

# Particle spatial distribution in suburban area Celakovice: The effect of commuter vehicle traffic.

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## Background

Celakovice is a suburban small city. Inhabitants commute daily to work to Prague by public transportation and many of them by car. This situation is typical for the most small cities and satellites around larger cities.

## The Aim

to determine the effect of traffic peaks on particle concentrations near main roads and their effect on farther dwellings.



Celakovice location

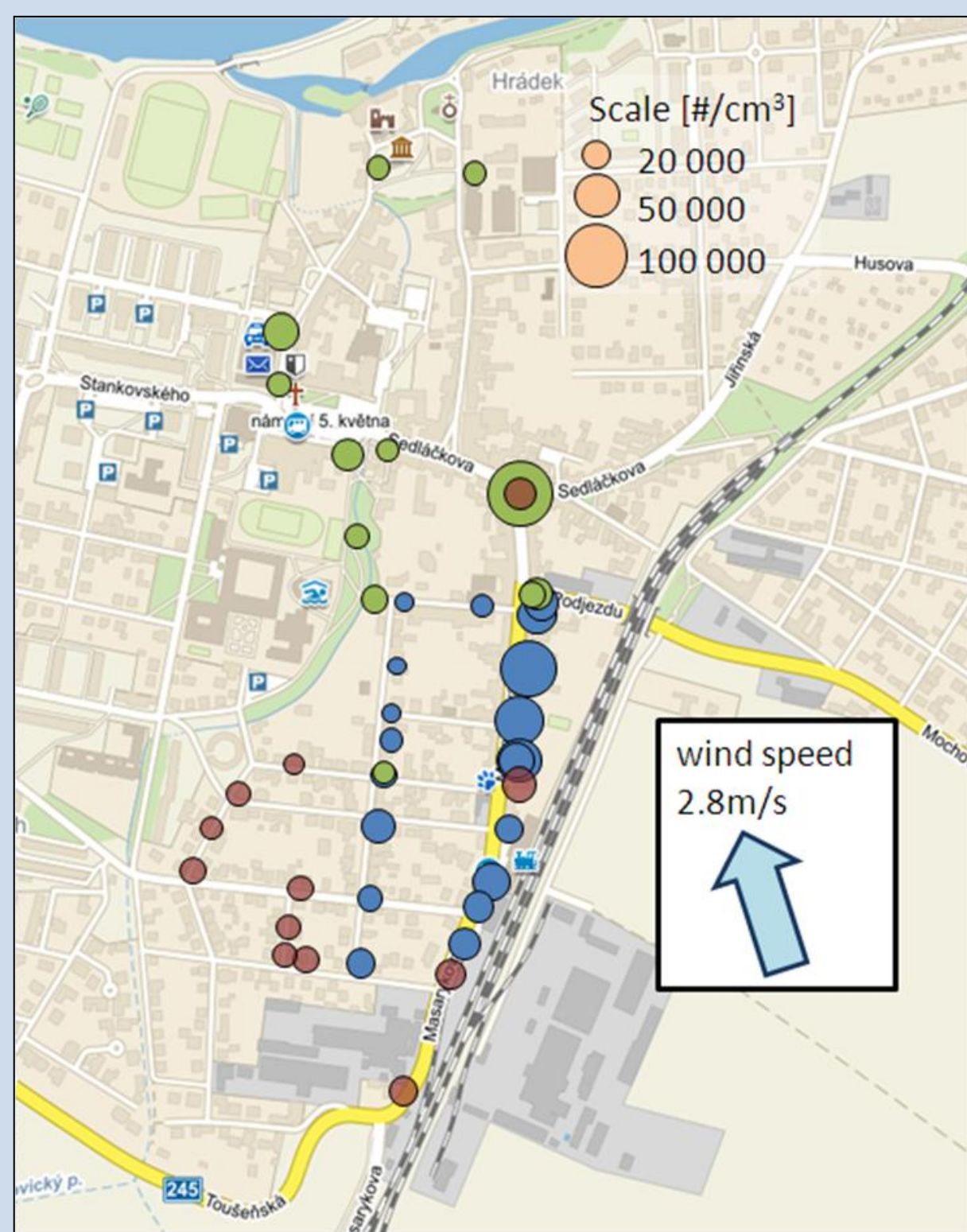


## Methods

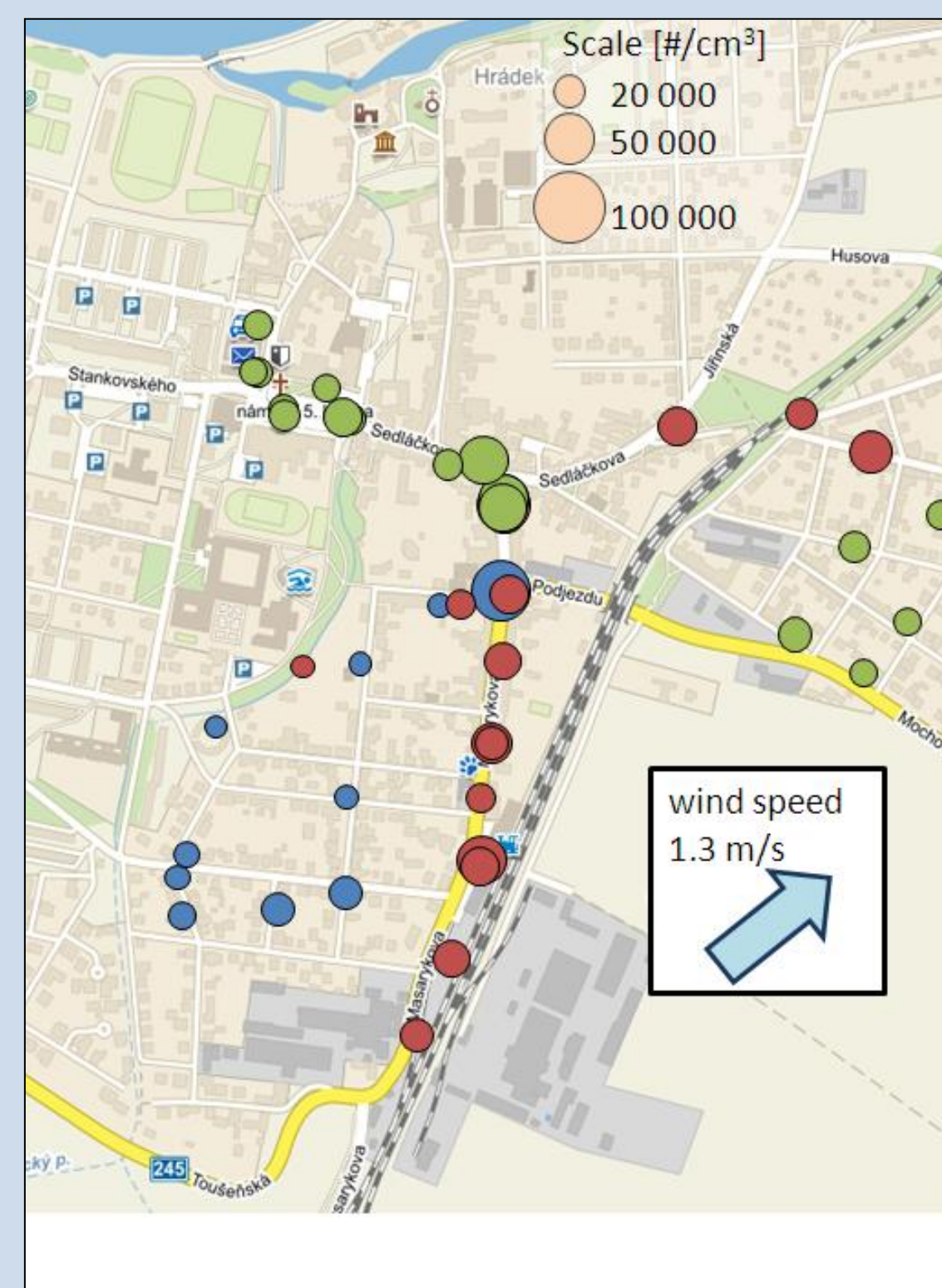
two mobile sets of instruments  
-**Particle classifier** with size-resolved measurements of particles in the 5 - 500nm (EEPS, TSI), bateries, GPS, and other accessories

One set includes additionally  
-**Condensation particle counter** (UF - CPC 200 Palas) counts particles from 5nm to 10µm

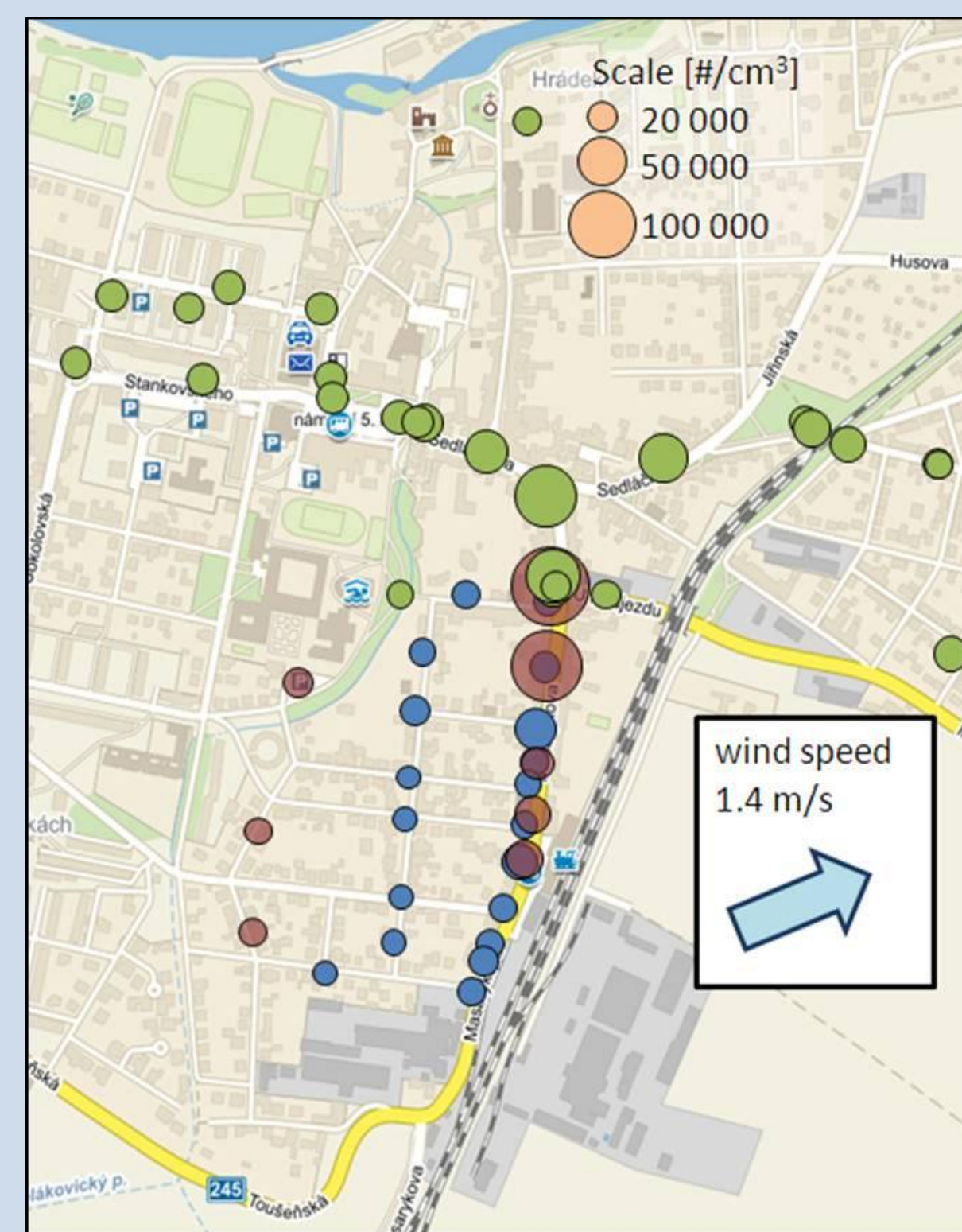
Traffic peaks	
Road	150m far from road
$2 \times 10^4 \text{ \#/cm}^3$ with peaks around $4 \times 10^4 \text{ \#/cm}^3$	$1.5 \times 10^4 \text{ \#/cm}^3$
After traffic peaks	
Up to 10:00 AM $1.5\text{-}2 \times 10^4 \text{ \#/cm}^3$	
After 10:00 concentrations gradually decreased to a concentration about $10^4 \text{ \#/cm}^3$ at midday (3 <sup>rd</sup> February), and $7 \times 10^3 \text{ \#/cm}^3$ (30 <sup>th</sup> January)	



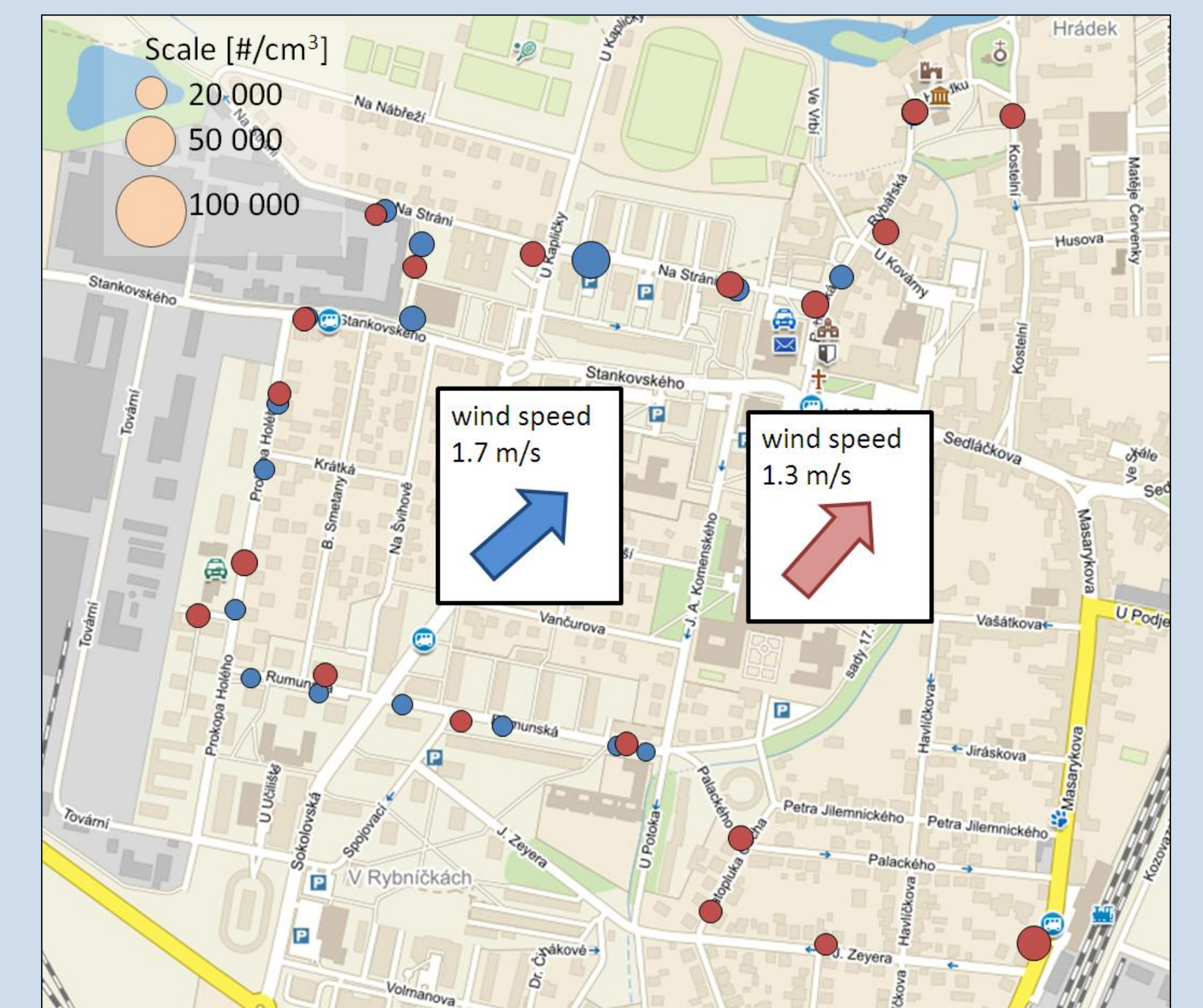
Particle number concentrations 30<sup>th</sup> January; simultaneous measurement at 7:30-8:00; 8:00-8:20; 8:20-9:00



Particle number concentrations 3<sup>rd</sup> February; simultaneous measurement at 6:45-7:20; 7:20-7:35; 7:35-9:00

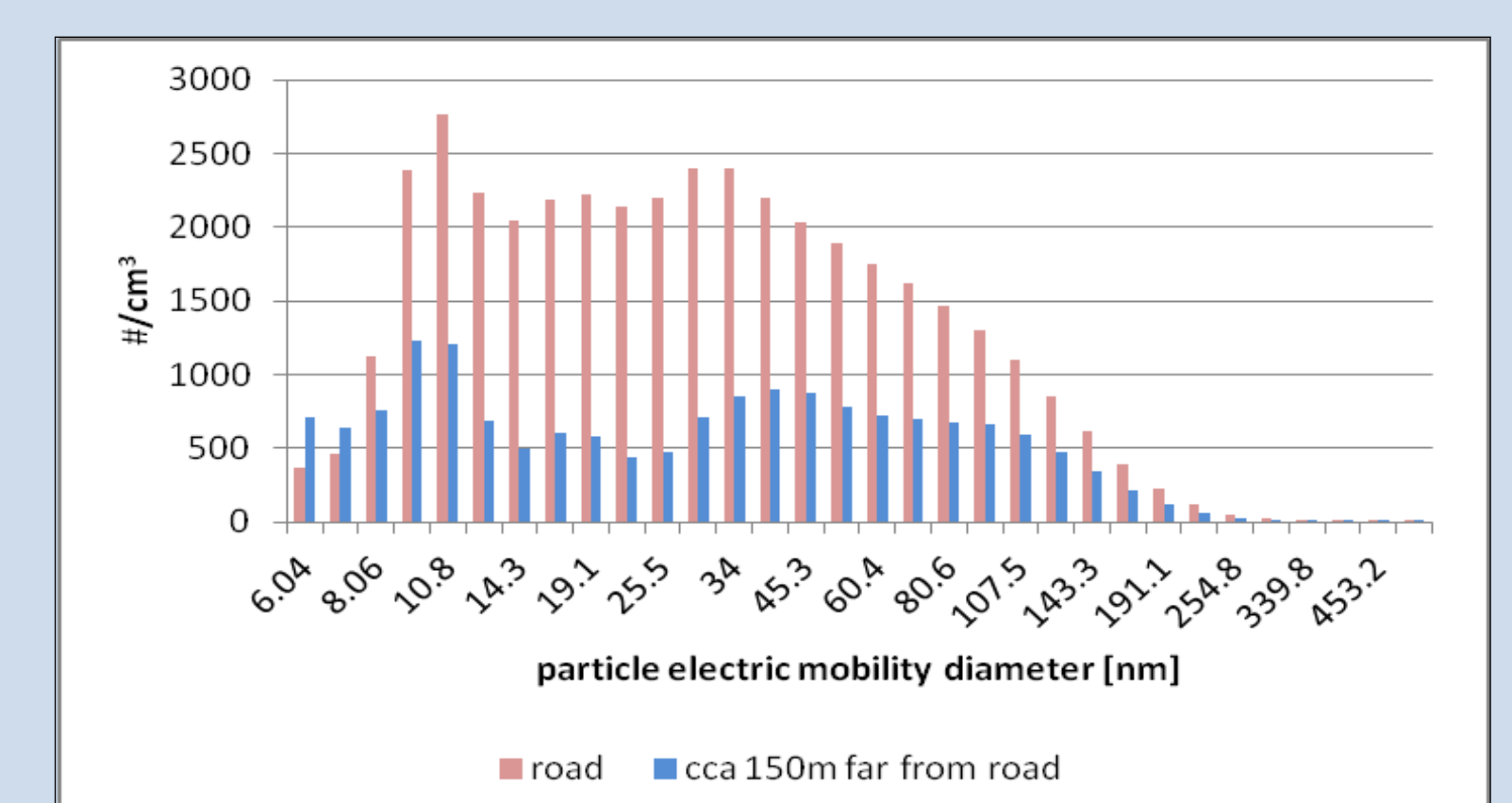
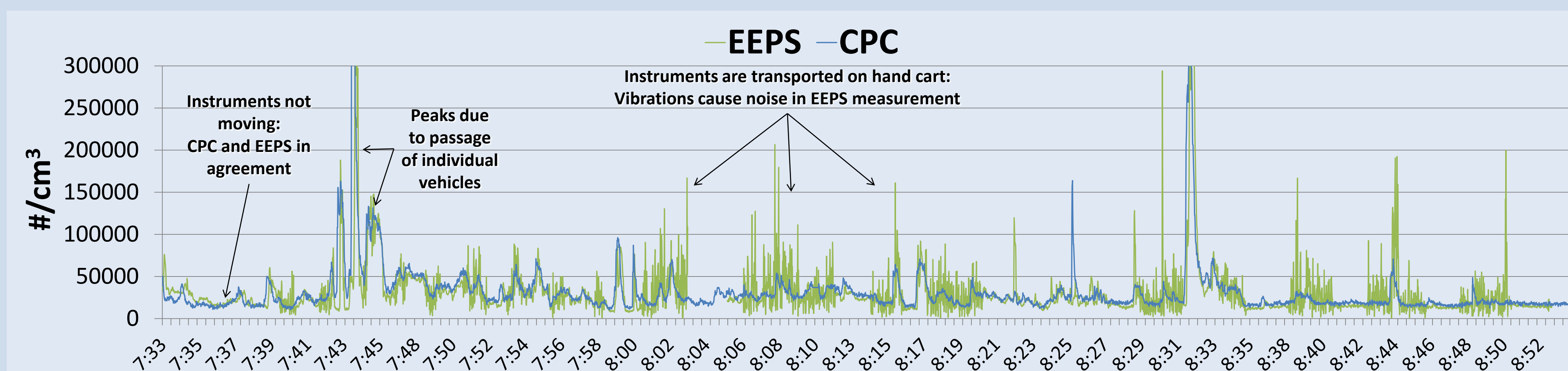


Particle number concentrations 3<sup>rd</sup> February; simultaneous measurement at 16:10-17:15; 17:15-17:50; 17:50-18:30



Particle number concentrations measured after traffic peaks on 30<sup>th</sup> January and 3<sup>rd</sup> February

EEPS measurement affected by vibrations during instrument movement; data are reliable only during stops, where EEPS total concentrations (5-560 nm) are in agreement with the UF-CPC (> 5 nm).



Averaged particle number distributions during simultaneous measurement by two instrument sets, one near the main road, the second cca 150m far from the road (30<sup>th</sup> January, 7:30-8:00).

## Conclusions

- Concentrations along main road were elevated in comparison with places at least 150m far from the road; however, the difference was relatively small.
- Concentration between morning and afternoon traffic peaks ( $7 \times 10^3$  to  $1.5 \times 10^4 \text{ \#/cm}^3$ ) was elevated in comparison with Prague background concentration,  $7.3 \times 10^3 \text{ \#/cm}^3$
- Although concentrations followed daily pattern corresponding to traffic intensity, the main road did not seem to be the main source of measured particles in areas 150 m from the road.

