

Assessing intra-urban variations of settlement structure based on the experimental GUF-Density



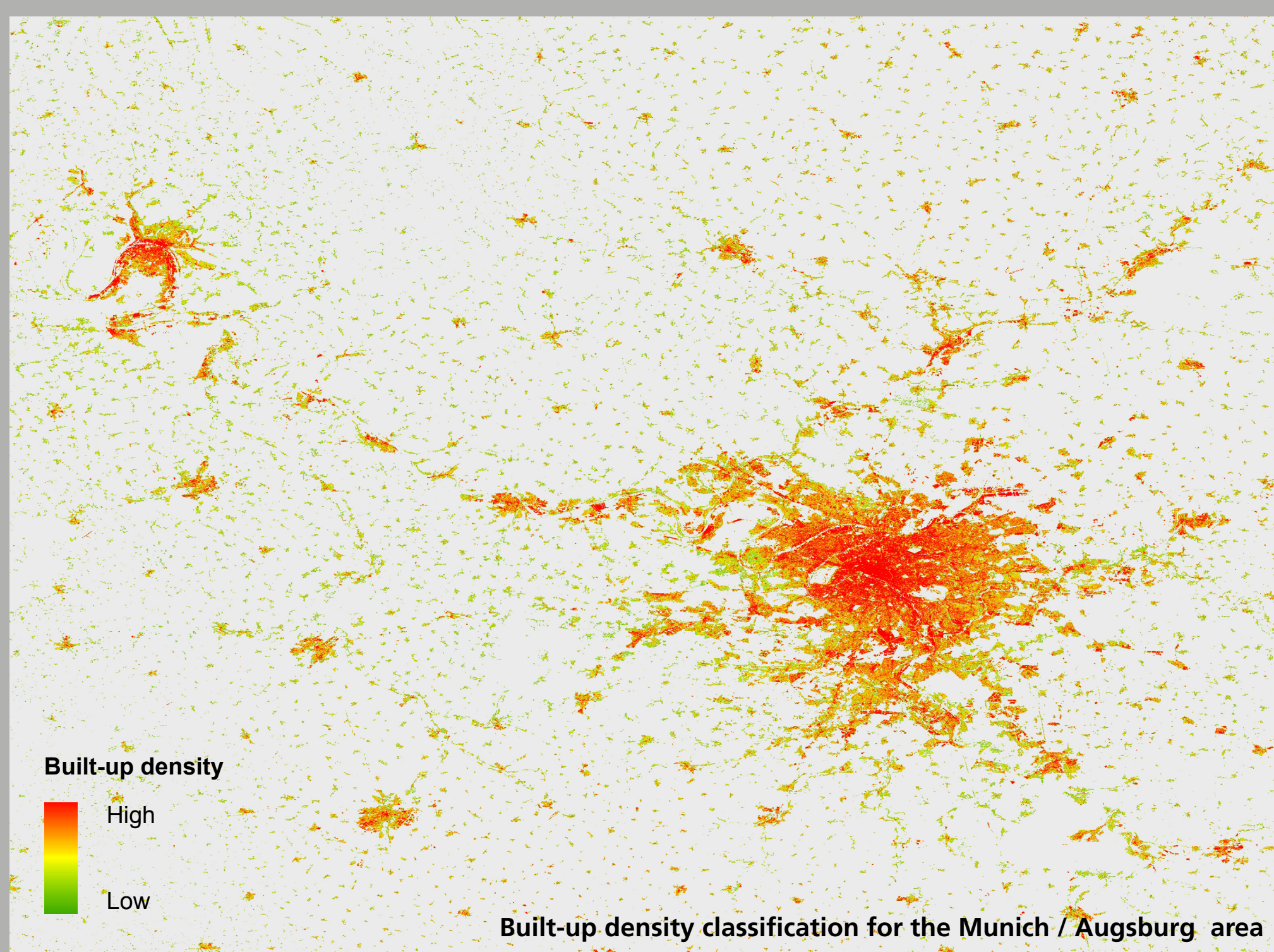
HELMHOLTZ
RESEARCH FOR GRAND CHALLENGES

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Motivation

- Consistent global geo-information on the intra-urban structural variation the *built environment* is barely available (Klotz et al., 2016)
- We evaluate the new experimental Global Urban Footprint Density Layer (GUF-D) in correspondence to very high resolution reference data

Approach



- GUF classification based on TSX and TanDEM-X data (Esch et al., 2012)
- Density classification of built-up structures based on Landsat data
- Reference data for map comparison from OpenStreetMap (OSM, 2017)
- Method (based on Taubenböck et al., 2016)
 - Unit of comparison 1km²
 - Density layers from OSM:
 - 1) buildings;
 - 2) buildings + streets;
 - 3) buildings + street + railway;
 - 4) buildings + street + railway + industry

Results

- The experimental GUF-Density Layer shows generally high agreement with very high resolution reference data from OSM
- The GUF-Density layer corresponds best to the built-up density calculated by the combination of thematic classes 'buildings', 'streets' and 'railways'
- The agreement varies in dependence of the urban structure of the particular city (e.g. we measure a higher over-estimation for lower dense cities such as Philadelphia)

References

Esch T, Taubenböck H, Roth A, et al. (2012): *TanDEM-X mission: New perspectives for the inventory and monitoring of global settlement patterns*. Journal of Applied Remote Sensing

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