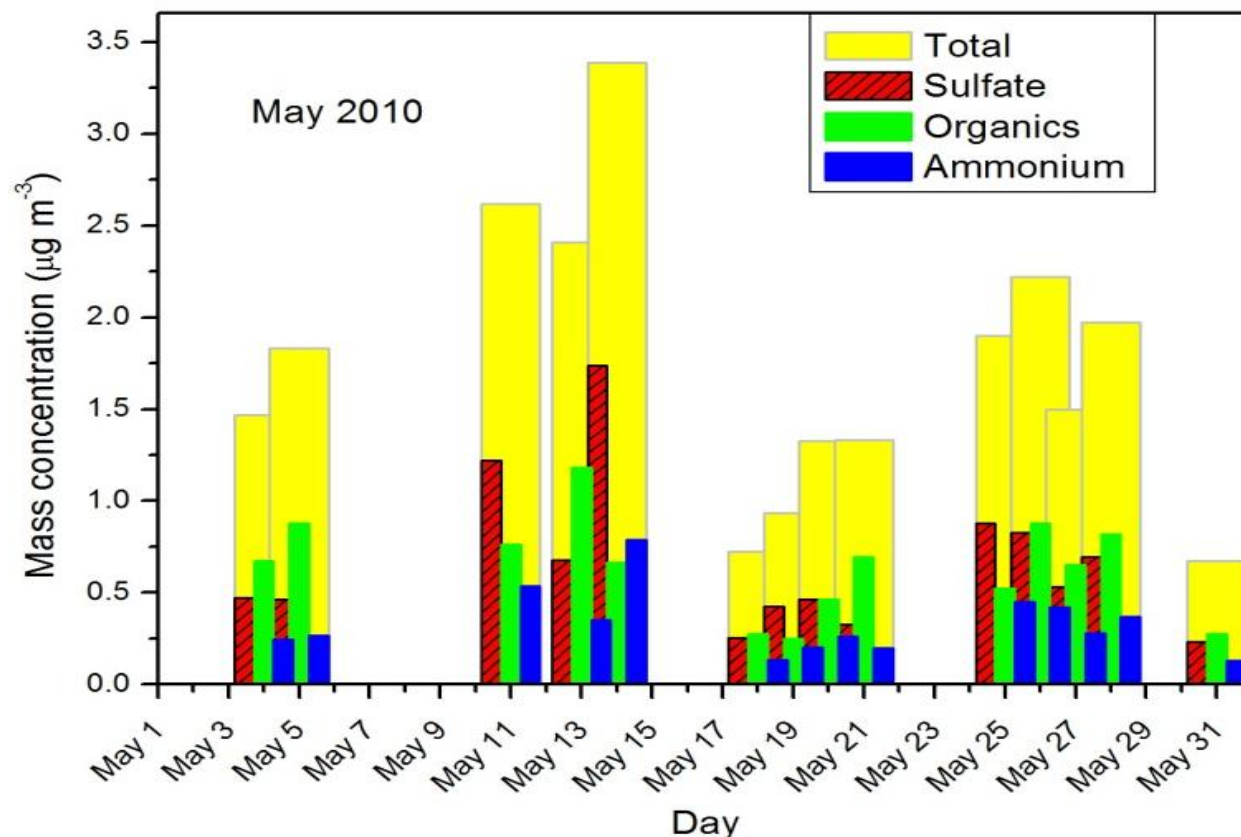
- Aerosol Mass Spectrometer
- Chemical composition during May 2010
- Aerosols size distribution
 - Measured by AMS
 - Measured by APS
- Diurnal variations of mass concentrations
- Conclusions

Aerosol Mass Spectrometer

- Aerodyne C-ToF-AMS
- Output parameters:
 - Average mass concentration for:
 - Organics
 - Sulfate
 - Ammonium
 - Nitrate
 - Chloride
 - Mass range distribution of aerosols up to 800 m/z;
 - Concentration time series,
 - Aerodynamic size distribution of aerosols.



Chemical composition

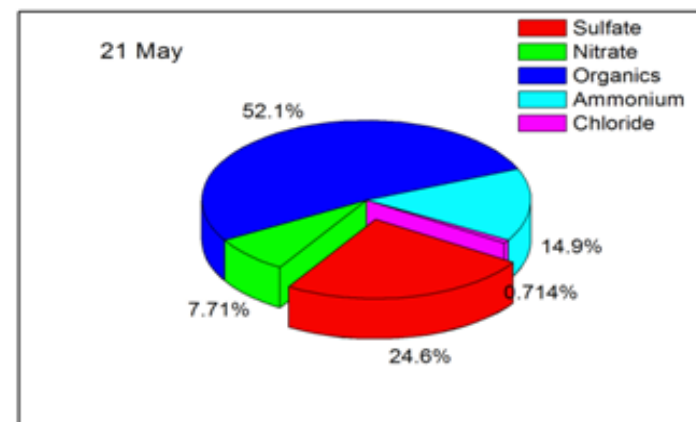
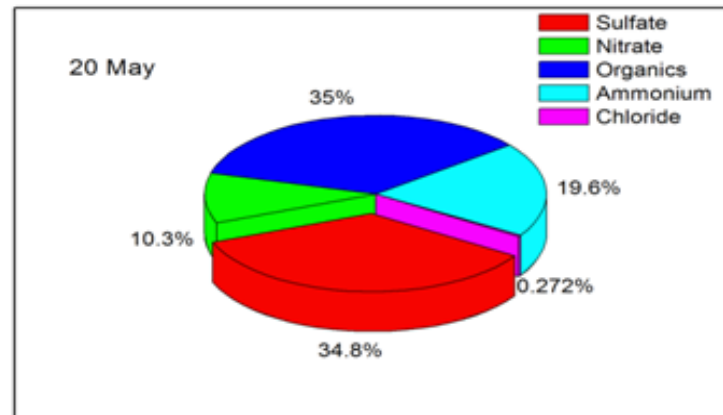
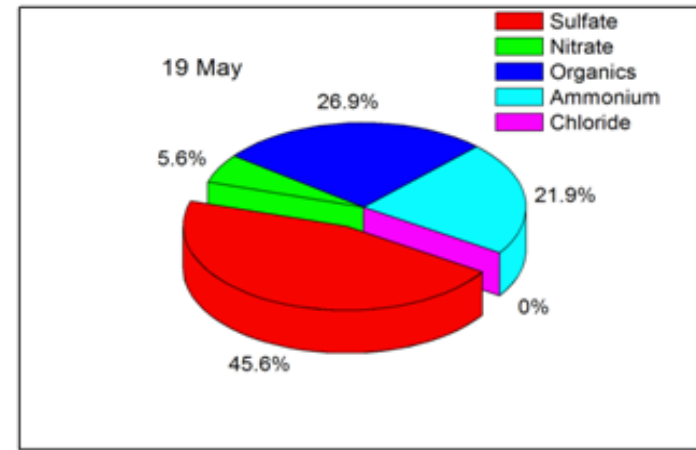
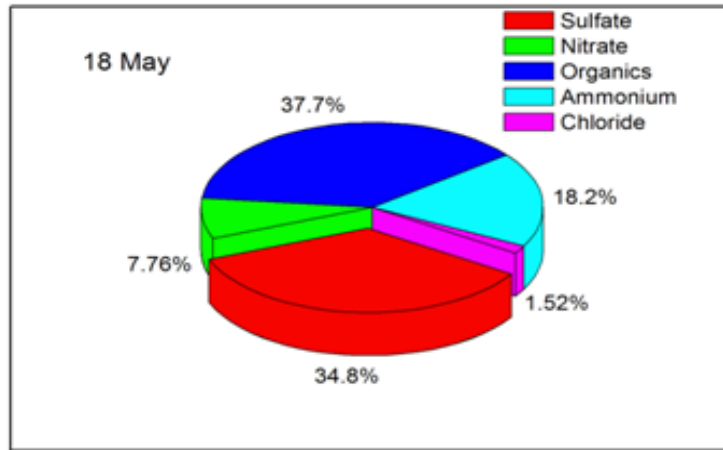


Main ion fragments

- Organics
43,44,55,57
- Sulfate
48, 64
- Ammonium
15, 16
- Nitrate
30, 46

Mass loadings of total, sulfate, nitrate, and organics aerosol species from Magurele during May 2010

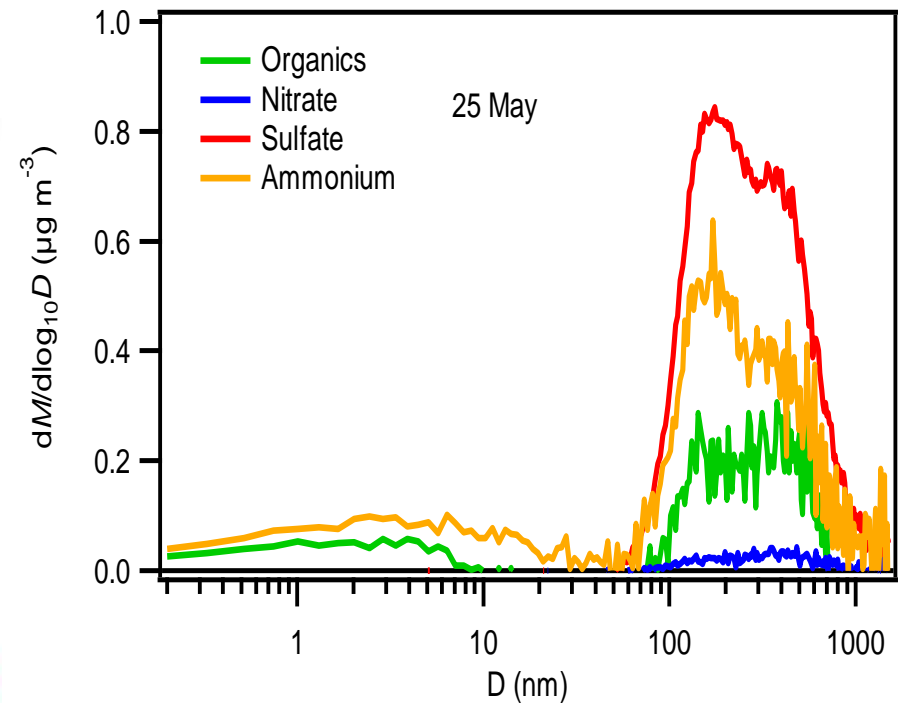
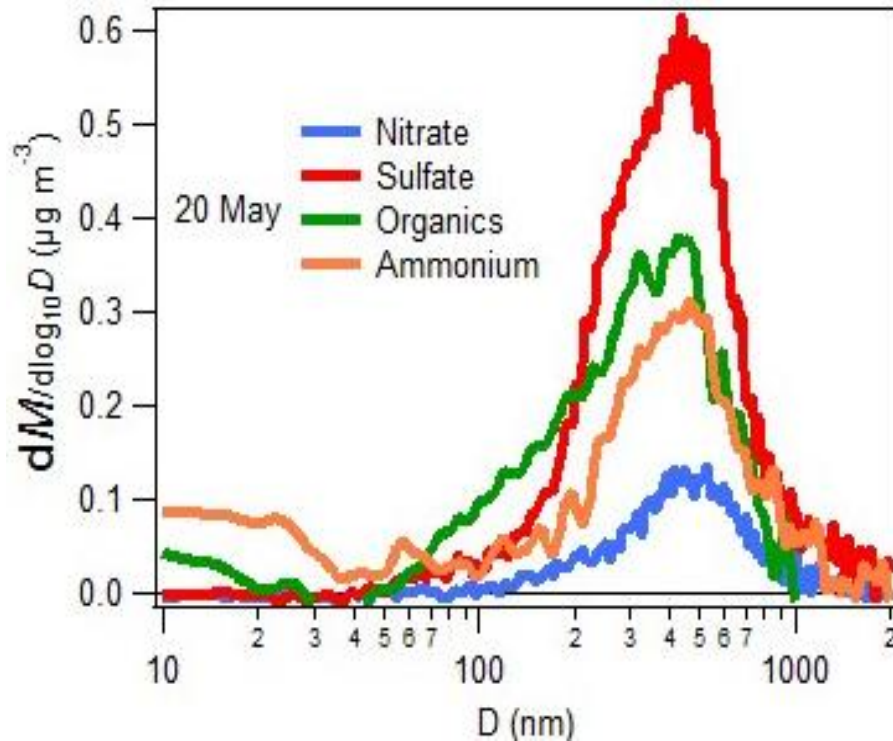
Chemical composition



- Organics & Sulfate ~ 75%
- Nitrate & Chloride ~5%
- Ammonium ~20%

Aerosol particle size distribution

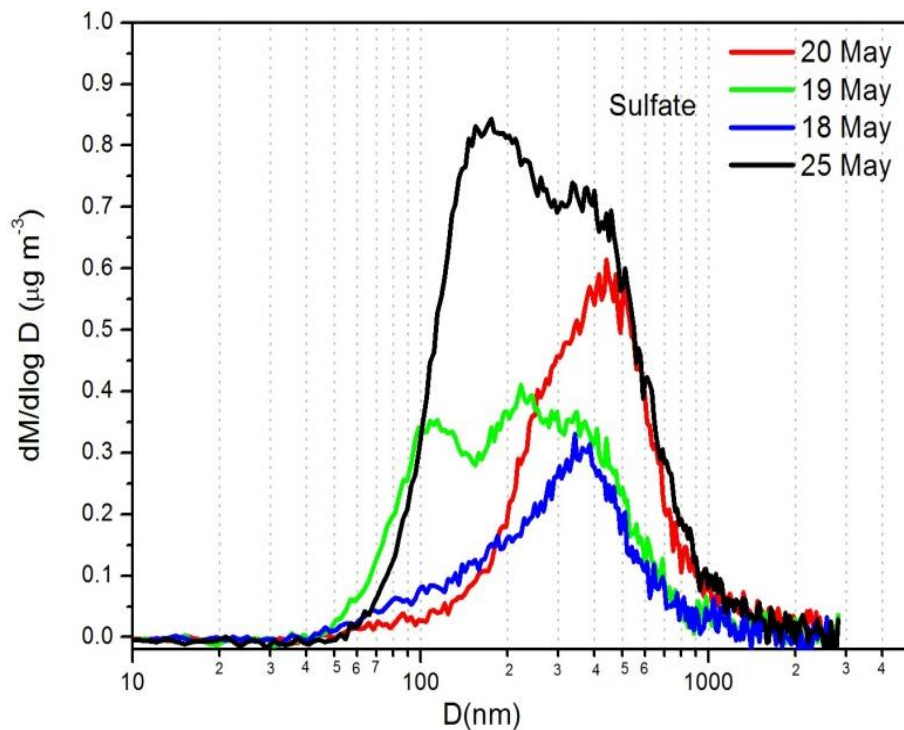
20 May 2010



25 May 2010

- accumulation mode peak between 350–600 nm
- an internal mixture of organics and sulfate with variable amounts of ammonium and a minor fraction of nitrate

Aerosol particle size distribution

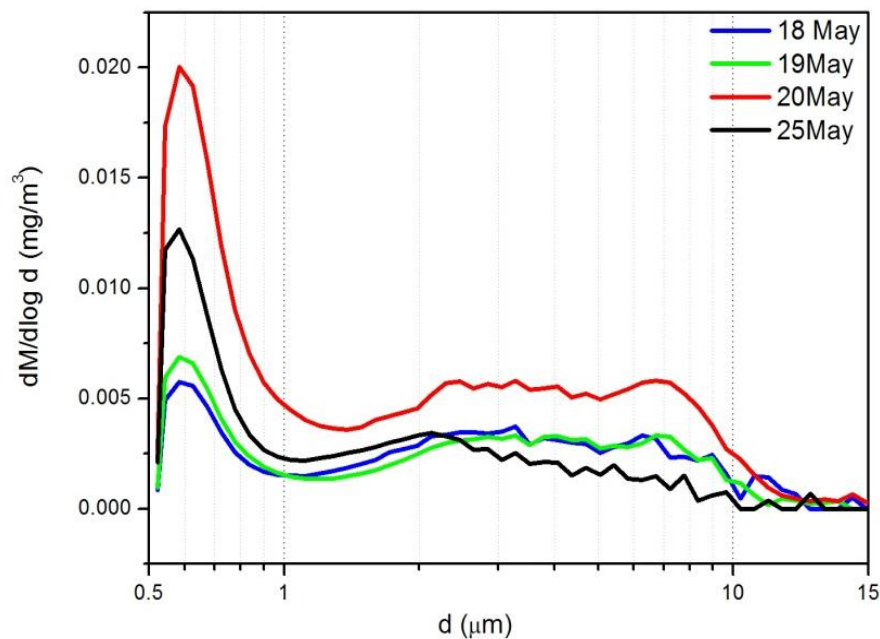


AMS-vacuum aerodynamic diameter

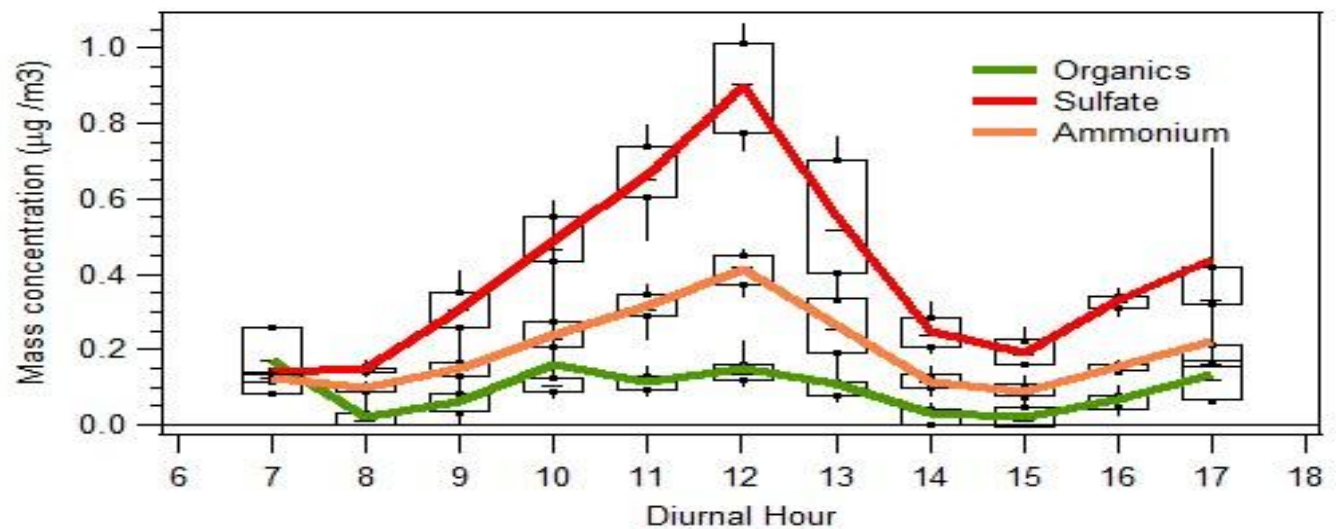
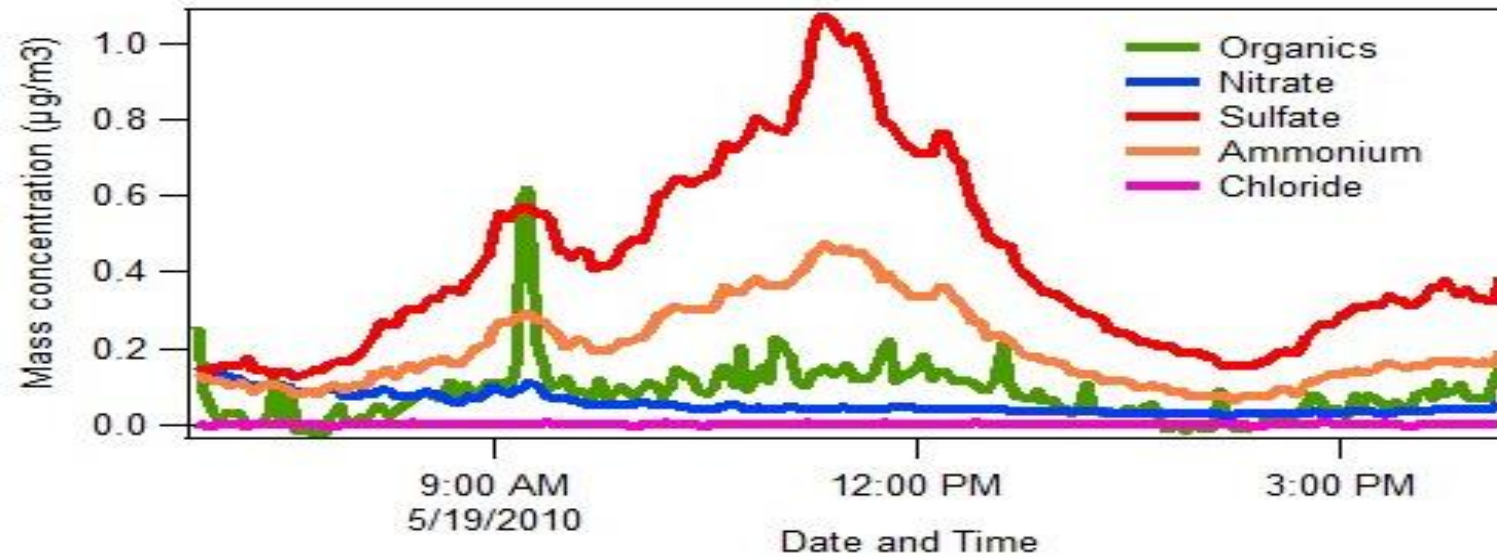
$$D = d \sqrt{\frac{\rho_p}{\rho_0 \chi}}$$

Relation between vacuum and classic particle size diameter

APS- classic aerodynamic diameter



Diurnal variation



Conclusions

- The signatures of sulfate, organics, nitrate, and ammonium were identified for submicron ambient particles -May 2010.
- The aerosol loading in Magurele was on average composed of 38% sulfate, 5.7% nitrate, 19% ammonium, 0.3% chloride and 37% of organic aerosol species.
- The average size distributions of sulfate, nitrate and organics were very similar and characterized by a prominent accumulation mode peaking between D 350-600 nm.
- The particle size distributions of nitrate, sulfate, and organic species showed similar behavior suggesting that these species are internally mixed in the same particles.
- The AMS and APS derived aerodynamic diameters show close values for 18-21 May 2010, major differences being observed for peaks smaller than 500 nm, where is the APS start offset

Thank you for your attention!

A decorative graphic consisting of a solid teal horizontal bar that spans the width of the slide. Below this bar, on the right side, there are several horizontal lines of varying lengths and colors, including teal and white, creating a layered, modern look.