

Estonian Environmental Research Centre

PM_x and B(a)P reduction plans from the RWC sector

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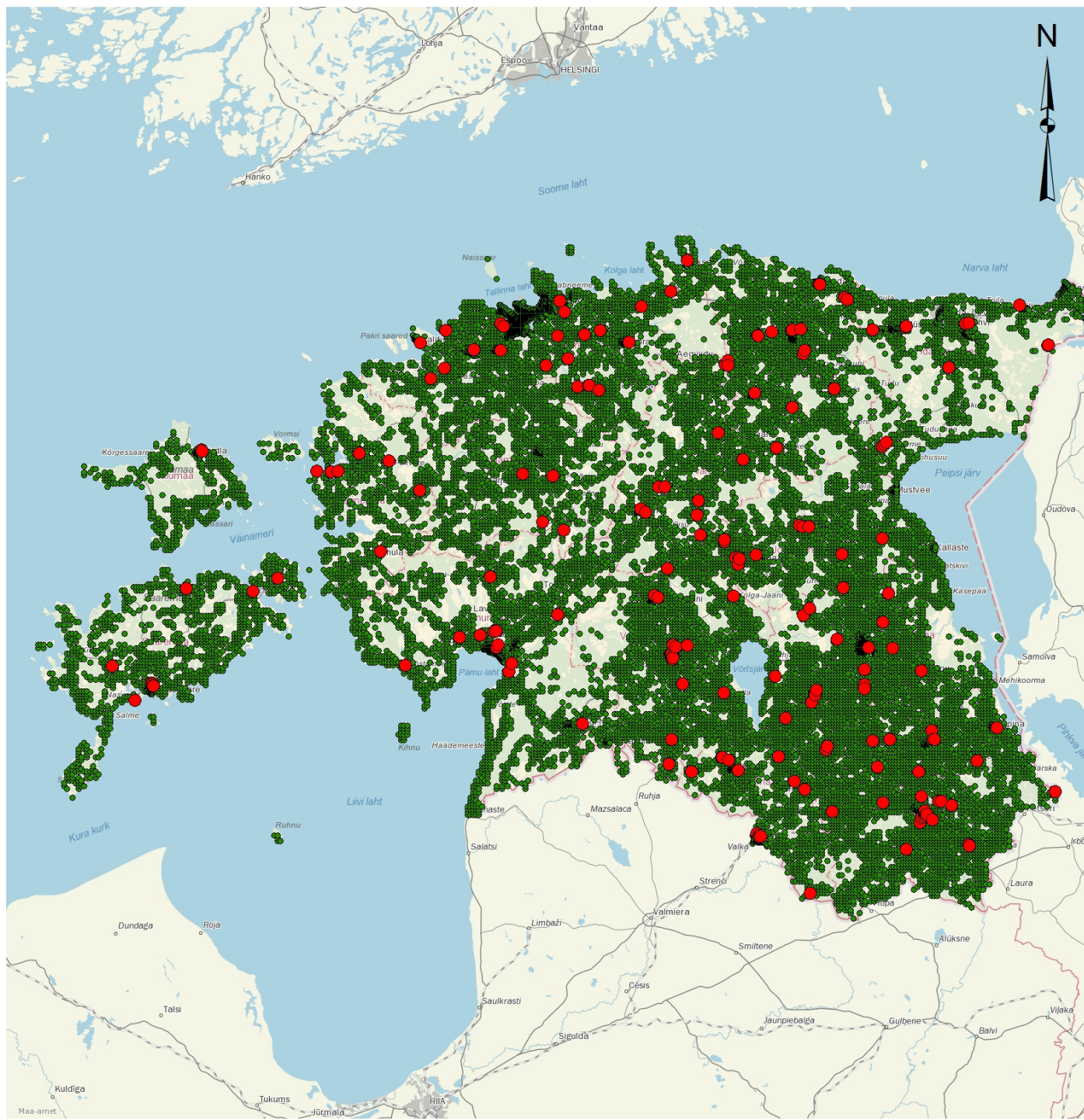
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Emissions from the RWC

- About 2/3 of total PM, POP and PAH emission in Estonia is attributed to residential wood combustion (RWC)
- In order to reduce GHG emissions the use of biomass in energy production has been favored, which in turn has led to elevated PM, POP and PAH levels from the biomass burning



PMx sources

- Industry
- RWC sources



Map compiled by:
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Estonian Land Board base card
(WMS service)

1:900,000

Emissions from the RWC

- Wood fuel
- Type
- >50
- Main type
- In a
- pac
- loc
- cor



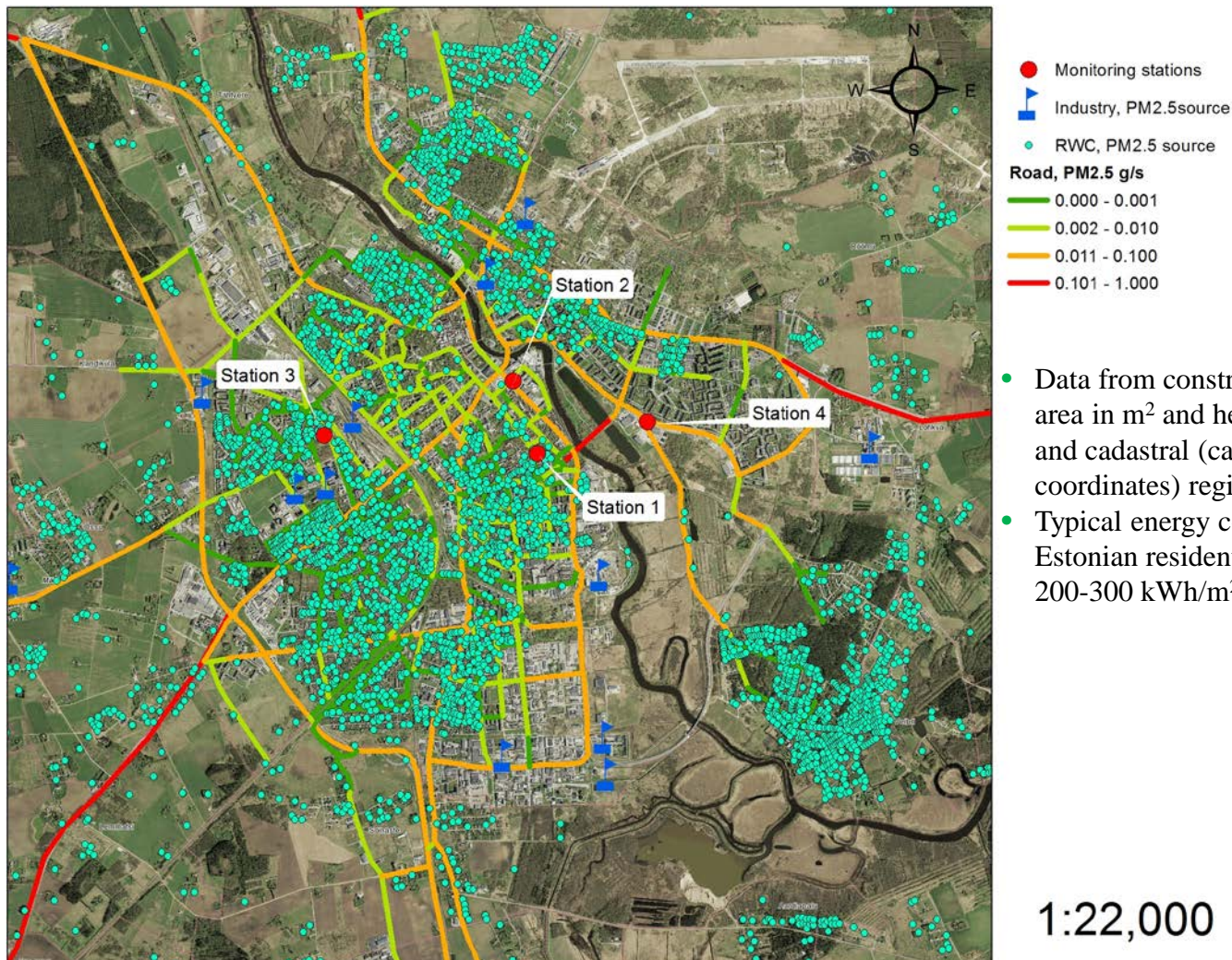
Photo by T. Blaat

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Source apportionment



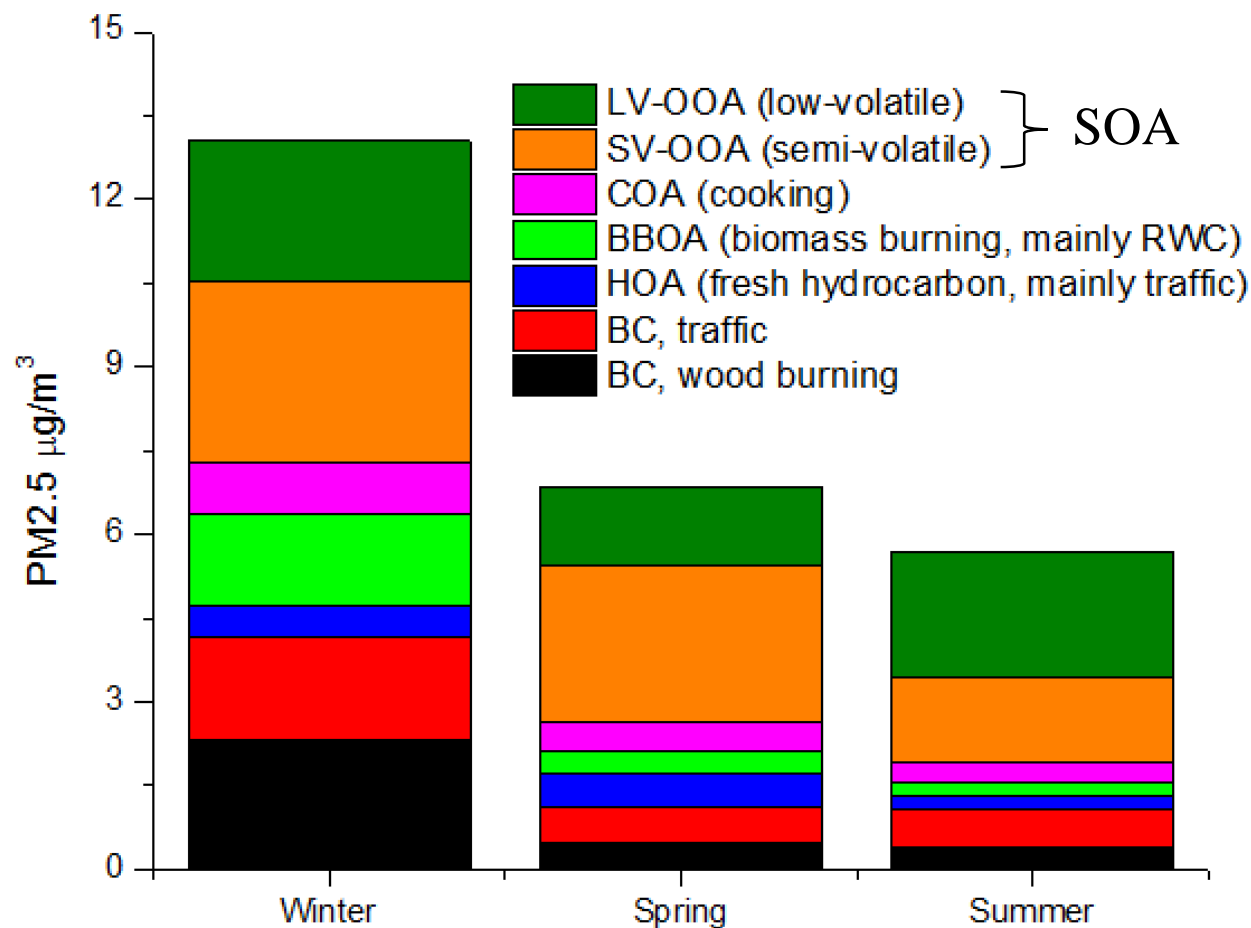
Sampling sites and main sources



- Data from construction (heated area in m² and heating system) and cadastral (cadastral coordinates) registry was used.
- Typical energy consumption in Estonian residential houses is 200-300 kWh/m²

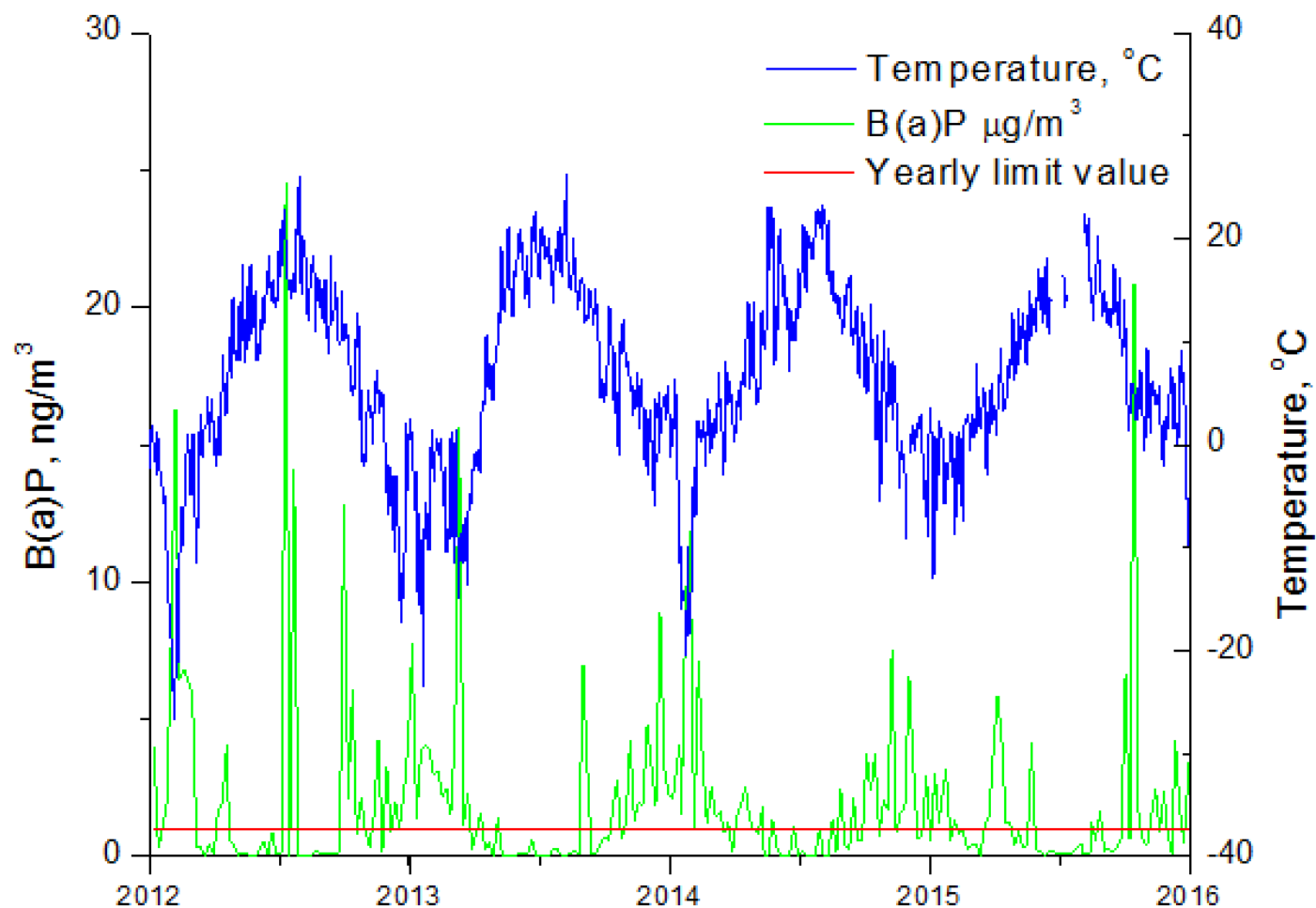
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PMF analysis using ACSM dataset

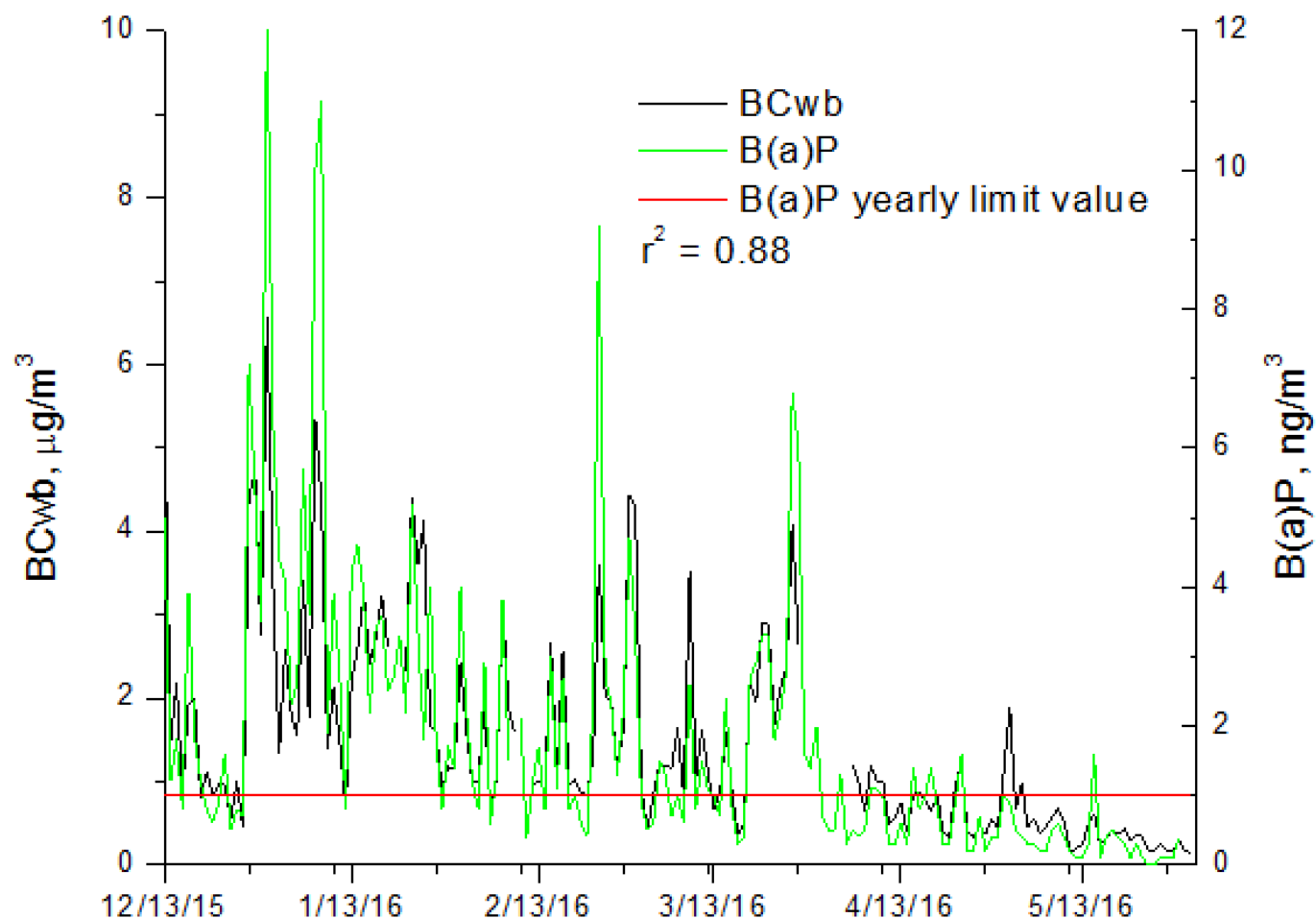


BBOA ~ 5 – 20%
SOA ~ 63 – 82%

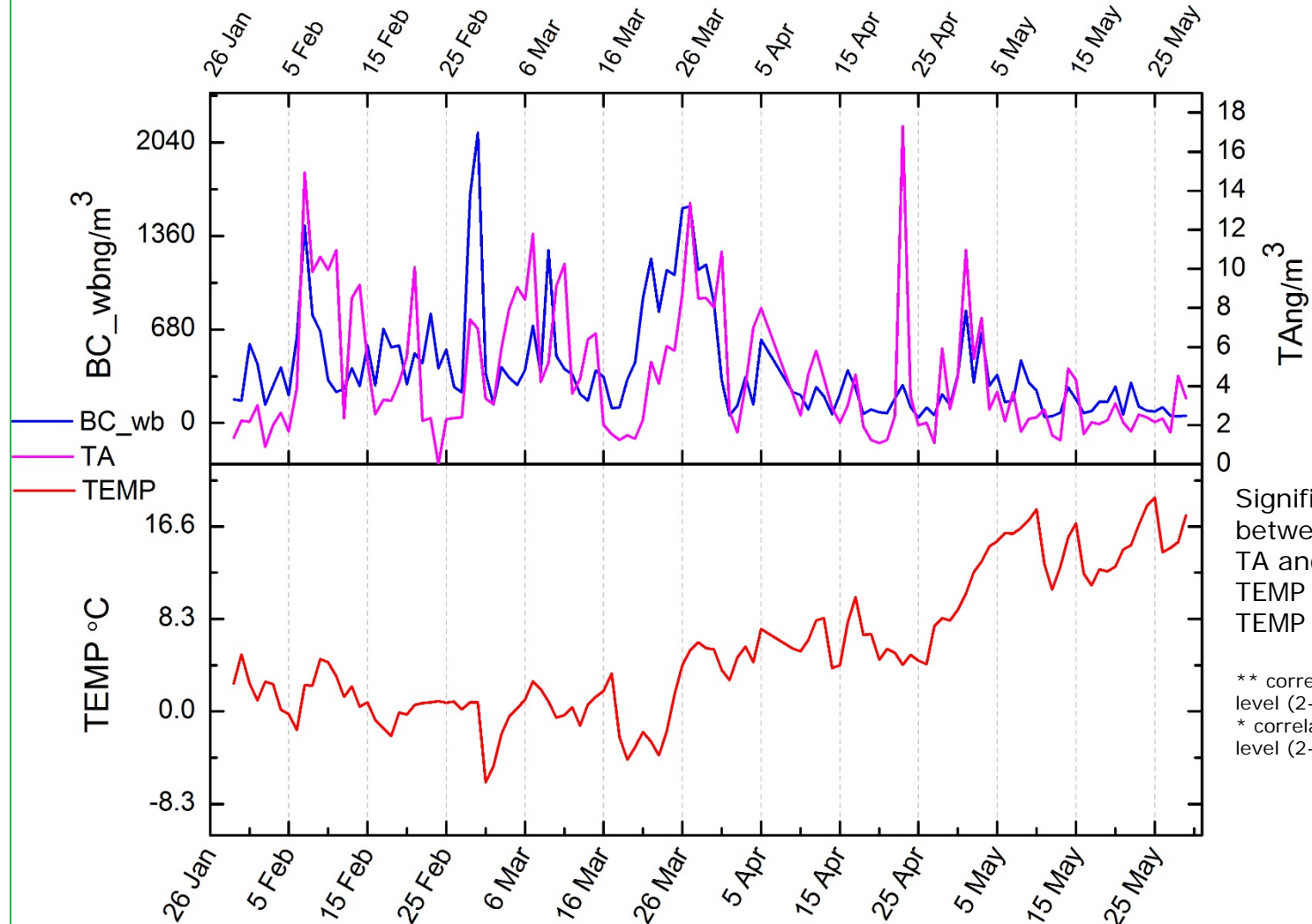
B(a)P in RWC area



B(a)P vs BC_{wb}



Plastic burning tracers



Significant correlation between:
 TA and BC_wb $R^2 = 497^{**}$
 TEMP and BC_wb $R^2 = 332^{**}$
 TEMP and TA $R^2 = 184^*$

** correlation is significant at the 0.01 level (2-tailed)
 * correlation is significant at the 0.05 level (2-tailed)

Further steps

- Action plan is currently under preparation and negotiations with local municipality are taking place
 - Lack of experience
- PM_x and B(a)P reduction from the residential sector is not an easy task
 - People are very sensitive about this topic
 - Guidance documents about the cost-effective reduction measures are missing - so far project based approach has been used

Further steps

- Emission reduction from the RWC sector can not be achieved **only** by replacing the old heaters with the new ones
 - The key factor is the end-user
 - Household insulation
- Continuous awareness raising campaigns (incl. chimney sweepers), about the proper wood usage in heaters, have to be conducted
- People like masonry heaters better than factory made heaters
 - Certification of potters and chimney sweepers according to the environmental standards?

Conclusions



- Elevated levels of PM_x and B(a)P are mainly related to the local emissions from the residential heating
 - Nevertheless the share of the regional pollution can be remarkable
- 5 main factors were identified
- So far emission reduction from the RWC sector is using project based approach – there are no established guidance documents
- Closer and coordinated co-operation with UNECE countries could take place

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Thank you for your attention!

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