

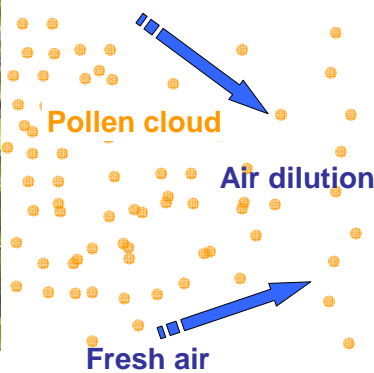
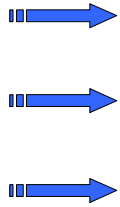
# EXPERIMENTAL AND MATHEMATICAL EVALUATION OF AIR THRESHOLD VELOCITY OF POLLINATION FOR SELECTED AEROALLERGENS



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## Wind blow



## Pollen deposition in urban areas

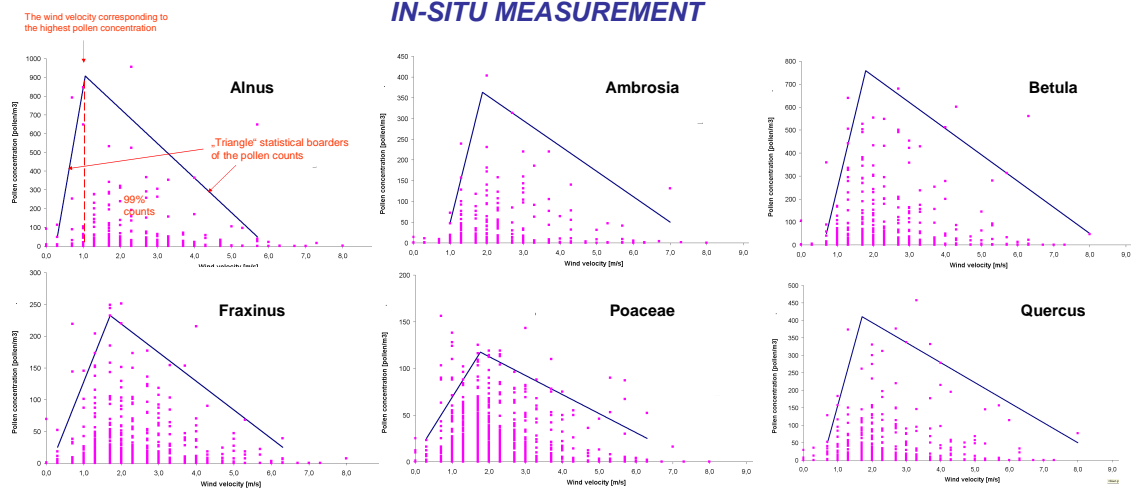


Receptor concentration

## THE RELATION BETWEEN WIND VELOCITY AND POLLEN CONCENTRATION IN CITY CANOPY LAYER

### DATA SOURCE

- LOCATION - The center of the city of Brno (pop. 400 000).
- TIME PERIOD – from 1998 to 2008
- 24 hours pollen counts and 24 hour average of meteorological conditions.
- EVALUATED SPECIES – Alnus, Ambrosia, Artemis, Betula, Corylus, Fraxinus, Poaceae, Quercus.
- Wind velocity measured 10 m above the ground surface.



## INFLUENCE OF VERTICAL DISTRIBUTION OF POLLEN GRAINS ON SPACE DISPERSION

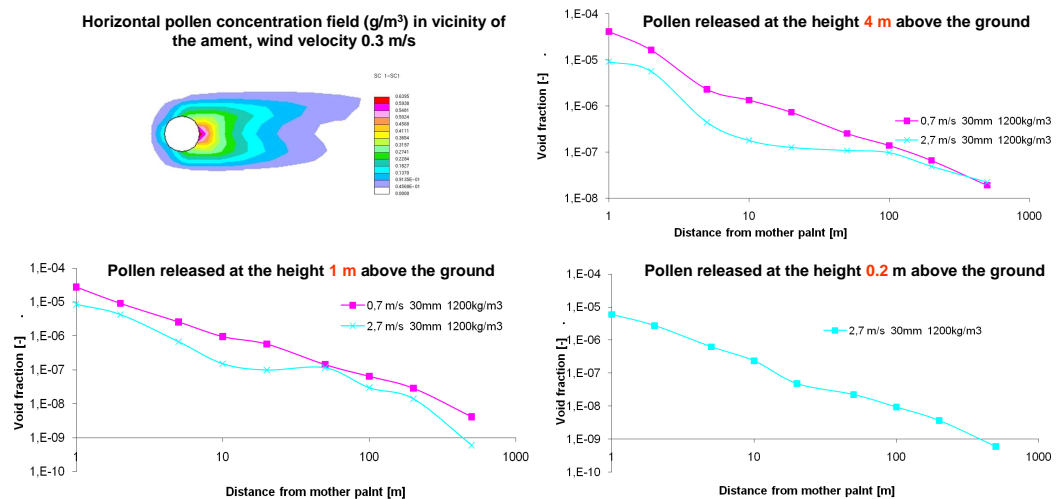
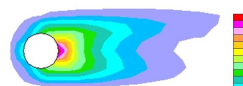
### MODEL DESCRIPTION

The parametrical study was focused on dispersion of pollens released in different heights above the ground. The different heights correspond to the different kind of vegetation, namely trees (releasing height 4 m), bushes (releasing height 1 m) and grassed (releasing height 0,2 m).

The spherical pollen grains were considered with diameter 30mm and pollen density 1200 kg/m<sup>3</sup>. The Lagrangian approach was used with detail description of the interaction between the pollen grains and an ambient air.

### CFD MODELLING

Horizontal pollen concentration field (g/m<sup>3</sup>) in vicinity of the ament, wind velocity 0.3 m/s



### Acknowledgement

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### CONCLUSION

- The wind velocity directly influences the pollen release rate from mother plant and subsequently transport of pollen grains.
- Clear evidence of the wind threshold velocity of pollination appears in the carried out graphical expression of in-situ measurement.
- The "triangle" trend was confirmed for majority of considered species.
- The study confirmed significant influence of the wind velocity on the air pollen concentration. The now-a-day's pollen season prediction models can be effectively improved by inclusion of the wind velocity monitoring and the wind velocity prediction.