



Session 6

Remote sensing and alternative techniques of phenology monitoring

# Using phenology and aerobiology to evaluate the allergy risk in urban parks

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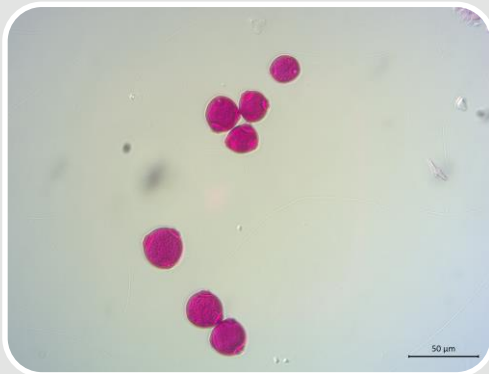
Professur  
Physische Geographie/  
Landschaftsökologie und nachhaltige  
Ökosystementwicklung

**BAYSIOS**

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- Ecosystem services by urban green spaces (climate regulation, air quality improvement, recreation etc.)
- “disservices” in case of allergy-affected people
- Increasing need for allergy-friendly urban planning

How to evaluate the allergy risk of parks?



Aerobiology



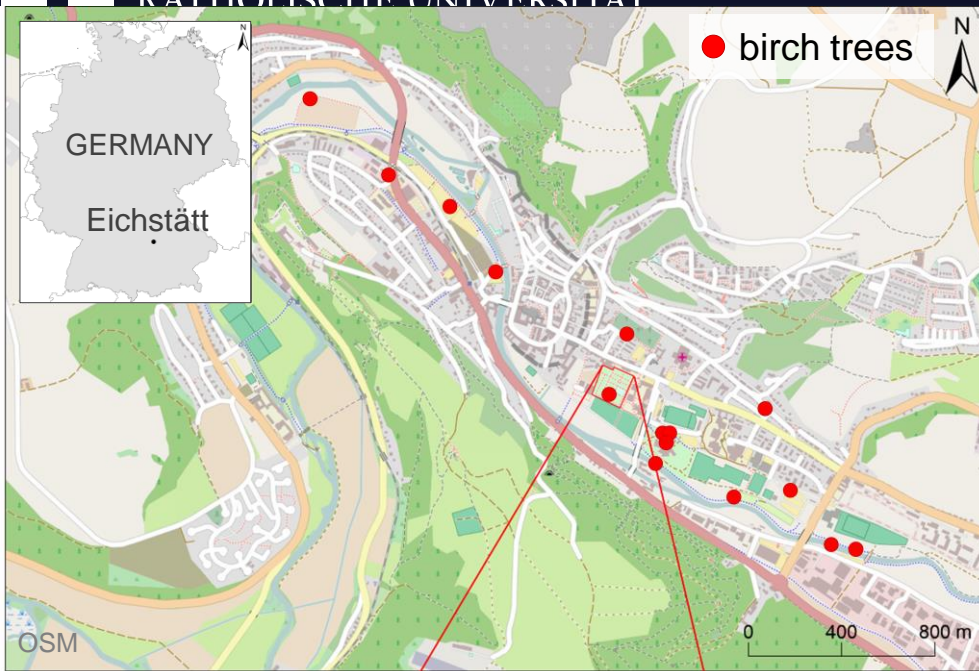
Phenology

IUGZA  
Cariñanos et. al. 2014

IISA  
Jochner-Oette et al. 2018

Allergenicity  
Index

# Study site and Methods



## Phenological survey

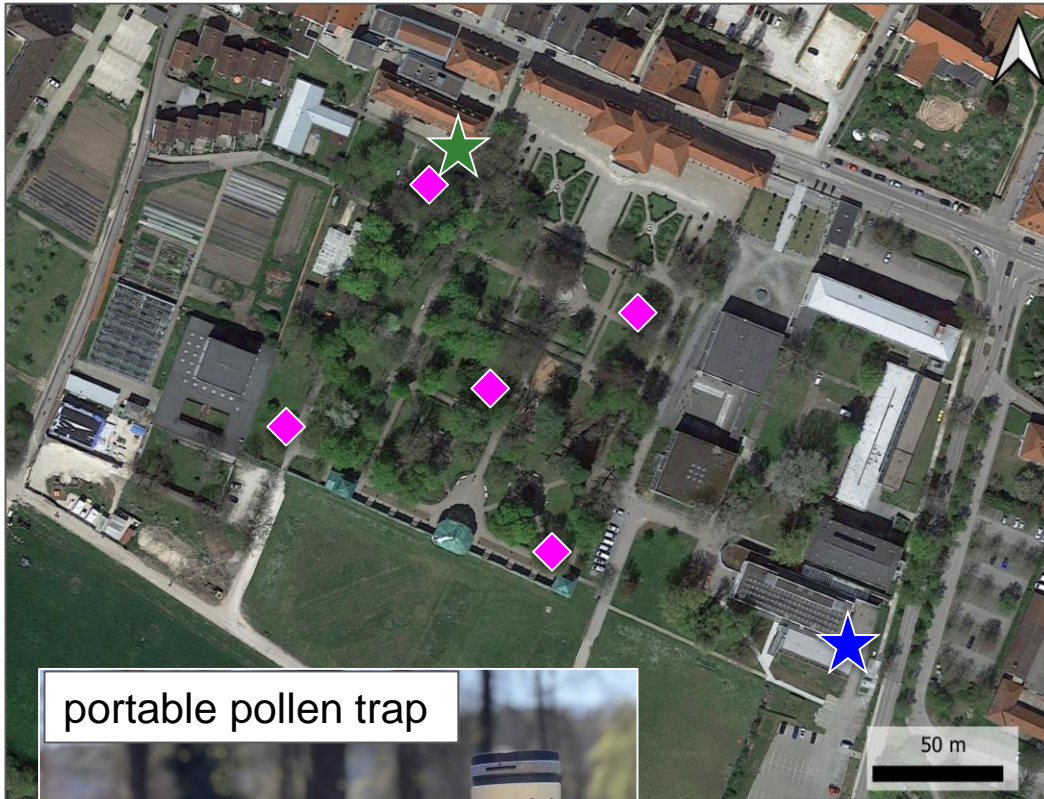
15 trees *Betula pendula* ROTH

- observation every three to four days
- from 21 March to 11 May
- BBCH code





## Aerobiological monitoring and sampling campaign



portable pollen trap



11 days



volumetric traps (7-day)

40 days

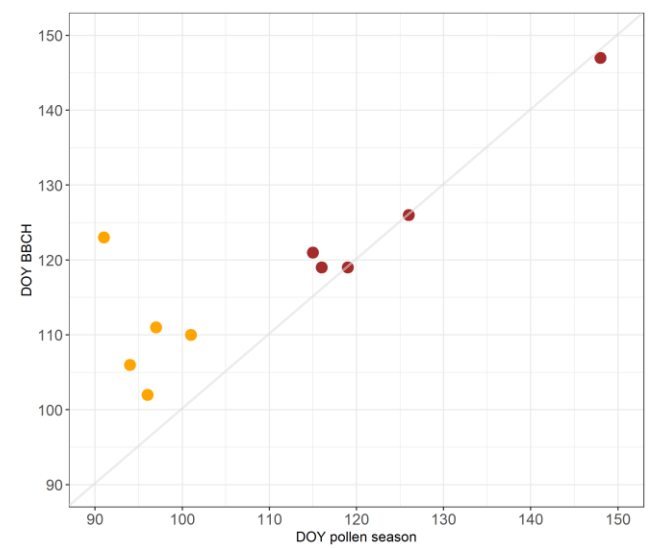
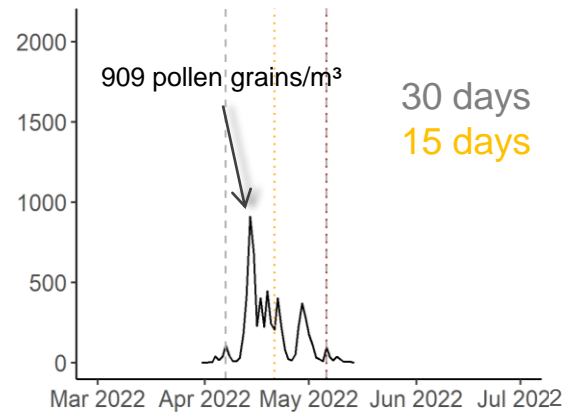
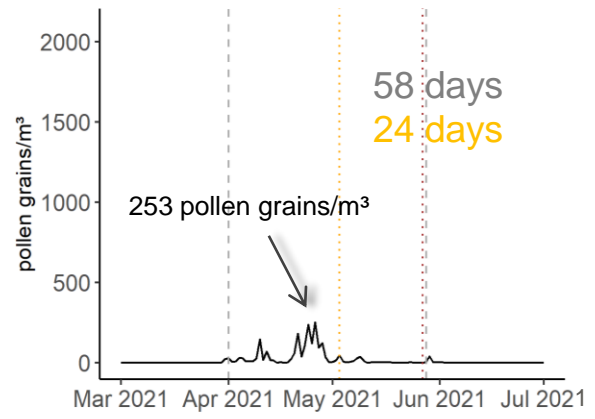
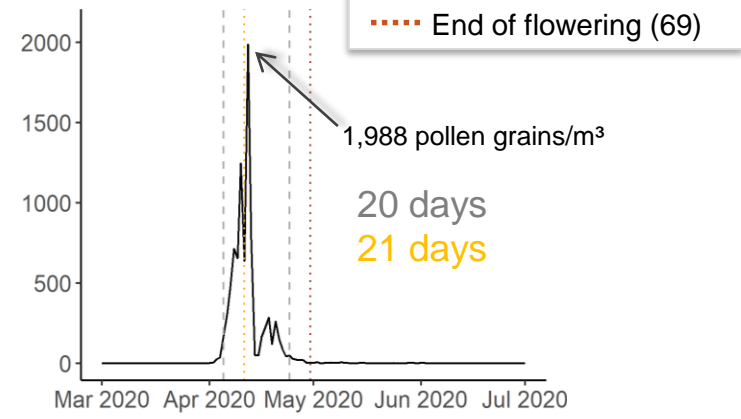
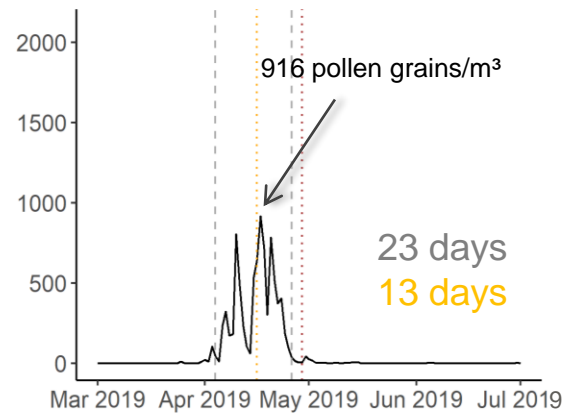
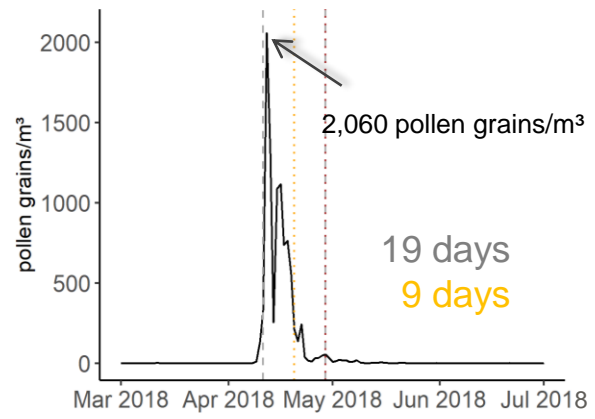
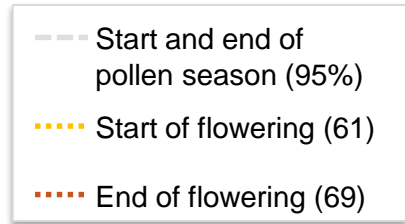
park trap



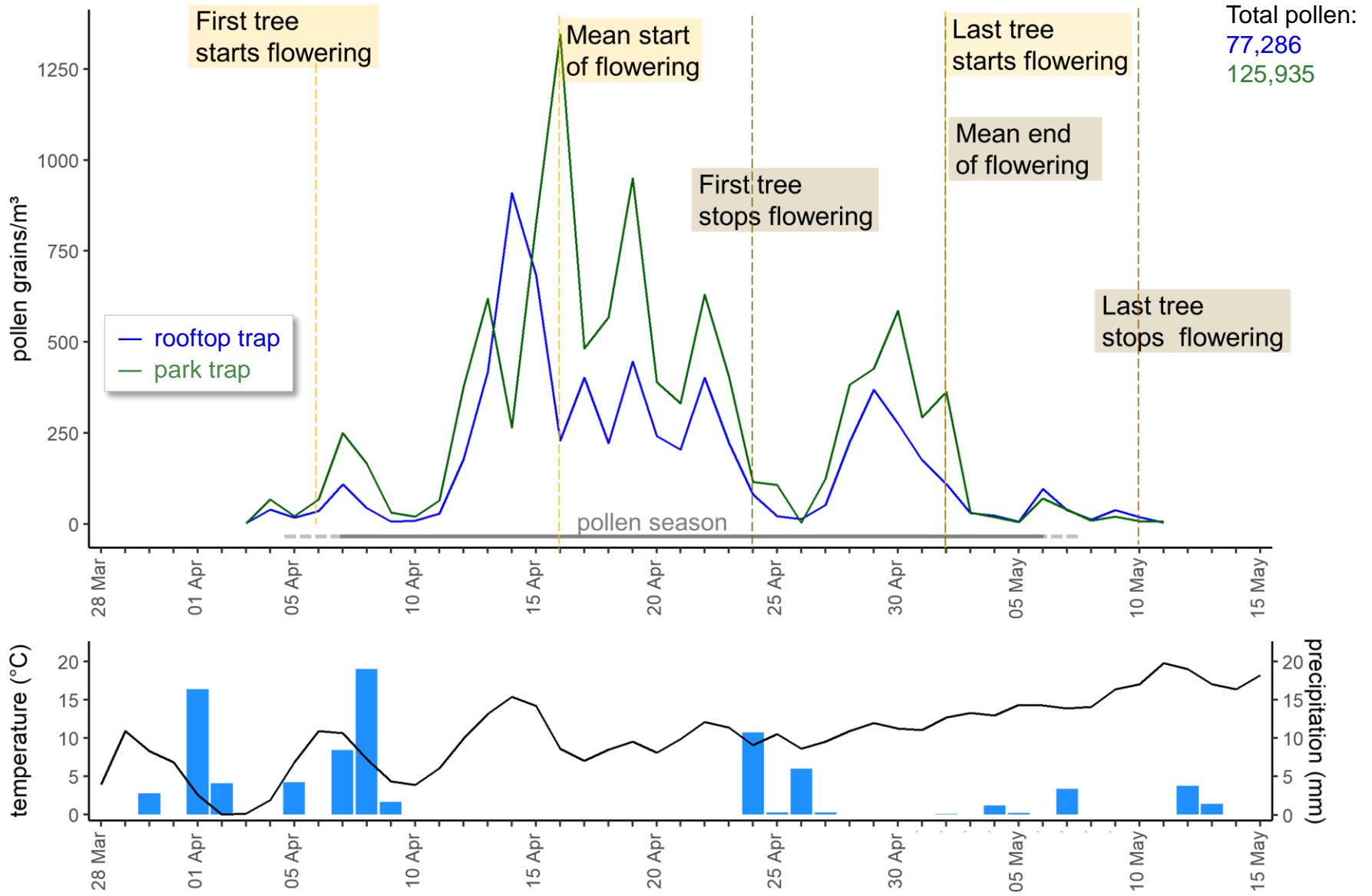
rooftop trap since 2017



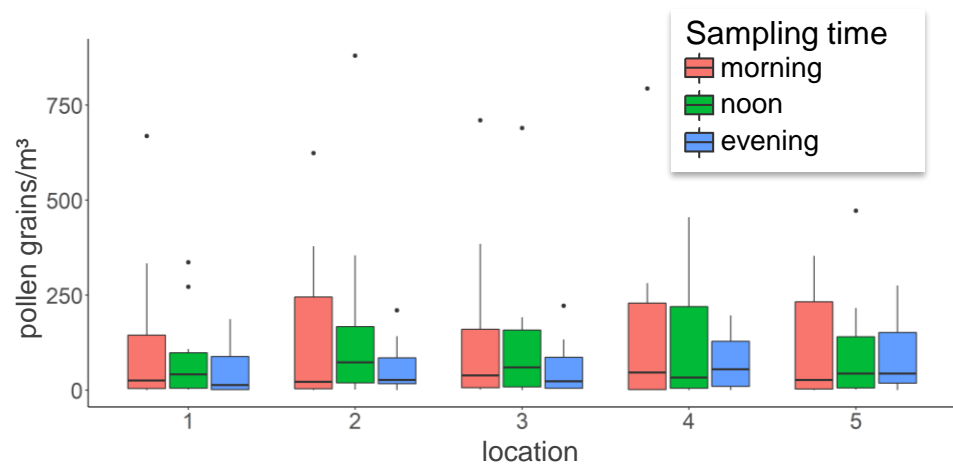
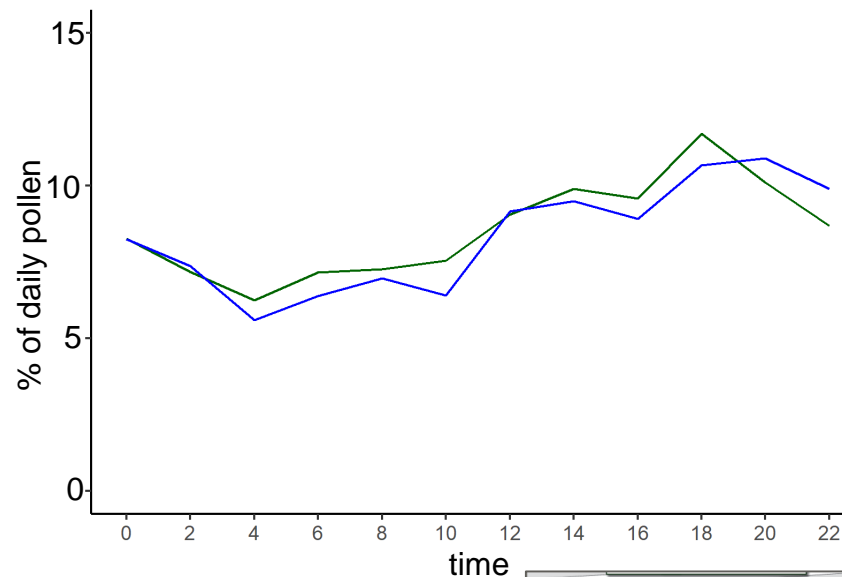
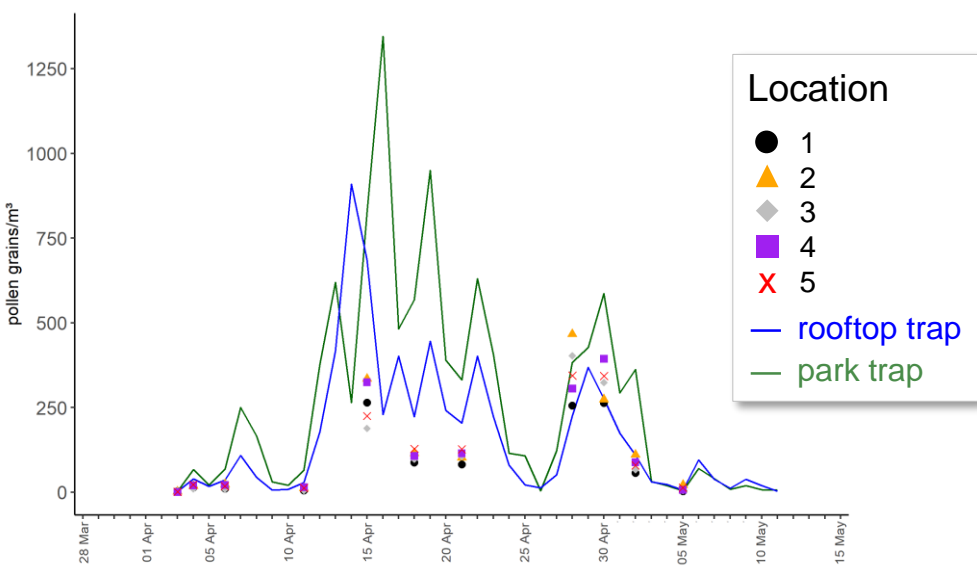
## 2018 to 2022: Pollen seasons and flowering of *Betula*



*Betula* pollen season and phenology 2022

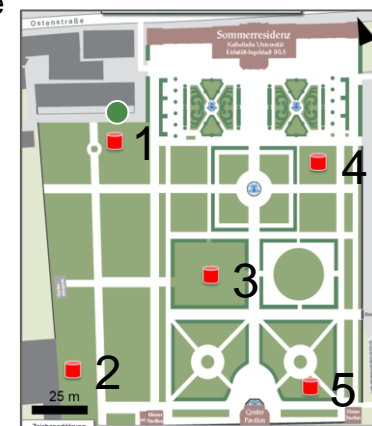


# Sampling campaign 2022: Temporal and spatial variations



	sampling time		
	morning	noon	evening
<b>Mean</b>	144	123	69
<b>Max</b>	793	880	275
<b>N</b>	55	55	45

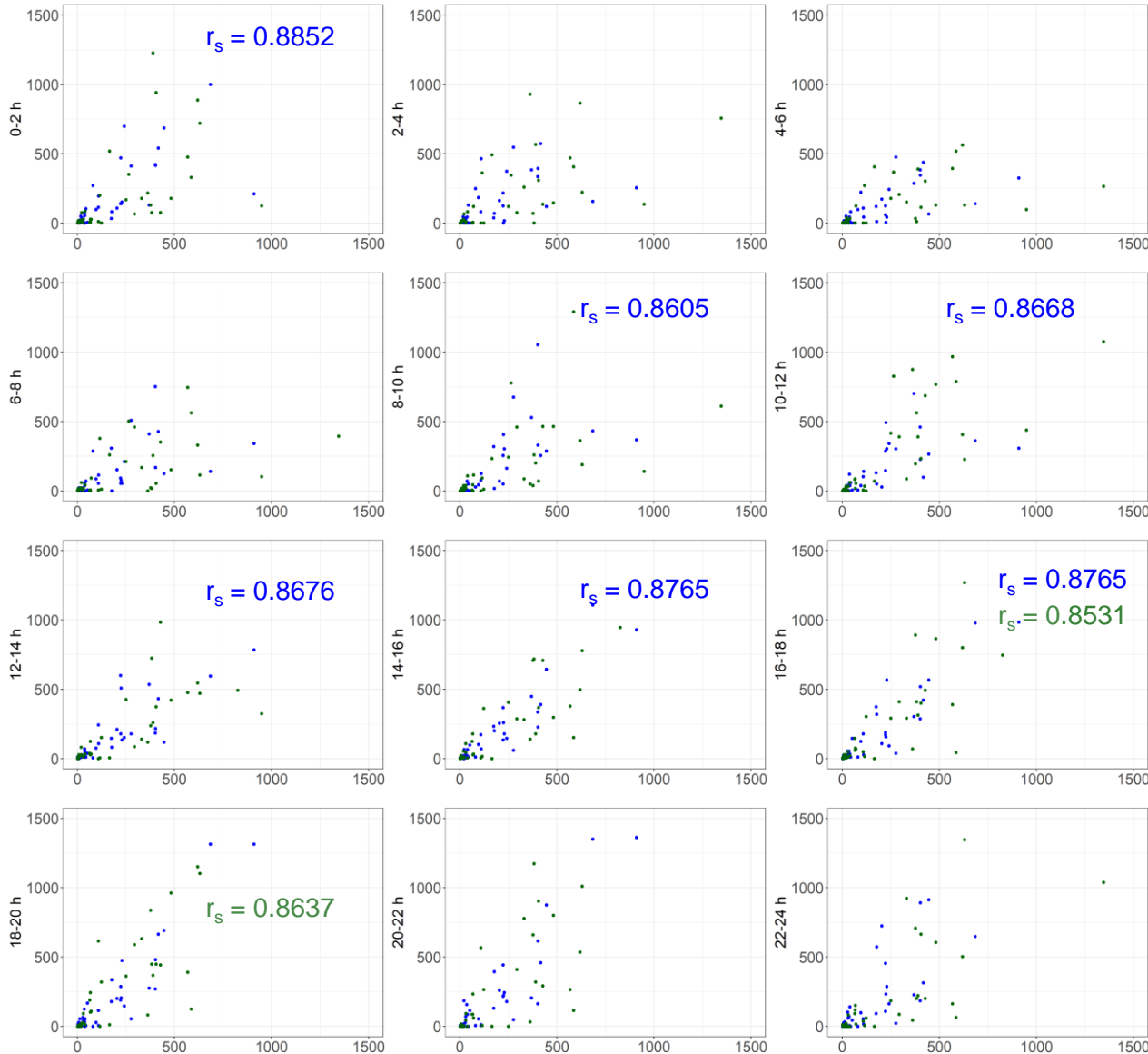
	location				
	1	2	3	4	5
<b>Mean</b>	91	129	113	122	117
<b>Max</b>	668	880	710	793	798
<b>N</b>	31	31	31	31	31





## Bihourly data 2022

Can a 2h-concentration represent the daily mean?

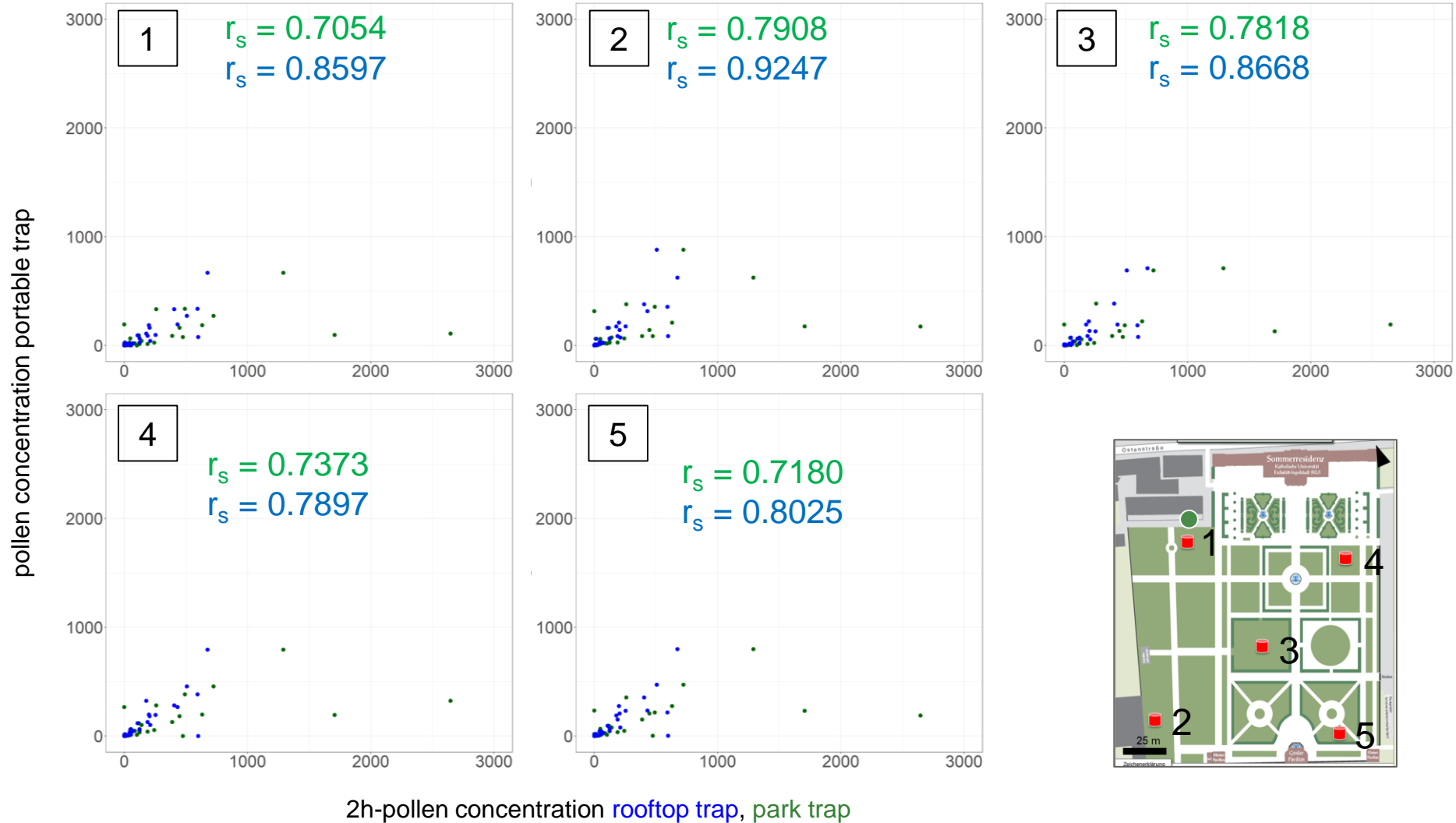


rooftop trap  
park trap

Daily mean pollenconcentration



## Pollen data sampled by different pollen traps





- Phenology is able to characterise the pollen season sufficiently, but only when
  - a large amount of trees is observed,
  - a detailed phenological code (e.g., BBCH code) for all phenological flowering phases is applied
- Phenological data provides no info on intensity
- Pollen concentration in the park was higher than at roof level
  - underestimation of allergy risk when sampling only at rooftop?
- Low spatial variability of pollen concentration within the park
- Further analyses..



# Thank you for your attention



This study is part of the project BAYSICS/subproject 5  
„Climate Related Changes in Pollen Loads”

## BAYSICS

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