



Climate-proofing via urban green infrastructure?

Evaluation of heat mitigation measures at the micro-scale

Centre for Urban Ecology and Climate Adaptation (ZSK), TUM

Project 1: Climate mitigation and urban green infrastructure

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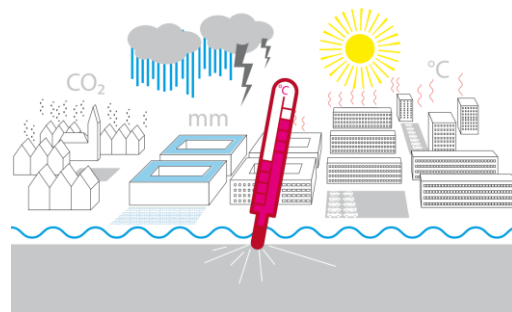


Background



http://www.wz.de/landscape_550/onlineimage.jpeg

- Summerly heat in cities affects thermal comfort of citizens
- City centres are especially affected → UHI effect
- Climate change is likely to amplify these effects
- Adaptation by urban green infrastructure increasingly promoted



ZSK TP 1

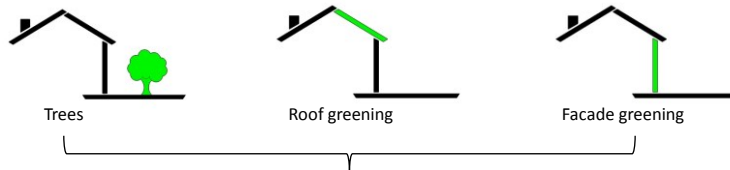
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Objective

What type of green infrastructure should be implemented for heat mitigation and how much of it?

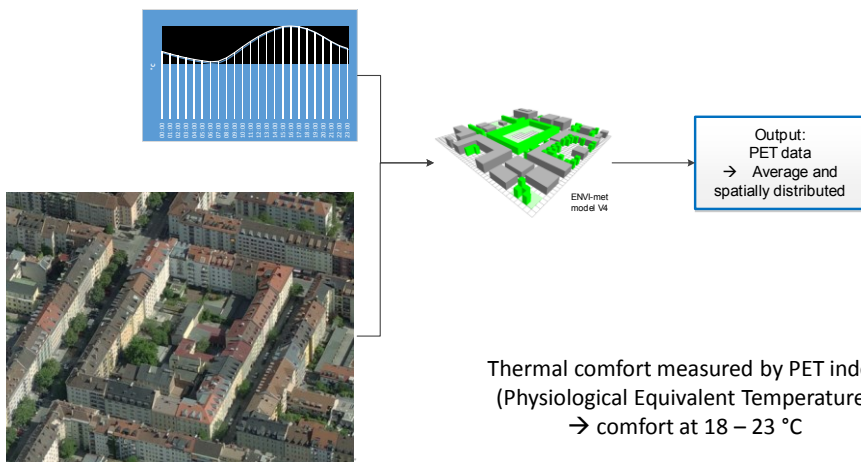


Scenario modelling:

- 3 types of green infrastructure
- Implementation in different quantities
- Under current and future climate conditions (REMO A1B)

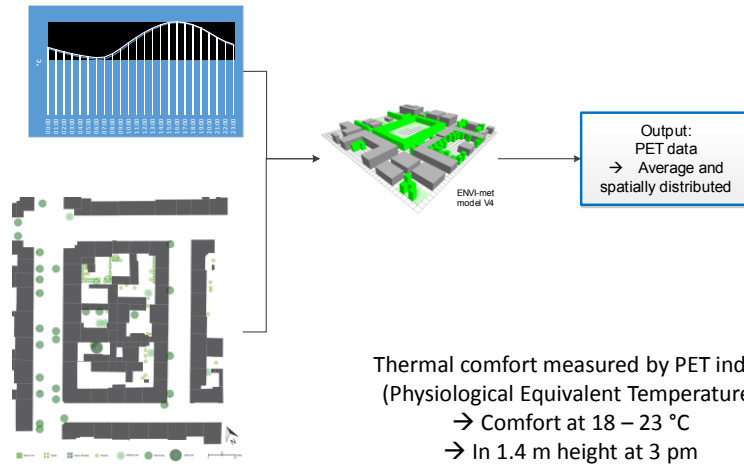


Approach





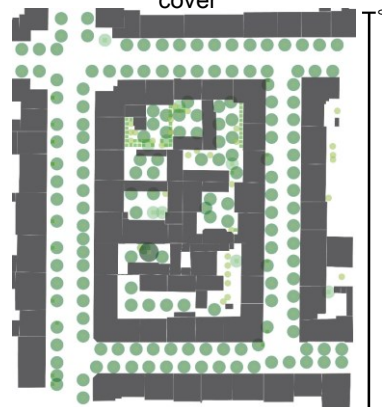
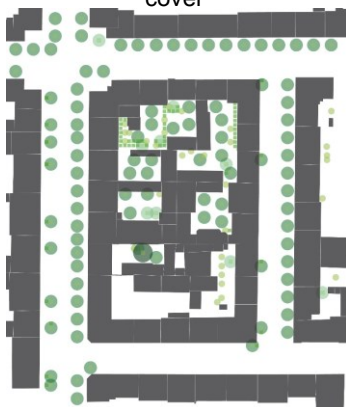
Approach



Approach

Realistic trees → 22% tree cover

Maximum trees → 34% tree cover





Results

Baseline

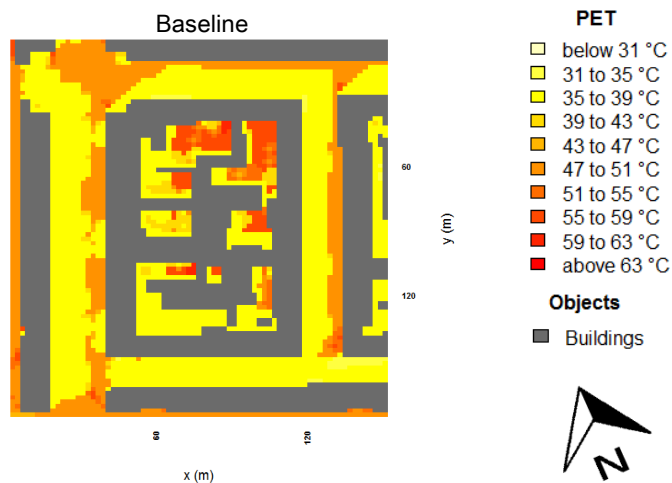
- Current climate = 42.8°C PET
- Future climate = 45.2°C PET → + 6.3% increase

*Relative changes in PET at 1.4 m at 3 pm
compared to baseline*

Scenarios	Current climate	Future climate
TreeR = Realistic trees	- 10.3	- 4.0
RoofR = Realistic green roofs	0.0	+ 6.3
FacadeR = Realistic green facades	- 5.1	+ 0.9
TreeM = Max. trees	- 13.0	- 7.1
RoofM = Max. green roofs	- 0.5	+ 6.3
FacadeM = Max. green facades	- 9.8	- 4.1

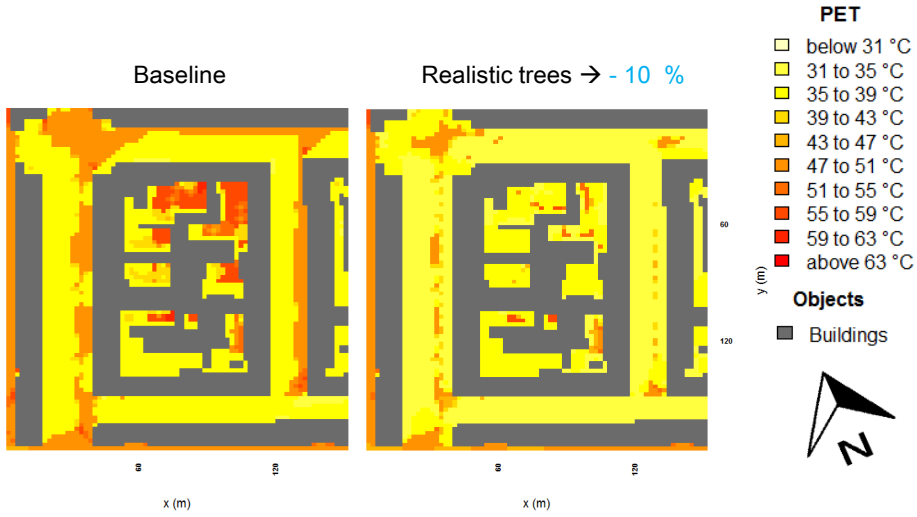


Results

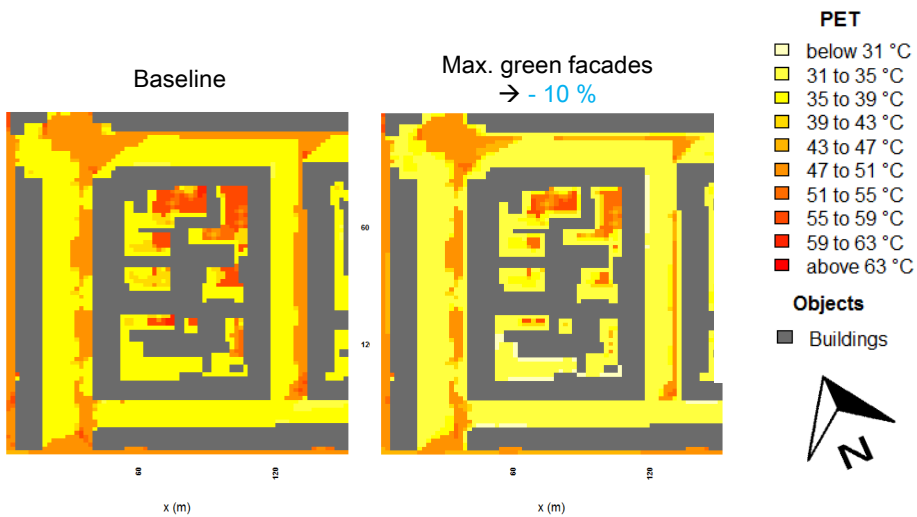




Results

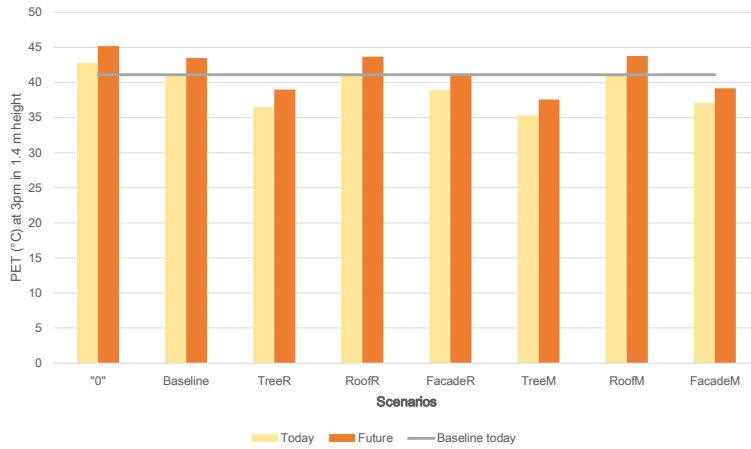


Results

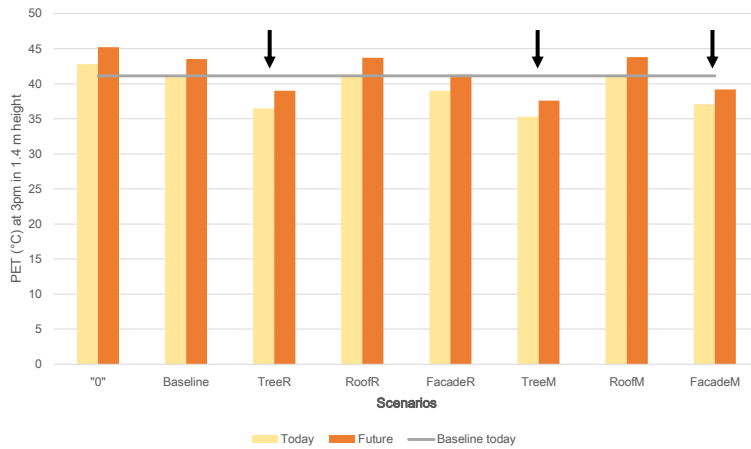




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Conclusion

- Green infrastructure influences thermal comfort differently
 - Major parameters: shading and evapotranspiration
 - Trees and green facades have potential to offset climate change
- Practical implications for urban planners
 - Prioritize tree plantings
 - Add green facades where trees are not an option (i.e. limited space)
 - Consider green roofs as multifunctional measure (for biodiversity, stormwater retention etc.)
- Green infrastructure supports effective adaptation to climate change and the improvement of outdoor thermal comfort



Thanks for your attention! Comments? Questions?

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