

# La composizione del particolato nelle stazioni speciali

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## Prepair Project: Action D6

- ACTION A4: Setting the measuring protocols for special stations
- ACTION D6: Monitoring of the environmental effects of the plan by special stations
- ACTION D5: Regular assessment (monthly/yearly) of the air quality of the Po basin

### Special stations

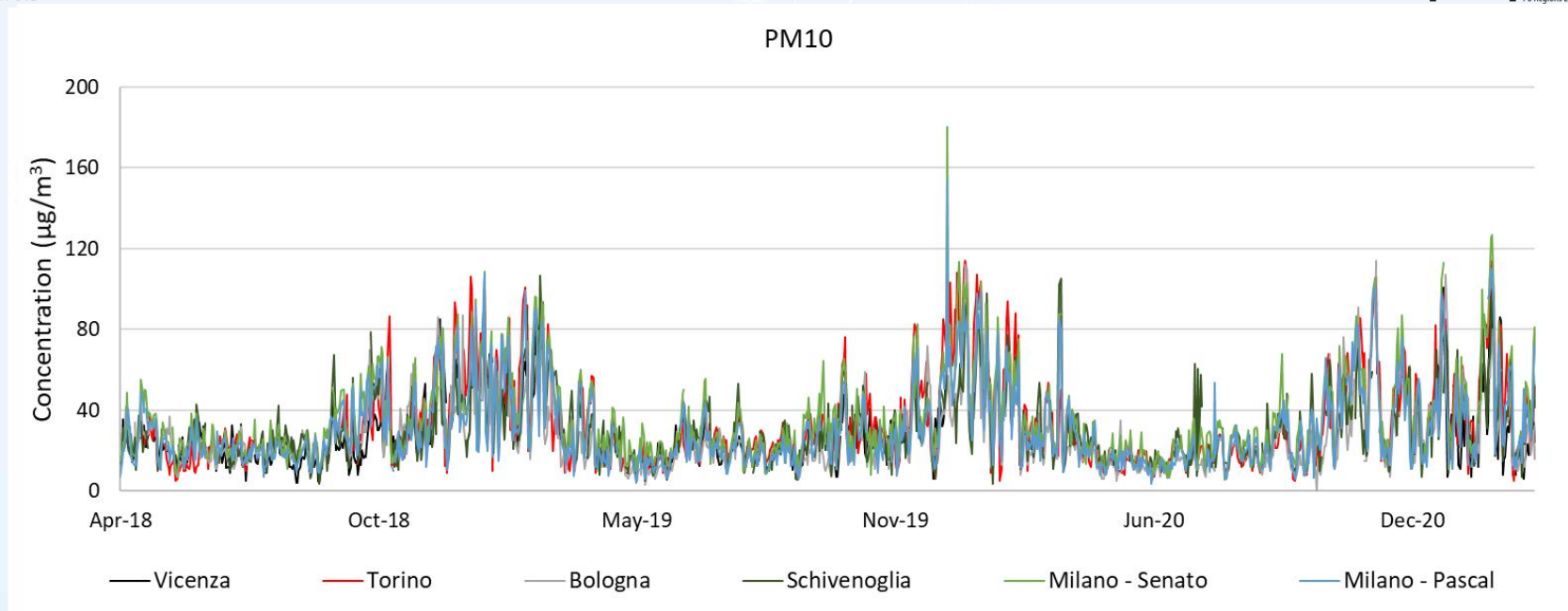
Four **urban** background site (Milano, Bologna, Torino, Vicenza)

One **rural background** site (Schivenoglia)

+ Data from traffic site Milano – via Senato as a back-up for Milano – Pascal



# Prepair Project: Action D6



PM10 well correlated



## Chemical analysis results

elemental fraction (crustal)

elemental fraction (not crustal)

SIA  $\left\{ \begin{array}{l} \text{NH}_4\text{NO}_3 \\ (\text{NH}_4)_2\text{SO}_4 \end{array} \right.$

Ion fraction (not crustal)

OC primary + secondary (SOA)

primary EC

organic matter e H2O

**X-ray Fluorescence (XRF):** ( $Z > 11$ ): Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, Br, Rb and Pb

**Ion cromatography:**  $\text{Na}^+$ ,  $\text{NH}_4^+$ ,  $\text{K}^+$ ,  $\text{Mg}^{2+}$ ,  $\text{Ca}^{2+}$ ,  $\text{Cl}^-$ ,  $\text{NO}_2^-$ ,  $\text{Br}^-$ ,  $\text{NO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{SO}_4^{2-}$ , Levoglucosan

**Thermo-optical method (TOT/TOR):** Carbon compounds (OC, EC)

**Chemical analisys are performed on a daily basis**

# PM10 CHEMICAL COMPOSITION

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## PM10 Compound

Crustal Matter

Anthropogenic compounds

Ammonium Nitrate

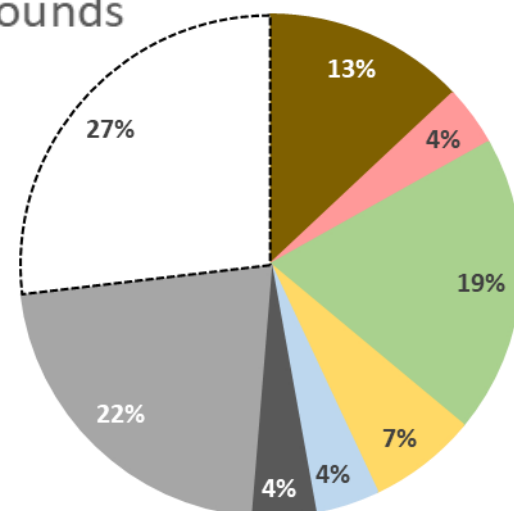
Ammonium Sulphate

Other Ions

Organic Carbon

Elemental Carbon

Undefined



**SIA:** Secondary Inorganic Aerosol

**SOA:** Secondary Organic Aerosol

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## PM10 Compound

■ Crustal Matter

■ Anthropogenic compounds

■ Ammonium Nitrate

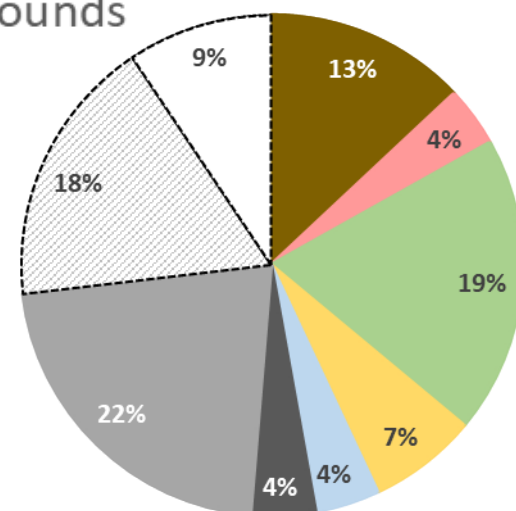
■ Ammonium Sulphate

■ Other Ions

■ Organic Carbon

■ Elemental Carbon

□ Undefined

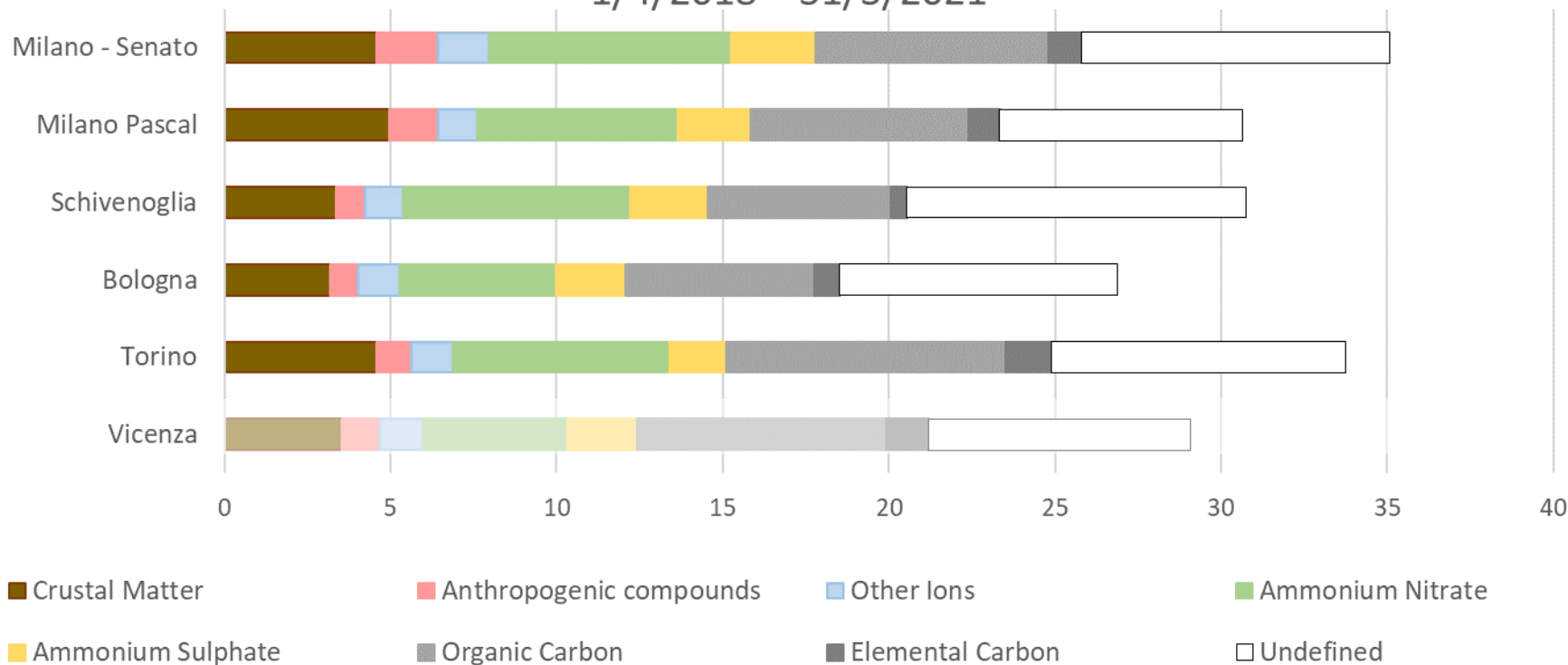


**SIA:** Secondary Inorganic Aerosol

**SOA:** Secondary Organic Aerosol

# PM10 CHEMICAL COMPOSITION

Chemical Composition  
1/4/2018 - 31/3/2021

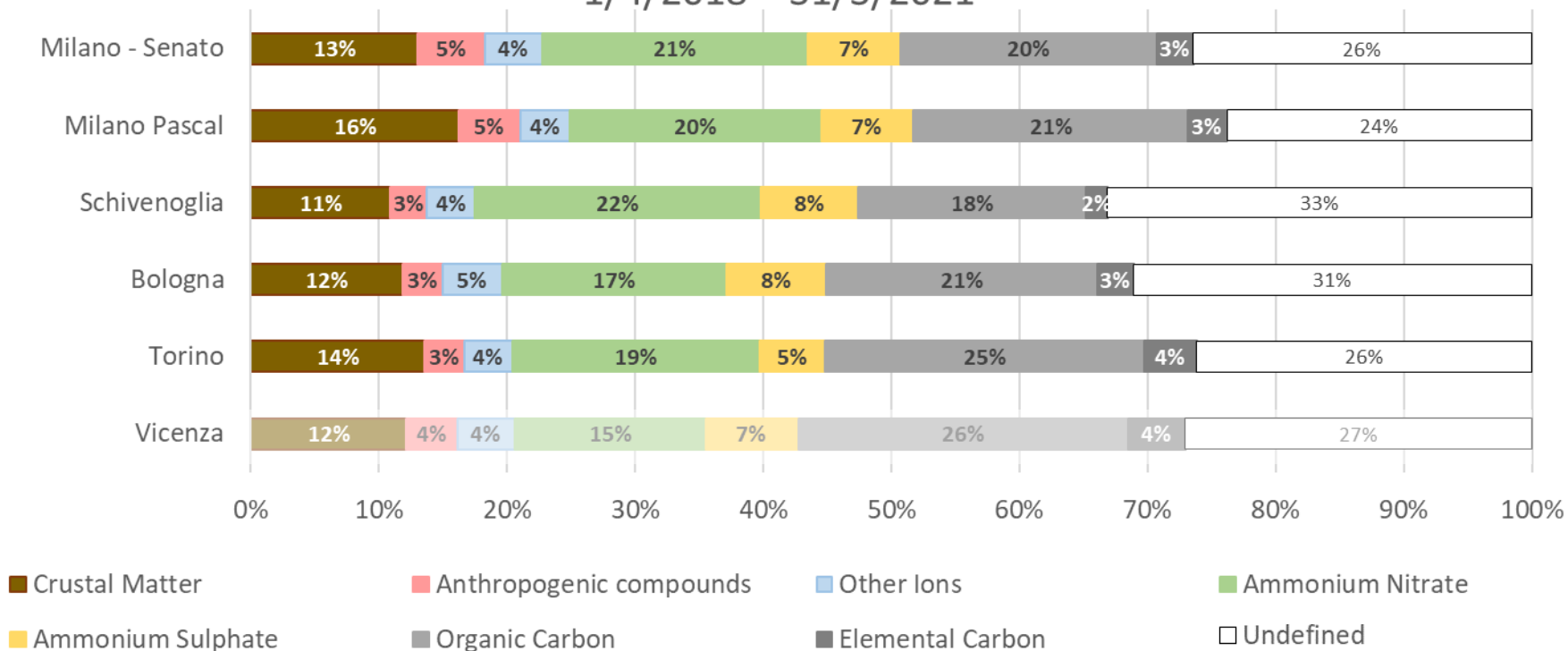


\* Due to instrumental problem in Vicenza station no sampling was performed during 2020

\* Validation data in progress

# PM10 CHEMICAL COMPOSITION

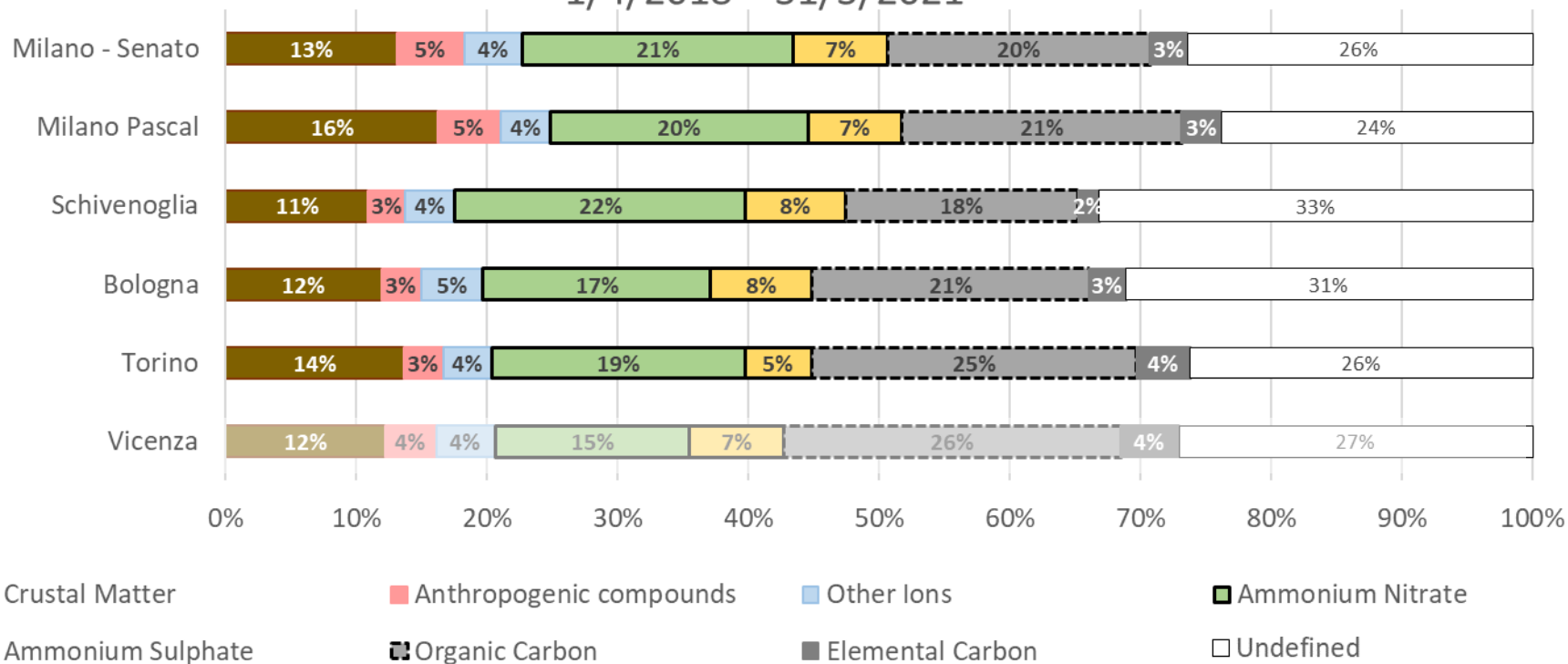
## Chemical Composition 1/4/2018 - 31/3/2021





# PM10 CHEMICAL COMPOSITION

Chemical Composition  
1/4/2018 - 31/3/2021



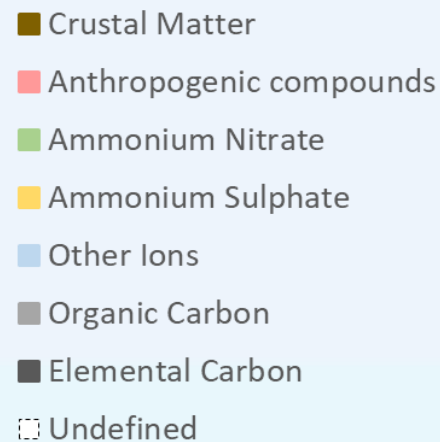
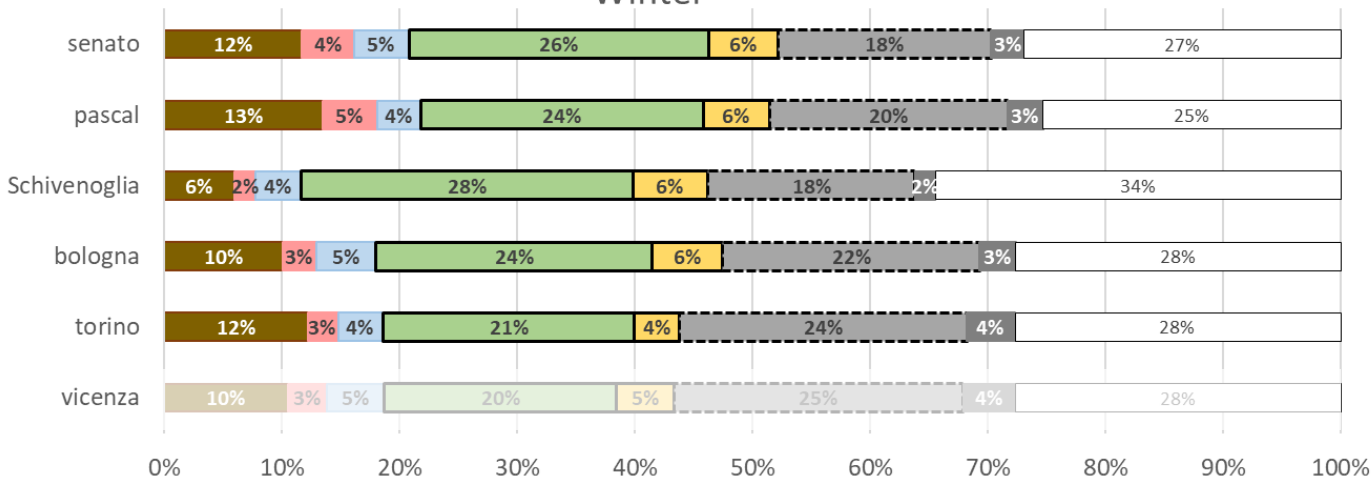
Secondary Inorganic Aerosol (SIA): one of the mayor PM10 component.

Secondary Inorganic Aerosol is omogeneous in the Po Valley.

Need for information on Secondary Organic Aerosol

# PM10 CHEMICAL COMPOSITION

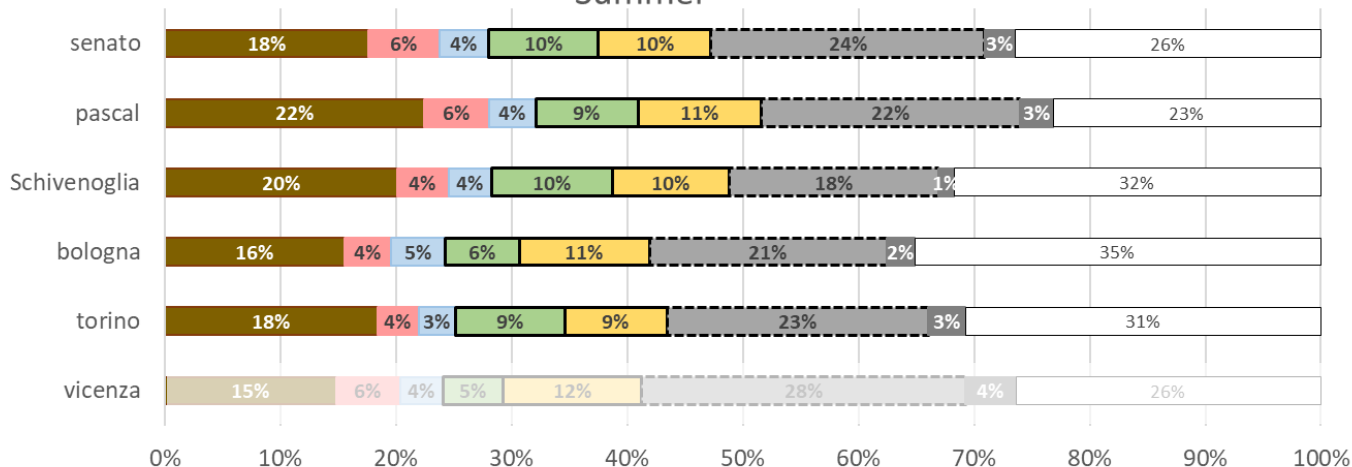
## Chemical Composition Winter



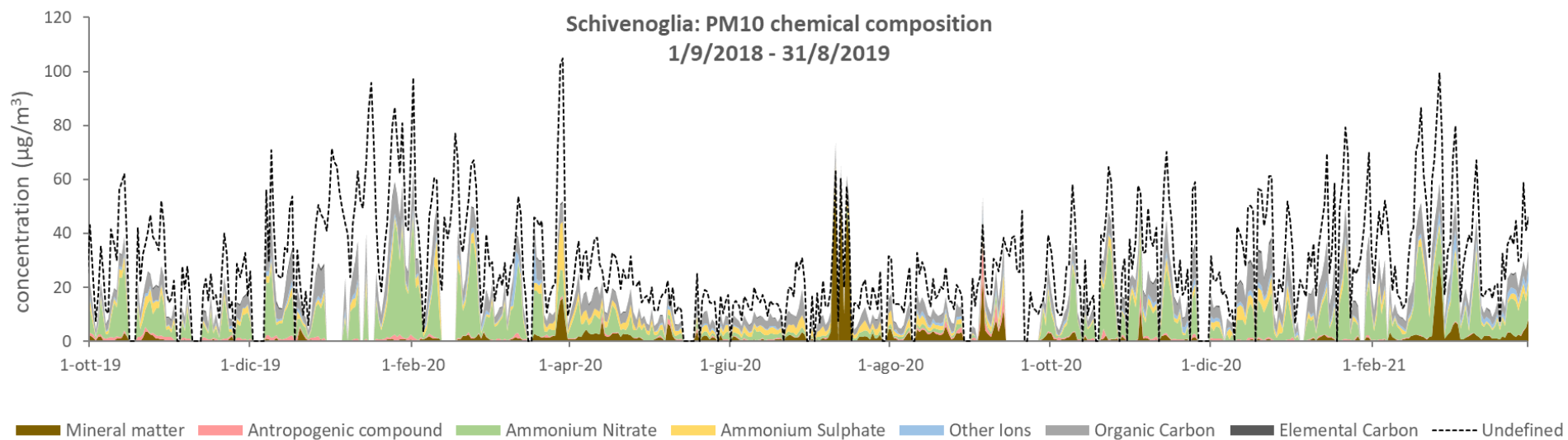
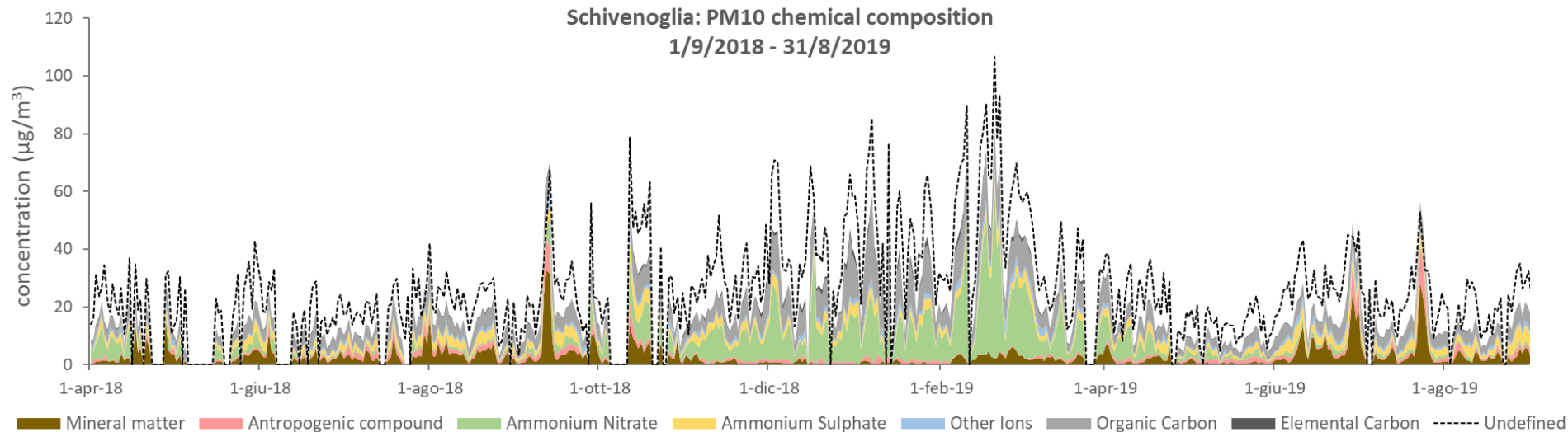
Cold season: increase in the contribution of SIA.

Warm season: increase in the contribution of crustal matter.

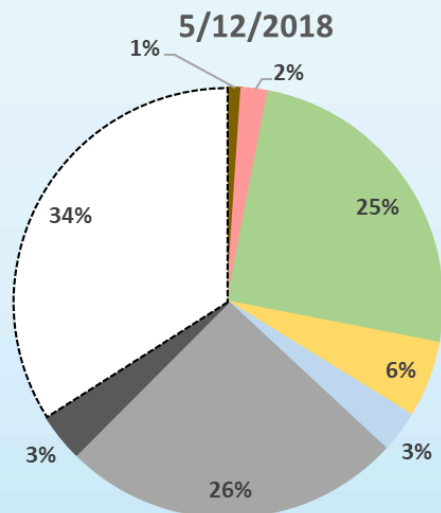
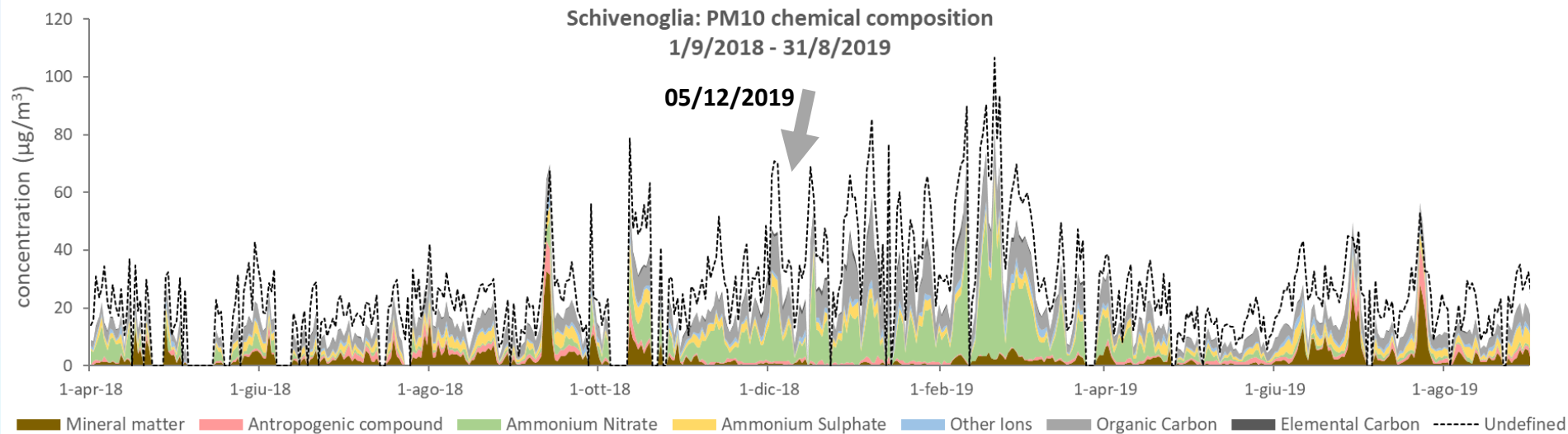
## Chemical Composition Summer



# PM10 CHEMICAL COMPOSITION:

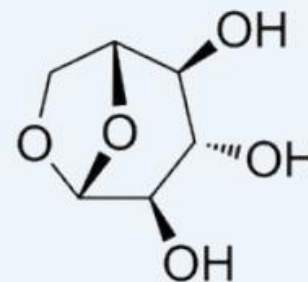


# PM10 CHEMICAL COMPOSITION: ORGANIC COMPOUNDS

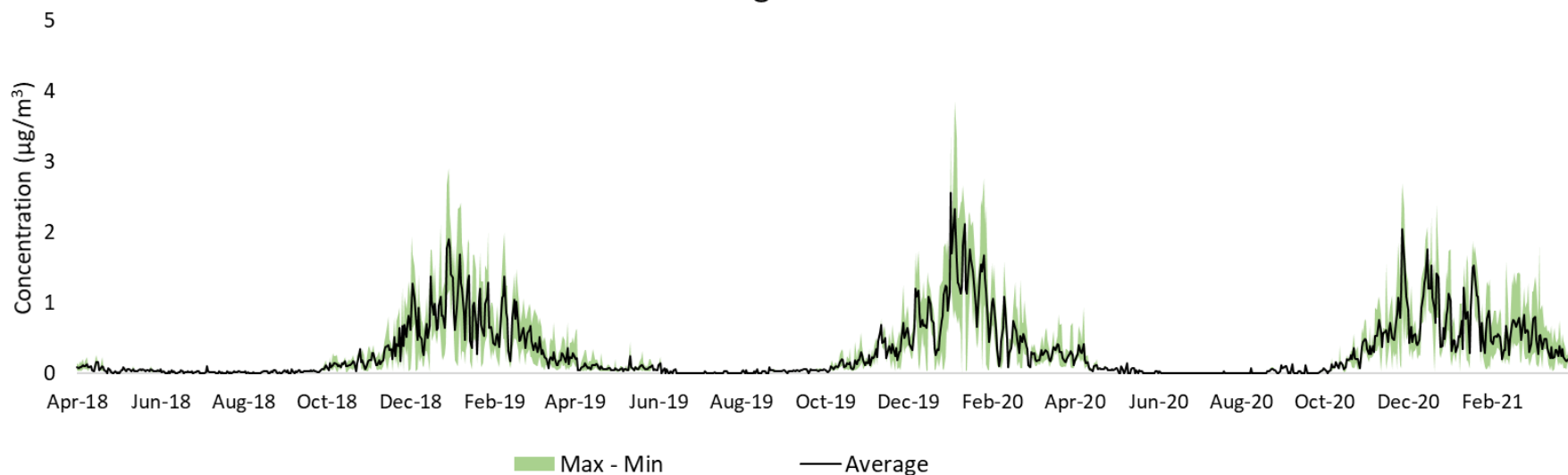


# PM10 CHEMICAL COMPOSITION: ORGANIC COMPOUNDS

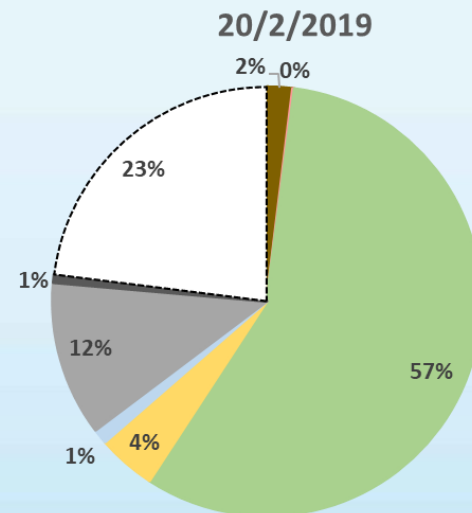
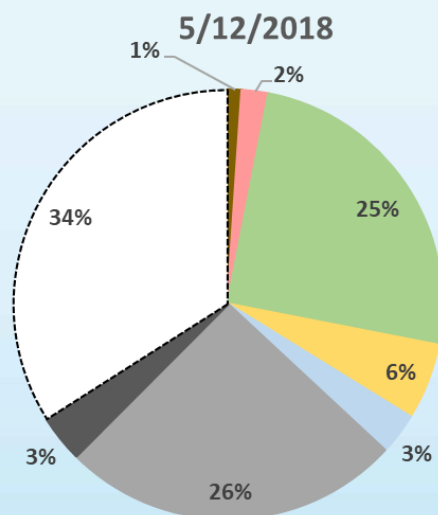
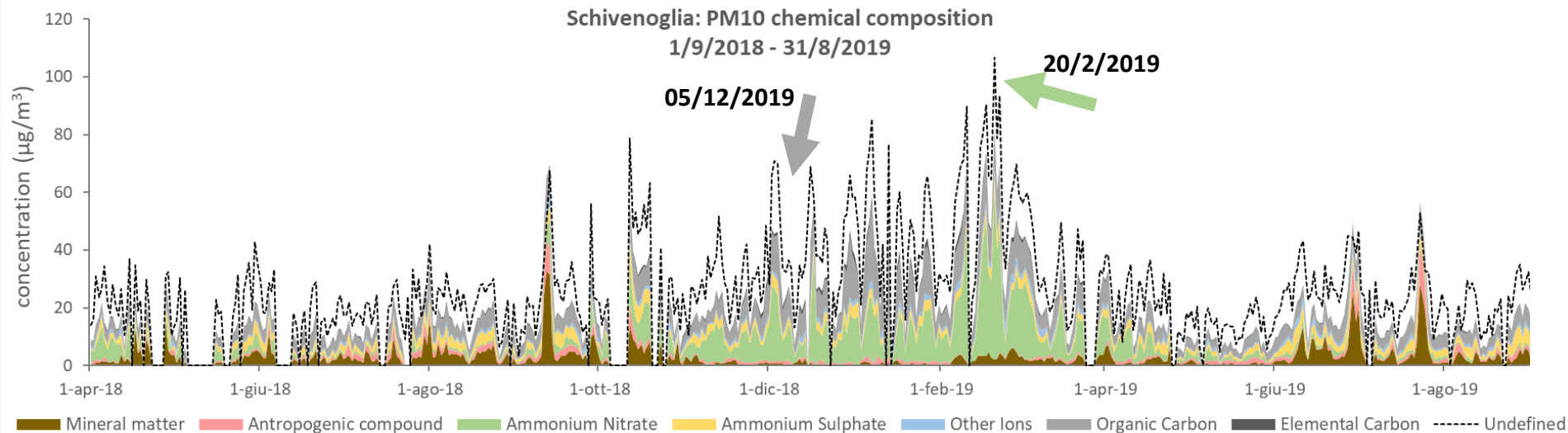
**Levoglucosan** is an anhydrosugar emitted by the pyrolysis of wood (biomass). As a result, levoglucosan is good chemical tracer for biomass burning, which represents an important fraction of PM10 concentration during wintertime.



Levoglucosan

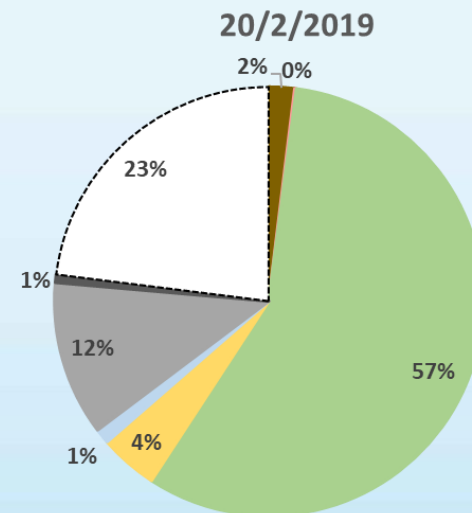
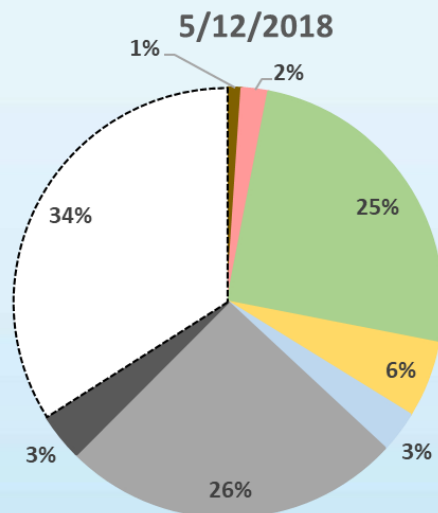
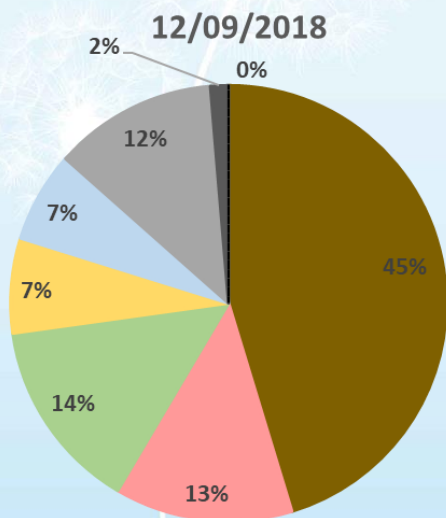
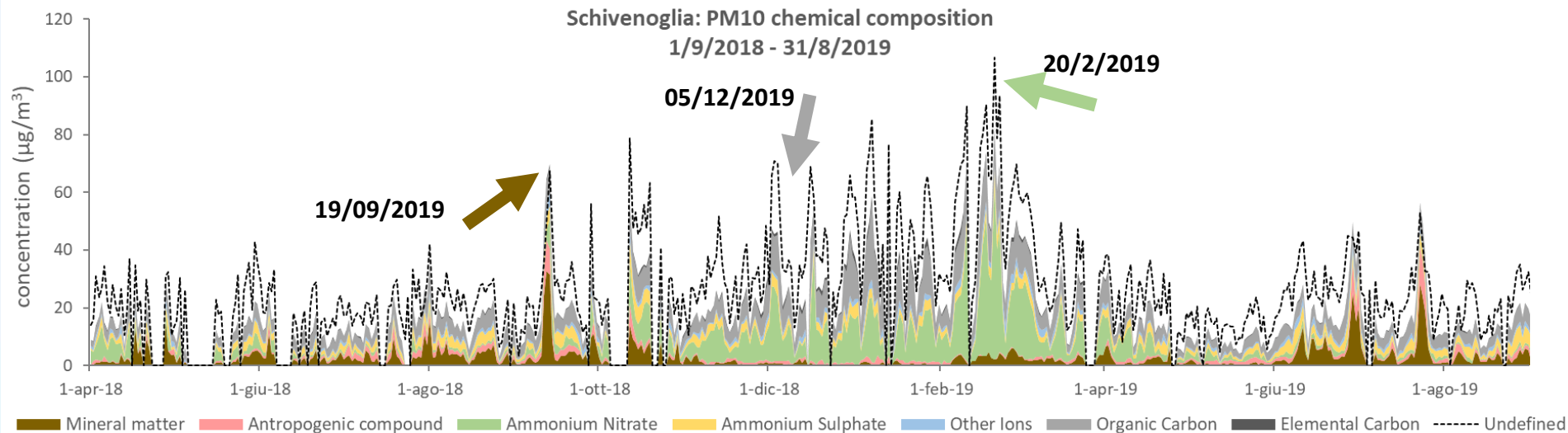


# PM10 CHEMICAL COMPOSITION: AMMONIUM SULPHATE AND AMMONIUM NITRATE





# PM10 CHEMICAL COMPOSITION: CRUSTAL MATTER





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