

WINTERTIME DISTRIBUTION OF PAH WITH AEROSOL PARTICLE SIZE IN TWO CITIES IN THE CZECH REPUBLIC

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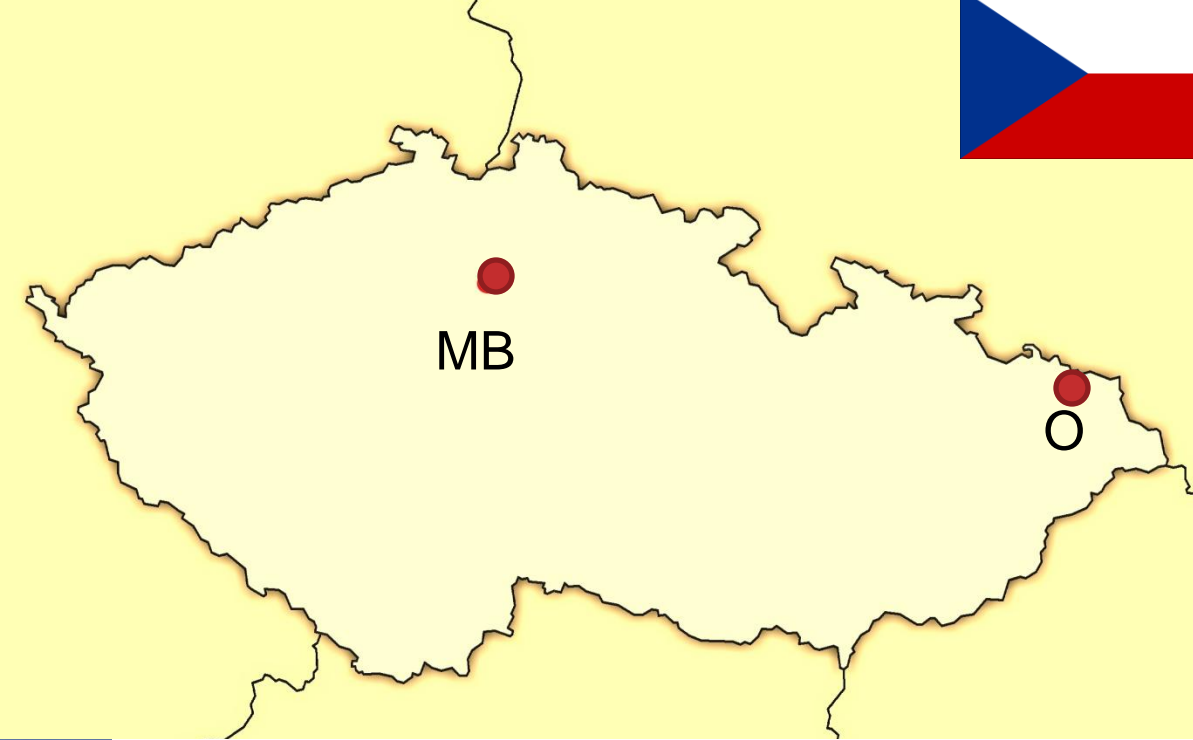
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Mladá Boleslav

population 44 000,
urban area 29 km²

WINTER 2013



Ostrava

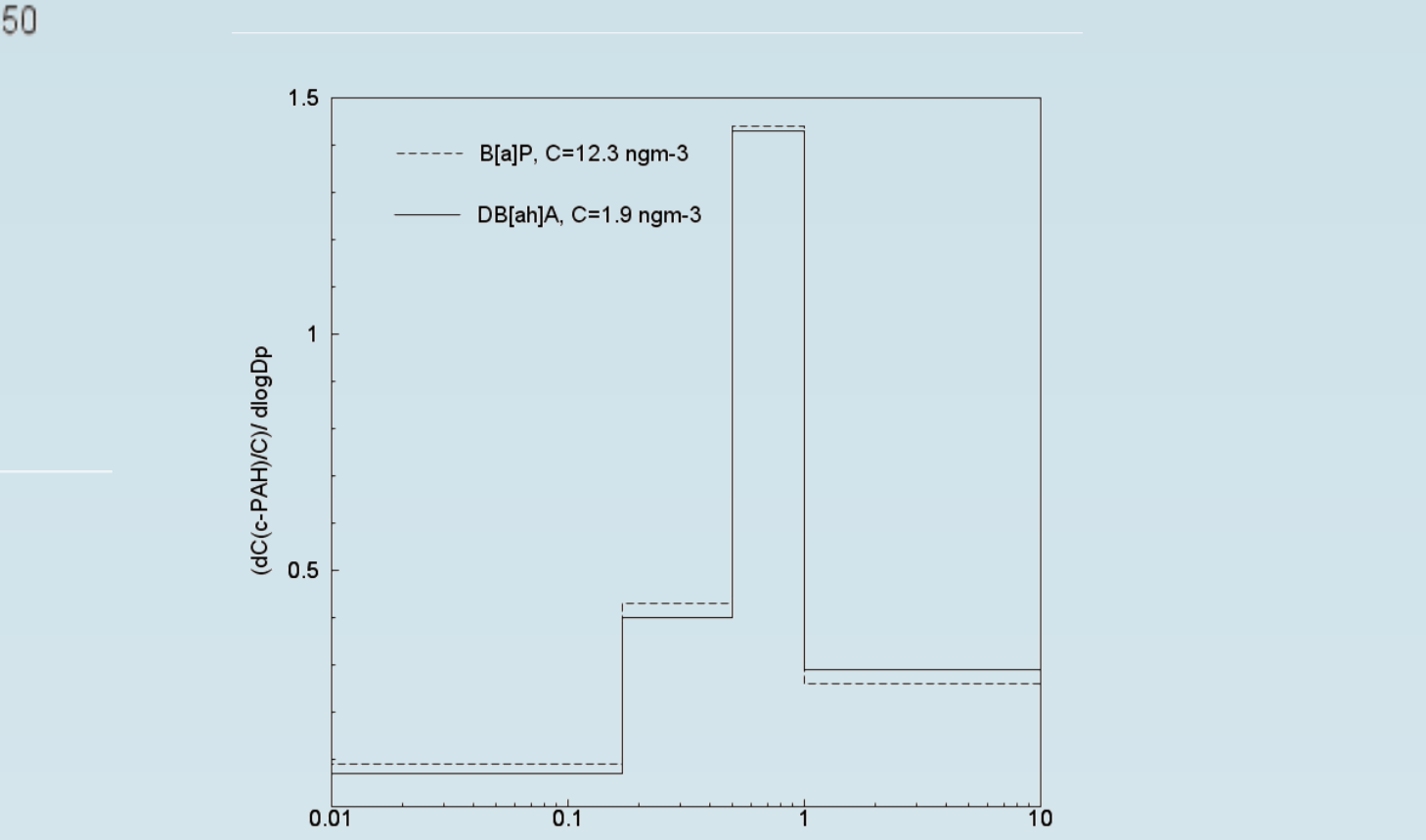
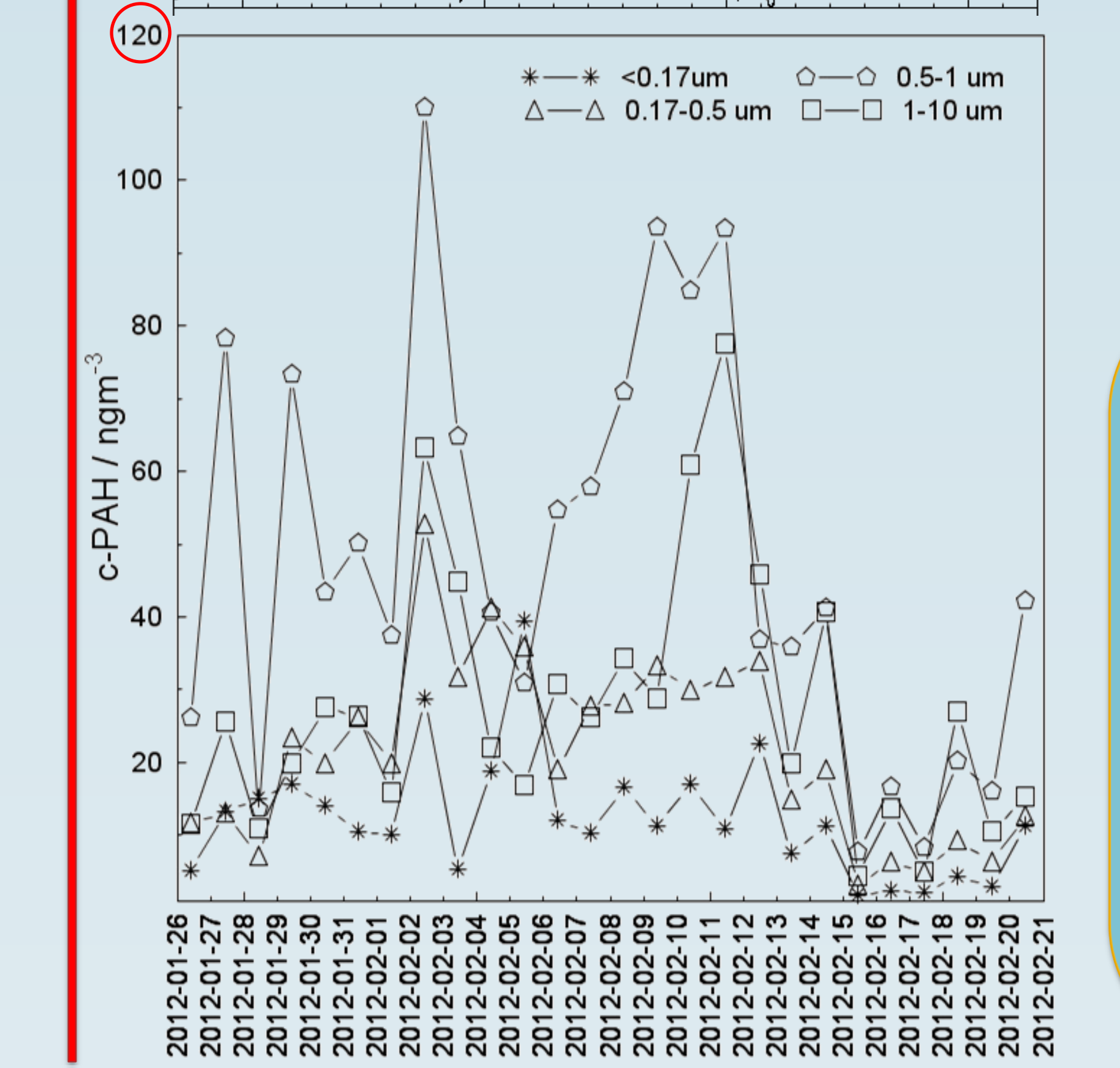
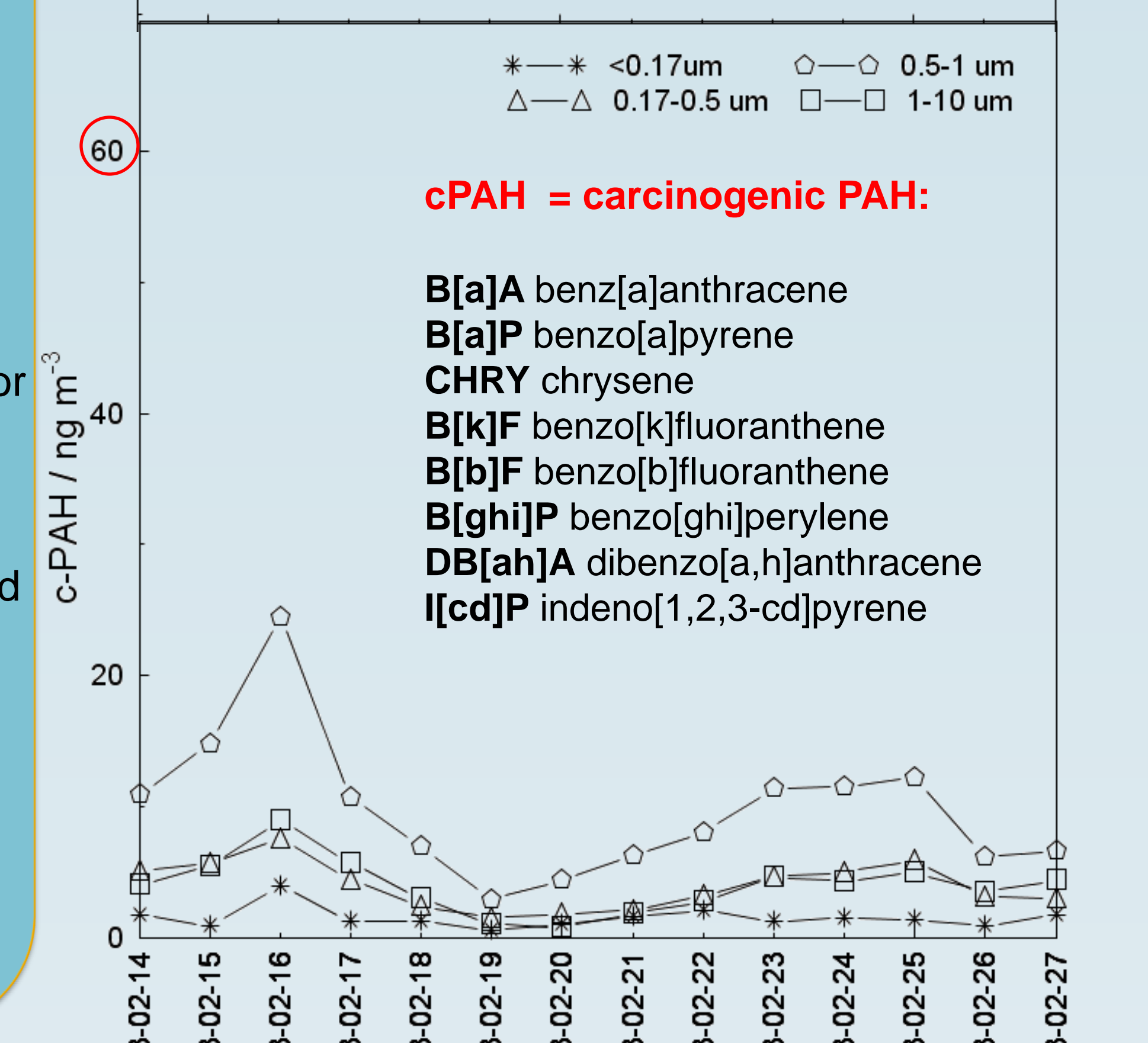
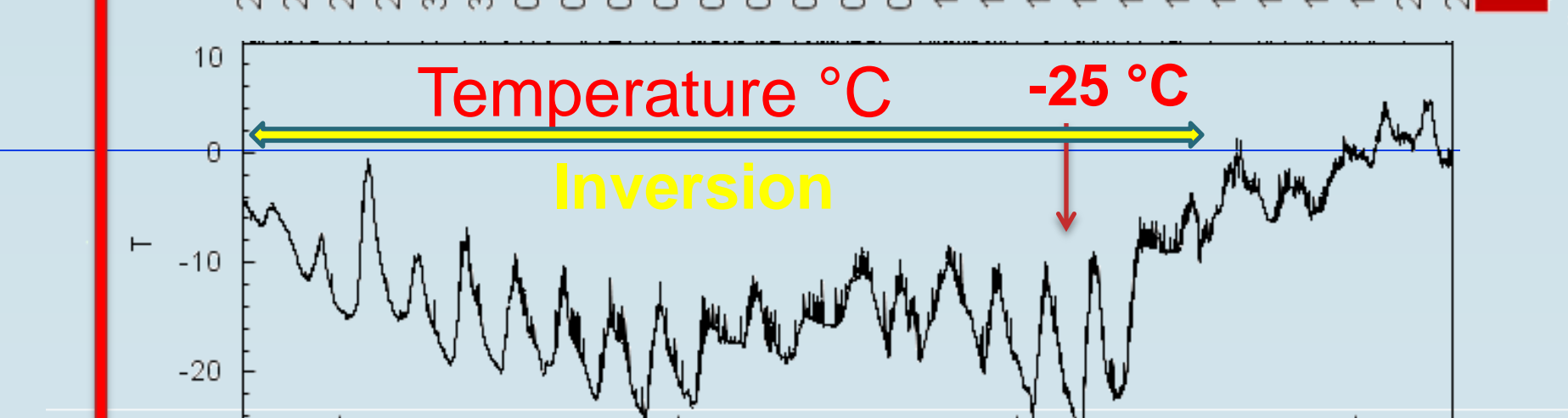
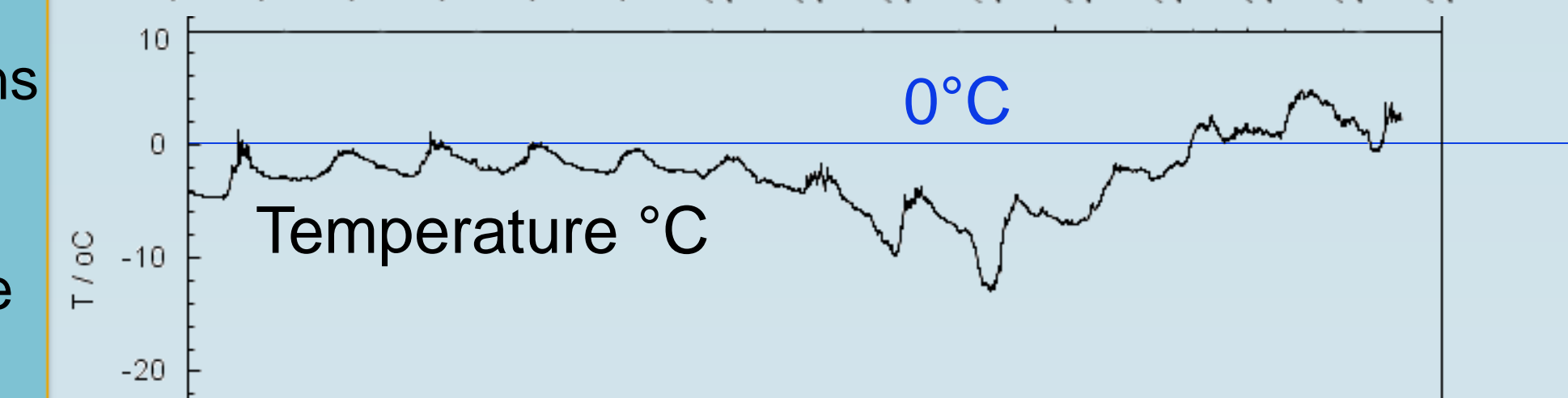
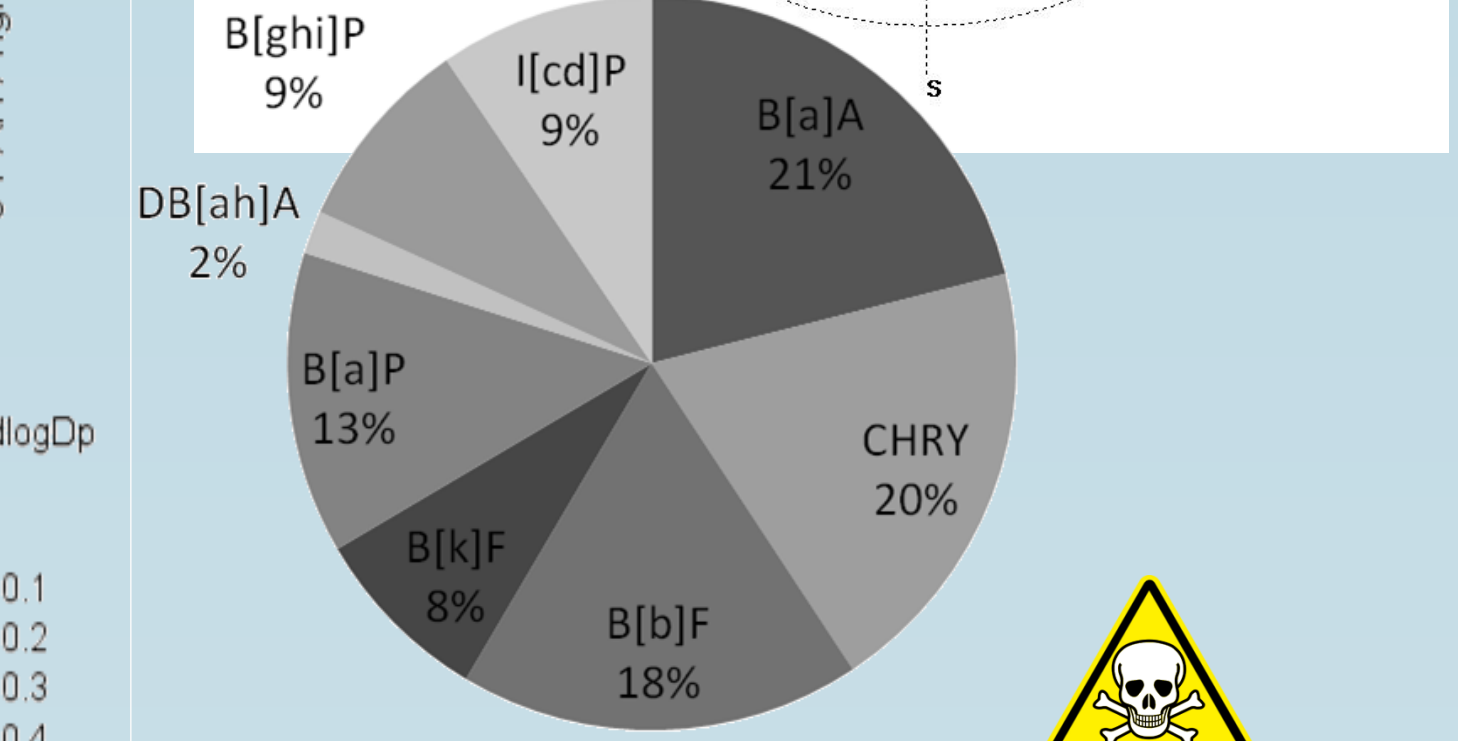
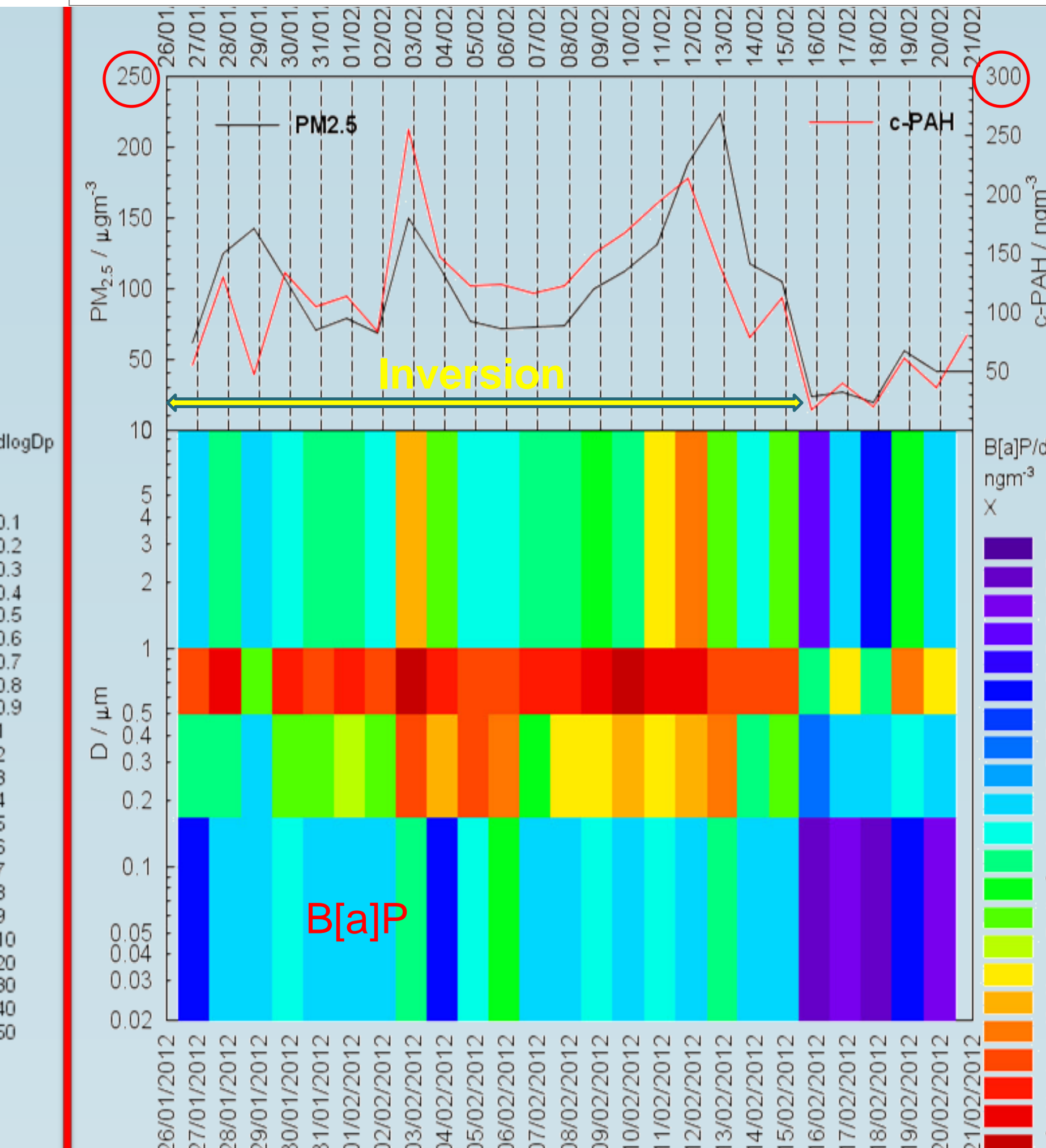
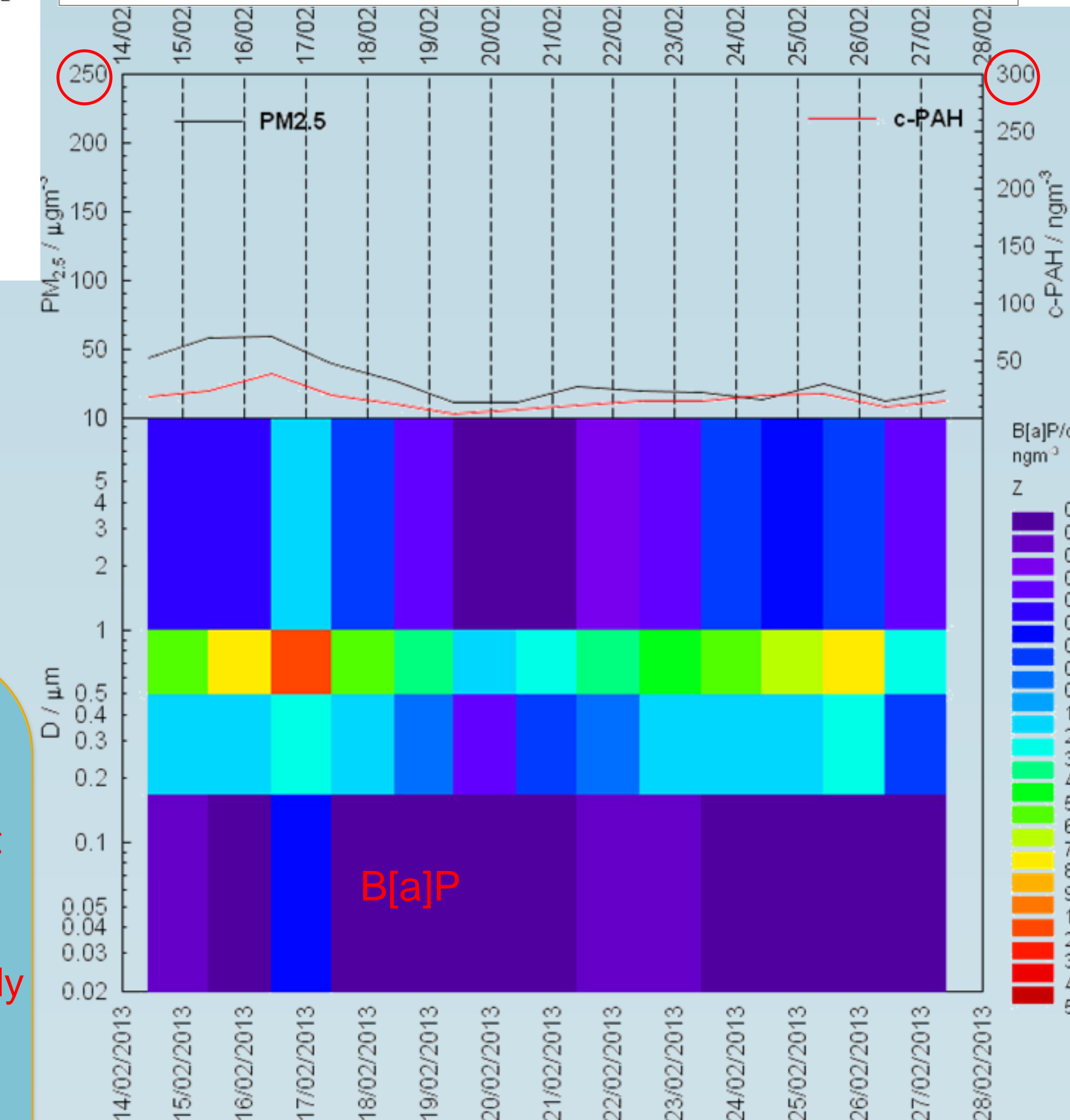
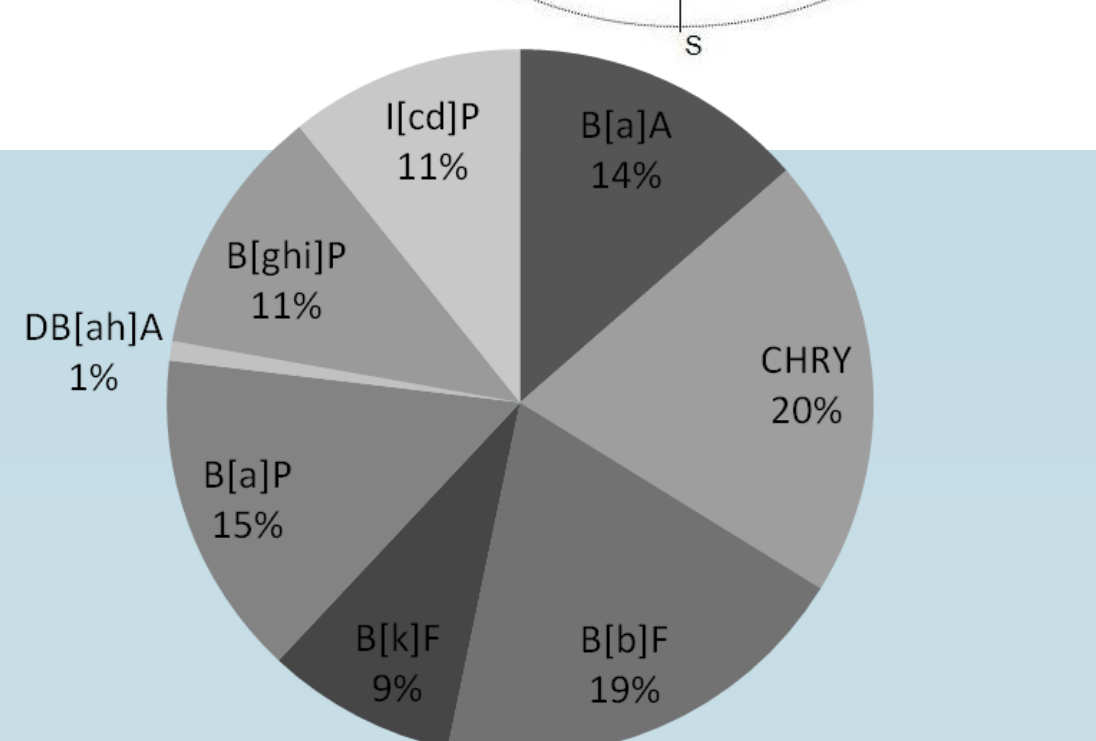
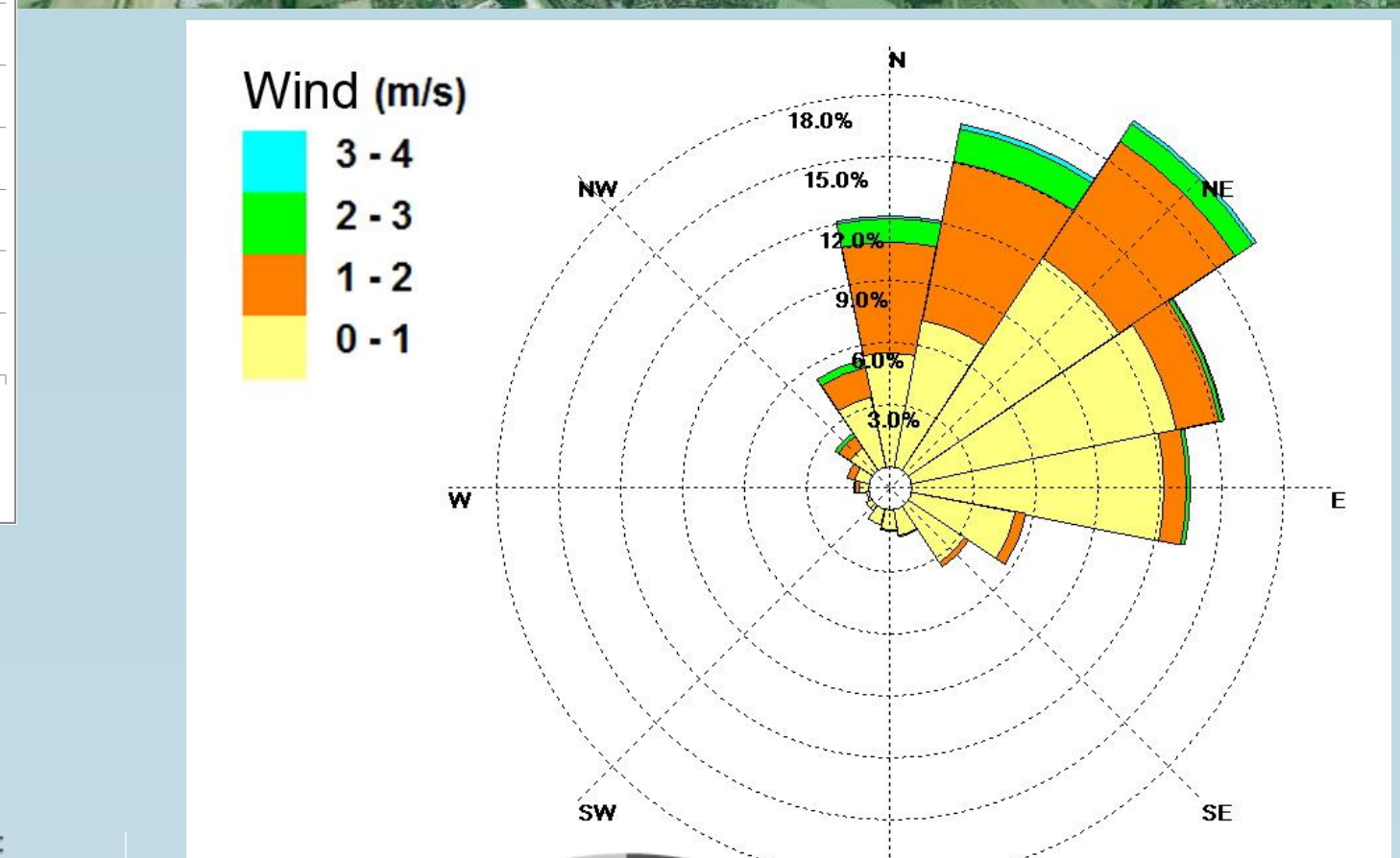
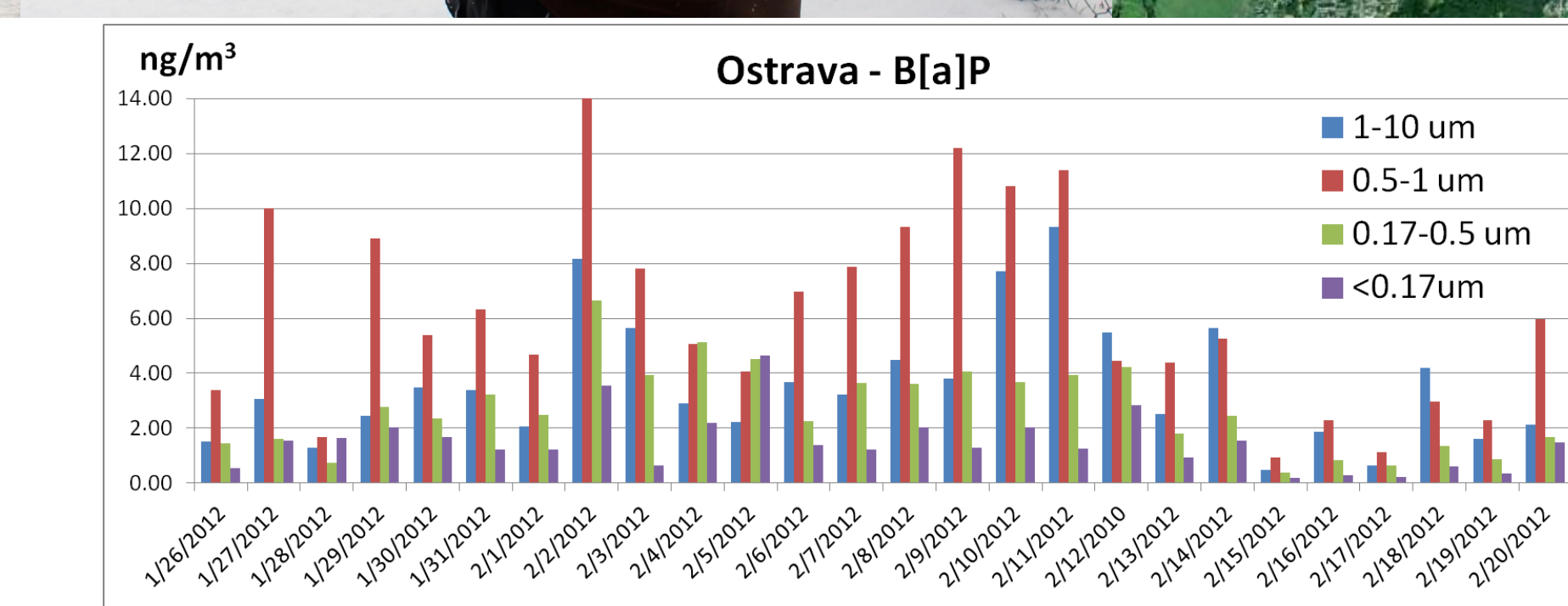
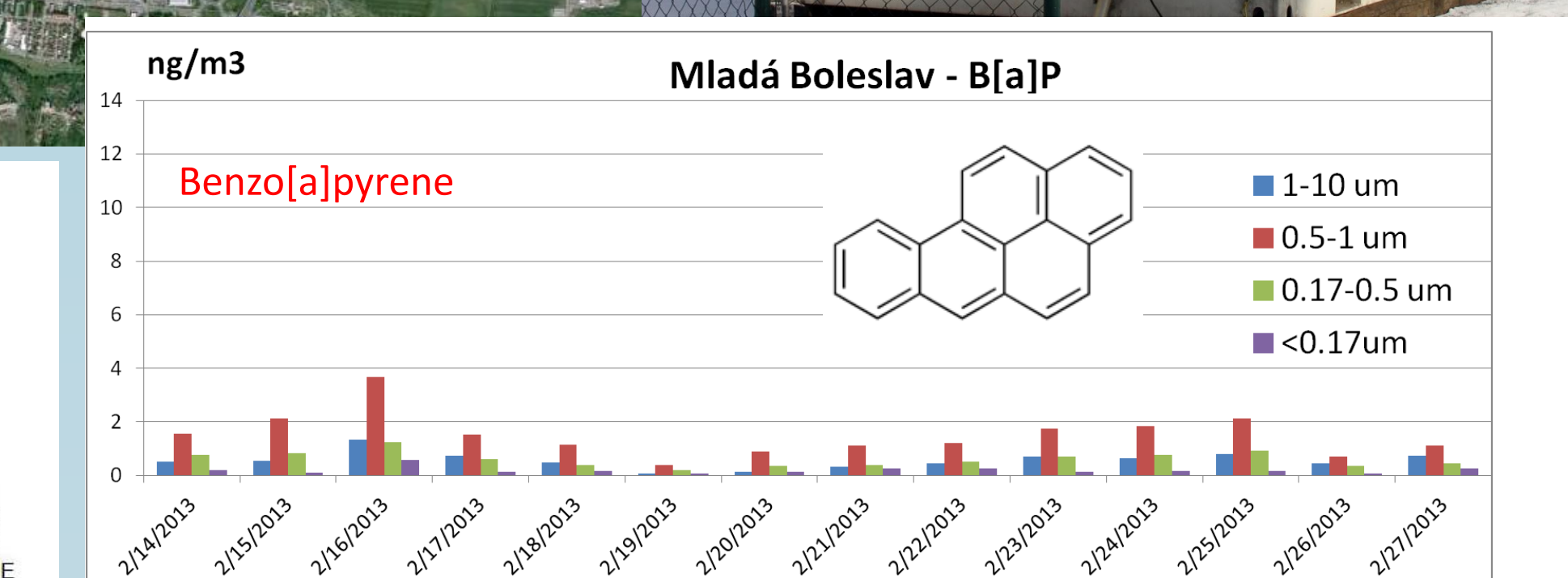
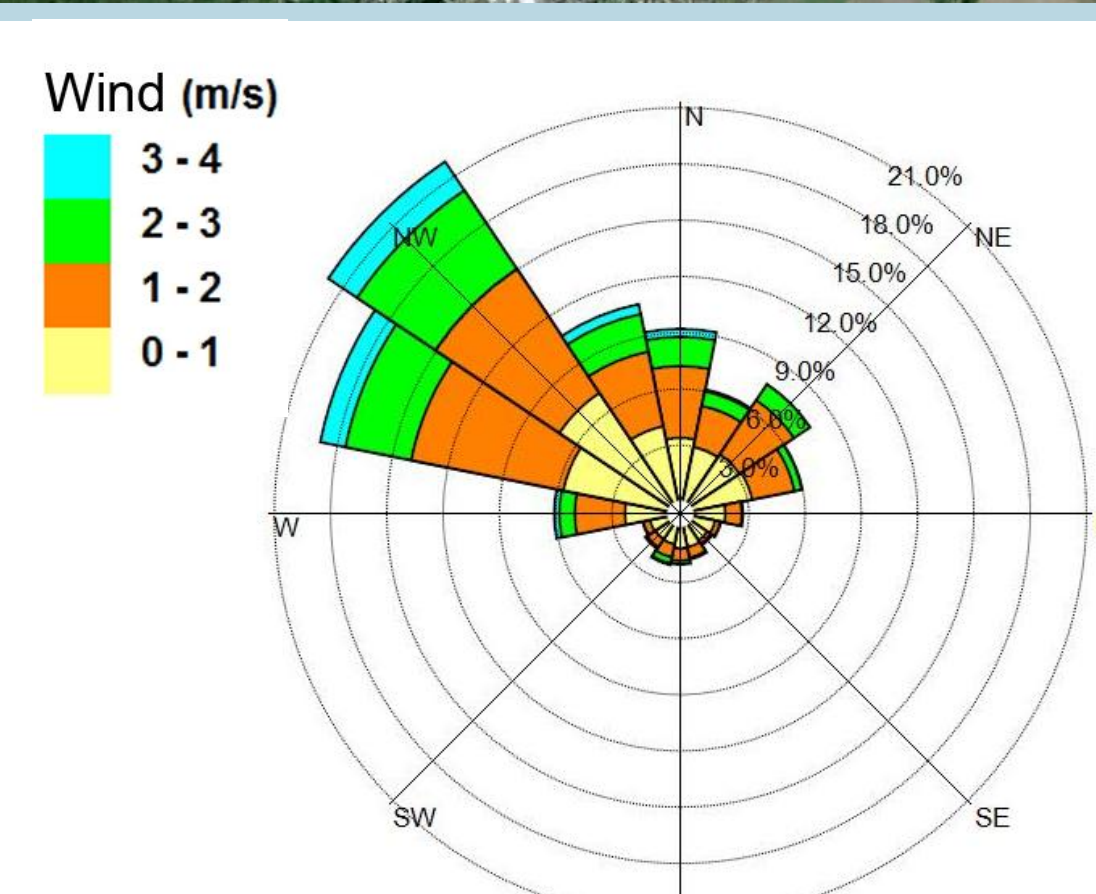
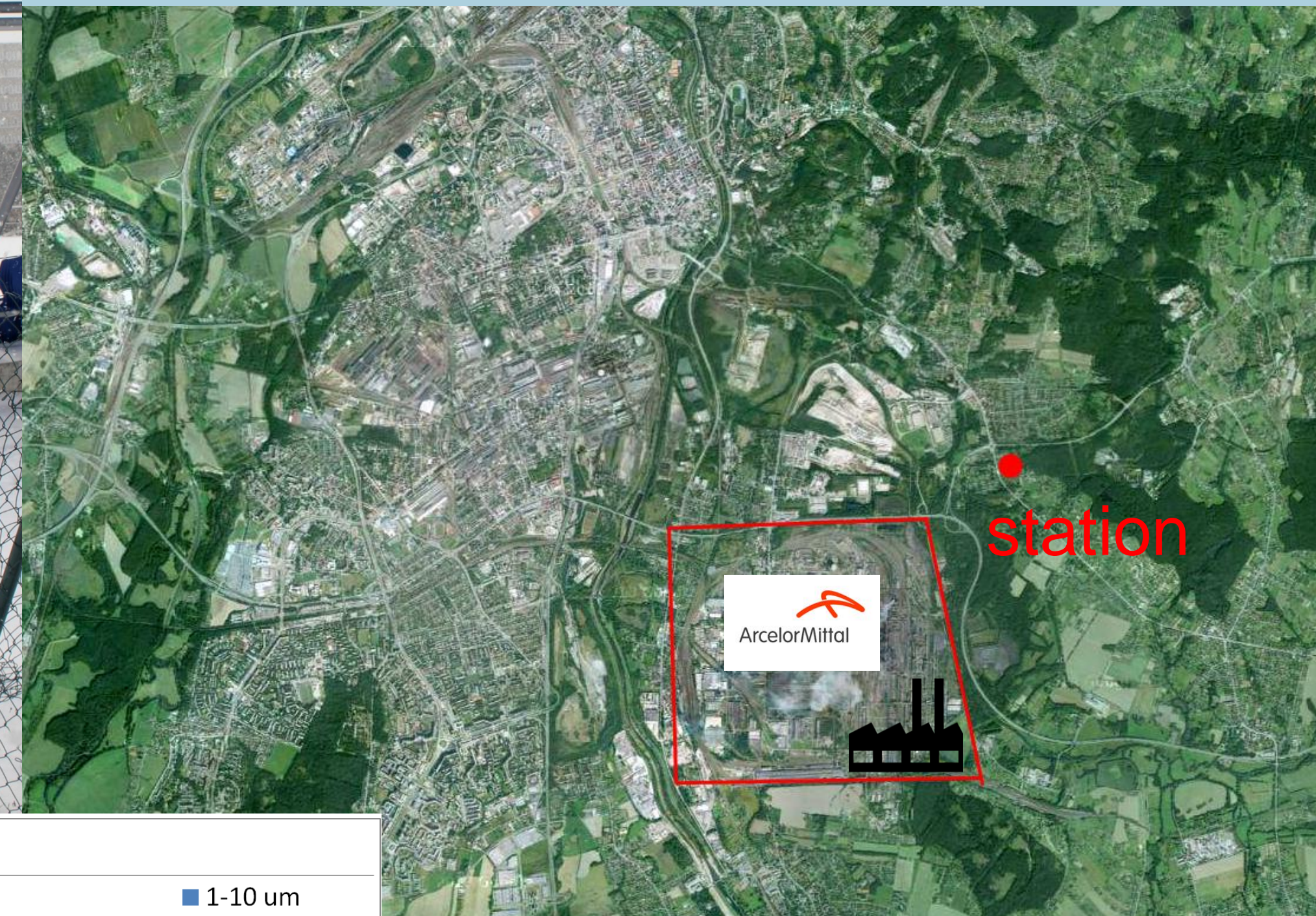
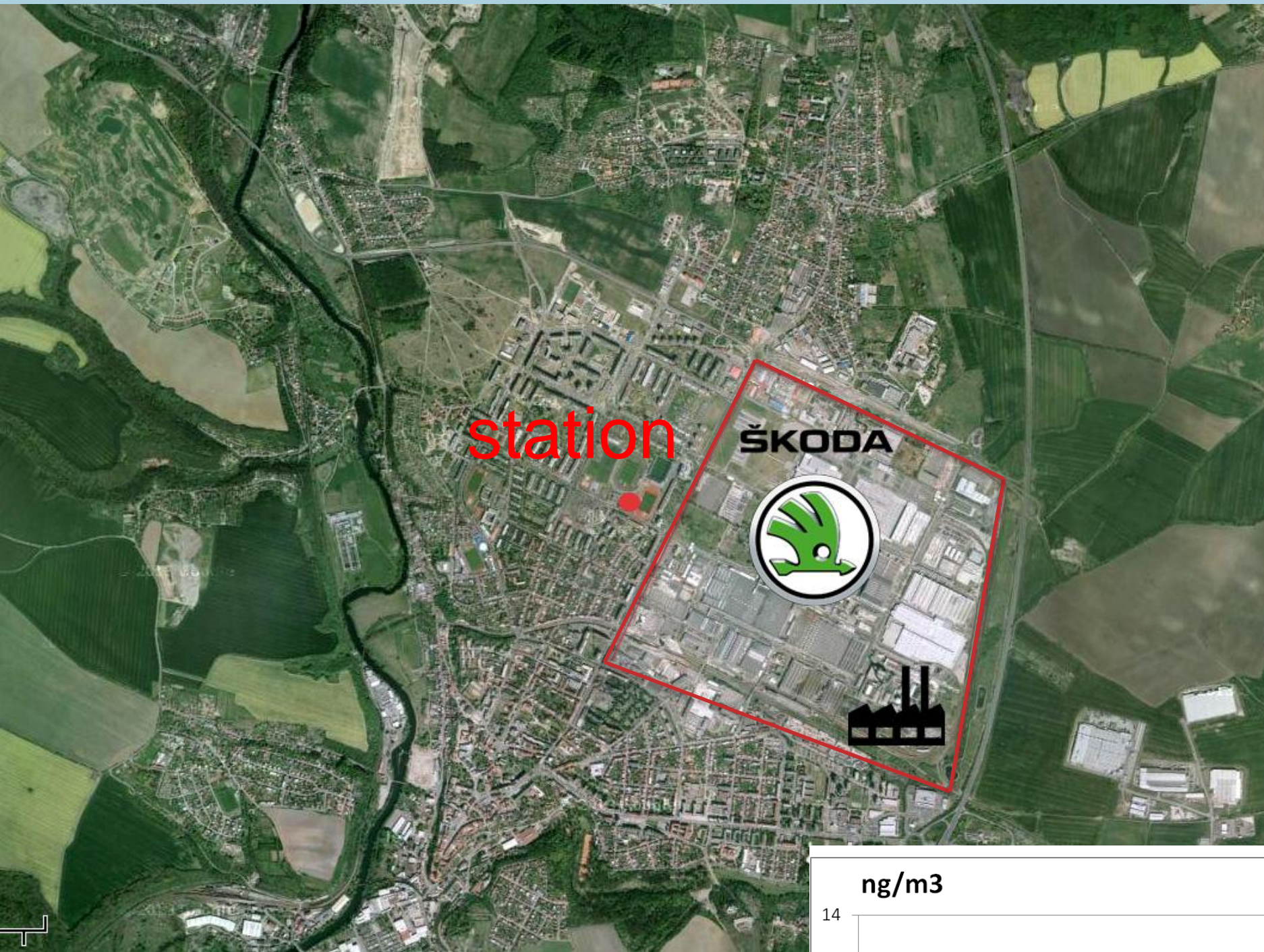
population 312 000 (3rd in CR),
urban area 214 km² (2nd in CR),

WINTER 2012



Big part of the city cover a car factory, but pollution in winter probably comes more from local heating and transportation. Situation here is less alarming than in Ostrava city.

Urban air in Ostrava city exhibits one of the **highest** polycyclic aromatic hydrocarbons **PAH concentration in the EU**. There are often inversion situations in the Ostrava basin.



Conclusions

- In both the cities:
 - B[a]P went over the WHO limit (1ng/m³) during measurements
 - The c-PAHs were predominantly enriched in 0,5 – 1 μm fraction
 - There were calm air conditions dominating during the campaigns
 - c-PAH proportionality did not change significantly with particle size
 - with exception of B[a]A proportionality of c-PAH are identical
- In Ostrava c-PAH reached alarmingly high concentrations over two orders of magnitude for B[a]P WHO limit (1 ngm⁻³)
- Ostrava possible sources: metal and coke industry, detailed source apportionment study is being conducted
- Mladá Boleslav possible sources: detailed source apportionment study is being conducted

PSA – Positive sampling artifact

Experiment with an extra PUF (polyurethan foam) substrate placed under the last ultrafilter of Hi-Vol BGI 900 was made during measurements in Ostrava and Mladá Boleslav. Significant amounts of gaseous phase of phenanthrene, anthracene, fluoranthene, pyrene and benzo[a]anthracene were captured after 24h exposition. The extent of the captured PAHs positively correlated with their individual vapor pressures - ranging from 10⁻⁴ to 10⁻¹ Pa. Other PAHs didn't exhibit the PSA. Based on this finding, correction for the capture of gaseous phase in the particle size fractions of PAHs in BGI 900 was calculated. The deduction for the captured gaseous volatile PAHs ranged from units to tens of percent of measured particle size fraction of PAHs. The ratio between solid and gaseous fraction is temperature dependent and will be applicable to future measurements.