

# Urban altitudinal zonation analysis of selected building blocks in Bochum

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## Introduction

The urban altitudinal zonation analysis helps to obtain an estimation of the “garden structure” in selected typical residential environment. These environments provide a variety of Ecosystem Services.

## Method

In 55 building blocks their composition and urban structure types were analysed. For the analysis building footprints and the normalized Digital Surface Model 50cm (nDSM50) were used. The following assumptions applied, all areas that are not buildings were divided into three altitudinal zones: < 1 m, 1-5 m, > 5 m (EEA). The nDSM50 is clipped onto the selected building blocks, the building footprints and the three zones as polygons were extracted, afterwards the selected building blocks were reassembled. Finally, the respective percentage of the areas was calculated.

## Results

For example, the results for a Terraced house (1950s-60s) as an urban structural conclusive in terms of urban morphology (s. Fig. 1). In the selected building blocks the buildings have a high mean of 43,5 % (s. Fig. 2.). A further differentiation in urban structure types allows a grouping (s. Fig. 3). The dense urban structure types, like “Old Building quarters - block edge development” and “Inner-city residential areas” have less higher altitude zones, e. g. trees. This analysis shows that there is no balance between the altitude zones. These results are compared with similar analysis of Leipzig or state-wide for NRW (Cabral et al- 2017, LANUV 2021).

## Outlook

These results are important to improve the resilience, especially in residential environment and thus to be better prepared for future developments. In addition, a heterogeneous altitude zone structure promotes general and mental health (Juergens & Meyer-Heß 2020). These findings come from the joint research project “IMECOGIP” funded by the BMBF. In future applications the traffic areas and LiDAR data itself should be integrated into the analysis.



Figure 1 Urban altitudinal zonation analysis of urban structure type: Terraced houses (1950s-60s).

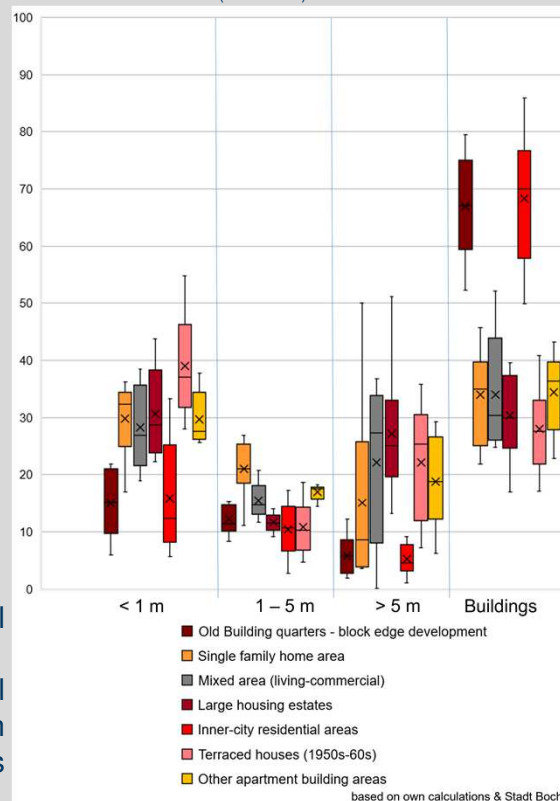


Figure 3 Percentage of altitudinal zonation distribution in selected urban structure types-building blocks.

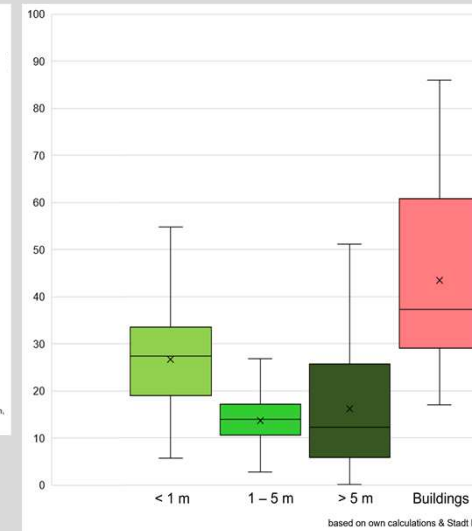


Figure 2 Percentage of altitudinal zonation distribution in selected building blocks.

## References

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