

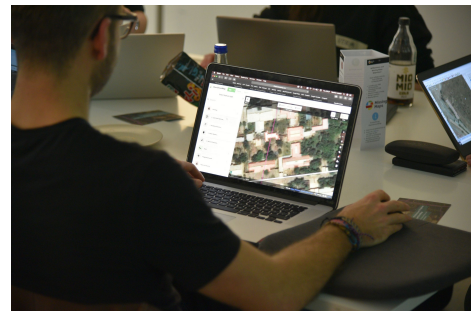
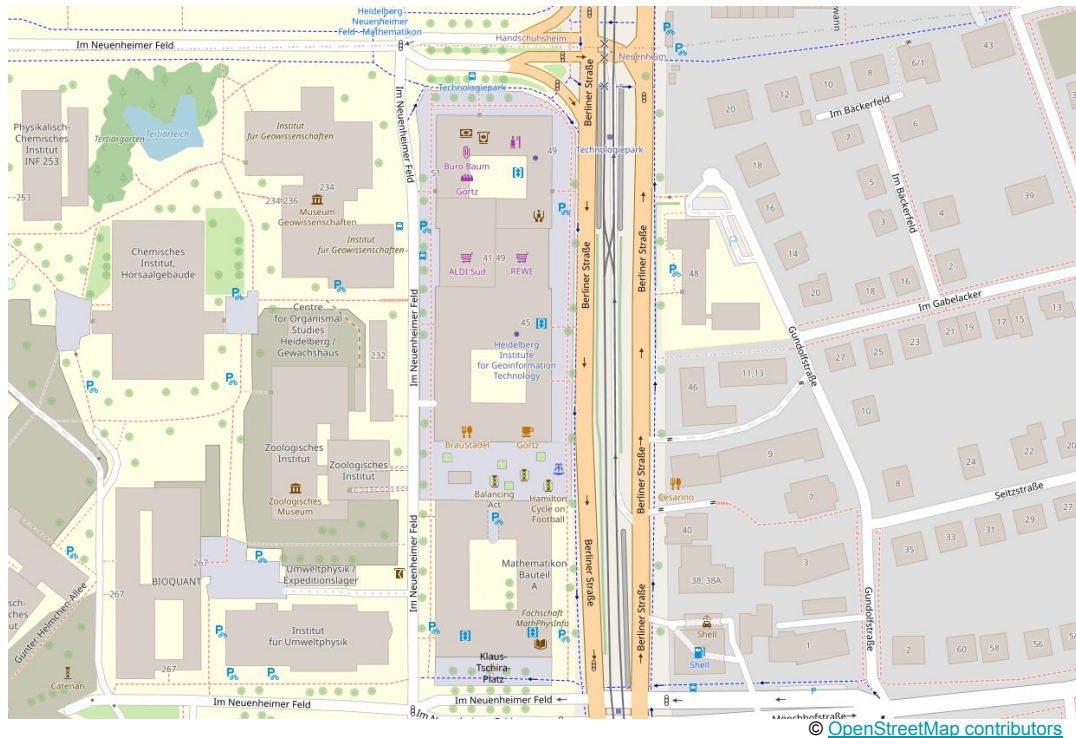
The evolution of humanitarian mapping in OpenStreetMap (OSM) and how it affects map completeness and inequalities in OSM

Benjamin Herfort

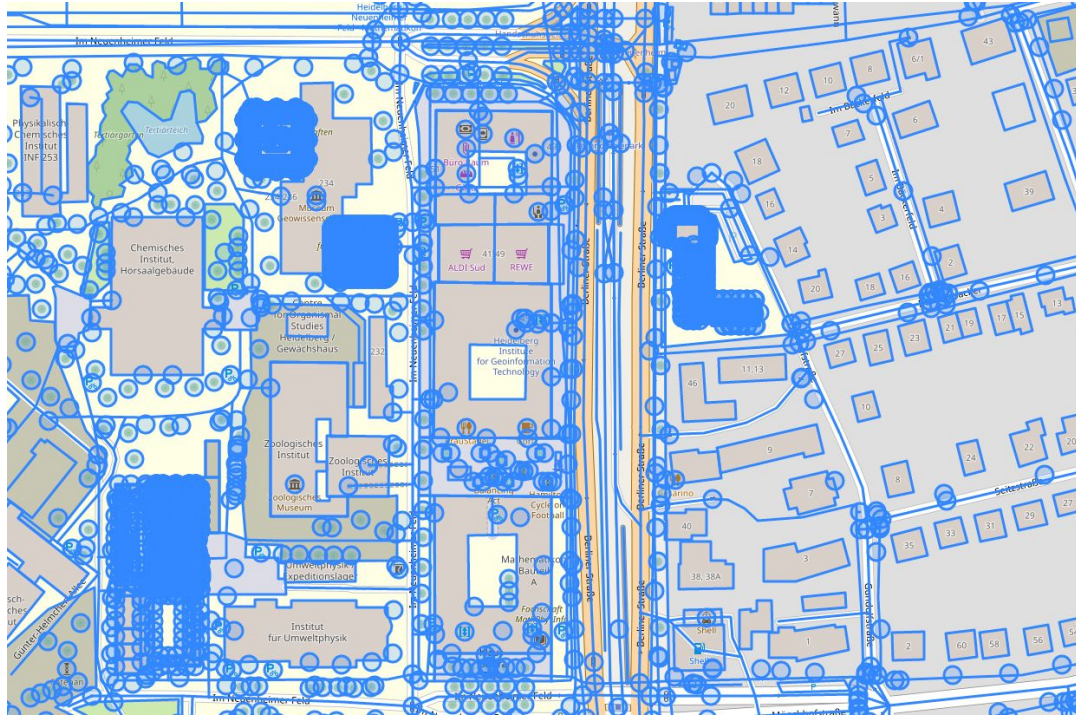
analysis conducted together with Jennings Anderson, Sven Lautenbach, Alexander Zipf and João Porto de Albuquerque



OpenStreetMap



OpenStreetMap



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Where is this?

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ipb

Node: Heidelberg

Institute for Geoinformation Technology (4540889804)

Version #7

add Wikidata identifier thanks to Moritz's local knowledge from State of the Map 2022

Edited 6 months ago by Viyi (itwikipedia)

Changeset #125178537

Location: 49.4184793, 8.6756824

Tags

| | |
|------------------|---|
| addr:city | Heidelberg |
| addr:housenumber | 45 |
| addr:postcode | 69120 |
| addr:street | Berliner Straße |
| level | 4 |
| name | Heidelberg Institute for Geoinformation Technology |
| office | research |
| short_name | HeiGIT |
| website | https://heigit.org |
| wheelchair | yes |
| wikidata | Q107522840 |

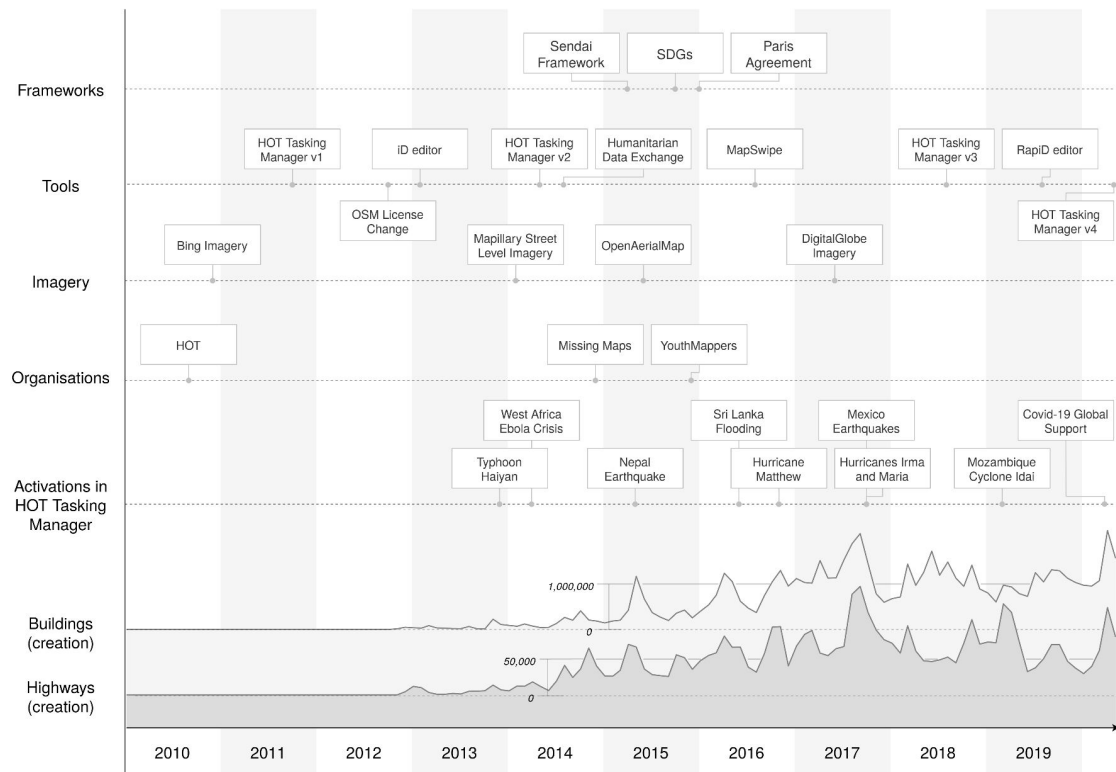
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Motivation

- "Data Revolution for Sustainable Development": need for new institutions, actors, ideas and partnerships to successfully monitor progress towards the SDGs
- ecosystem composed of volunteer mapping communities, corporations, governmental and humanitarian organizations which contribute to and use the open geographic database of OSM for various purposes

<https://www.nature.com/articles/s41598-021-82404-z>

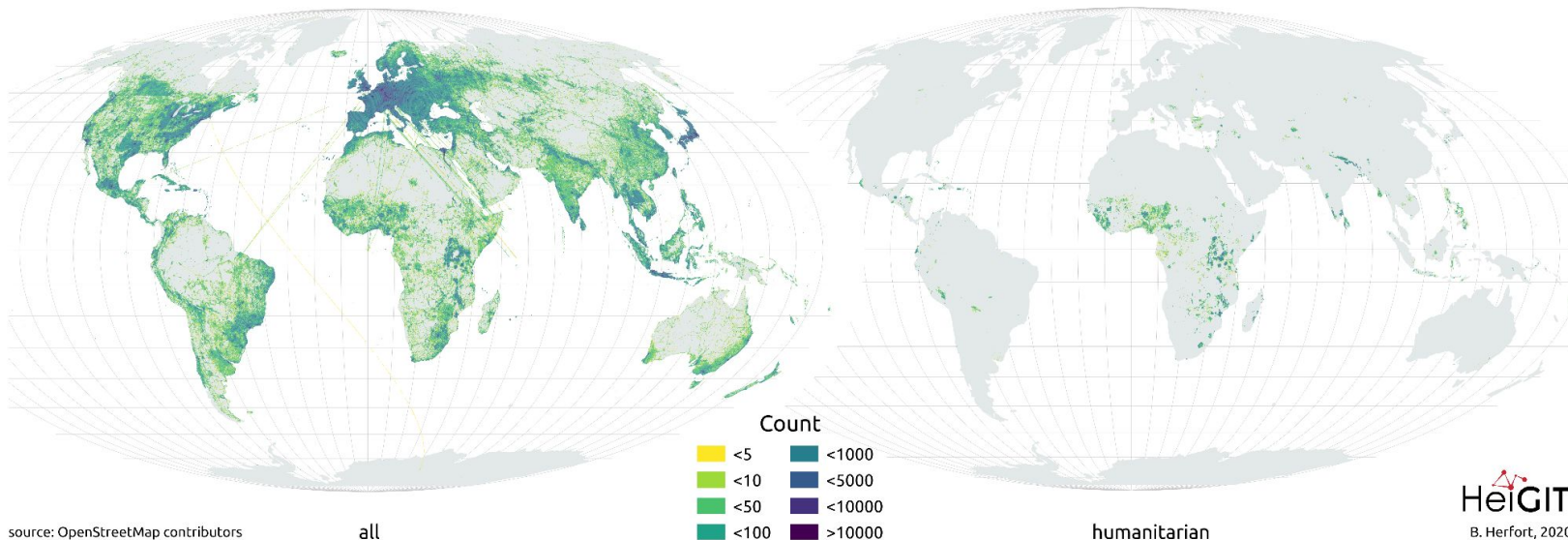
The Evolution of Humanitarian Mapping within OpenStreetMap



Author: Benjamin Herfort, HeiGIT, 2020

Spatial distribution and bias of mapping in OSM

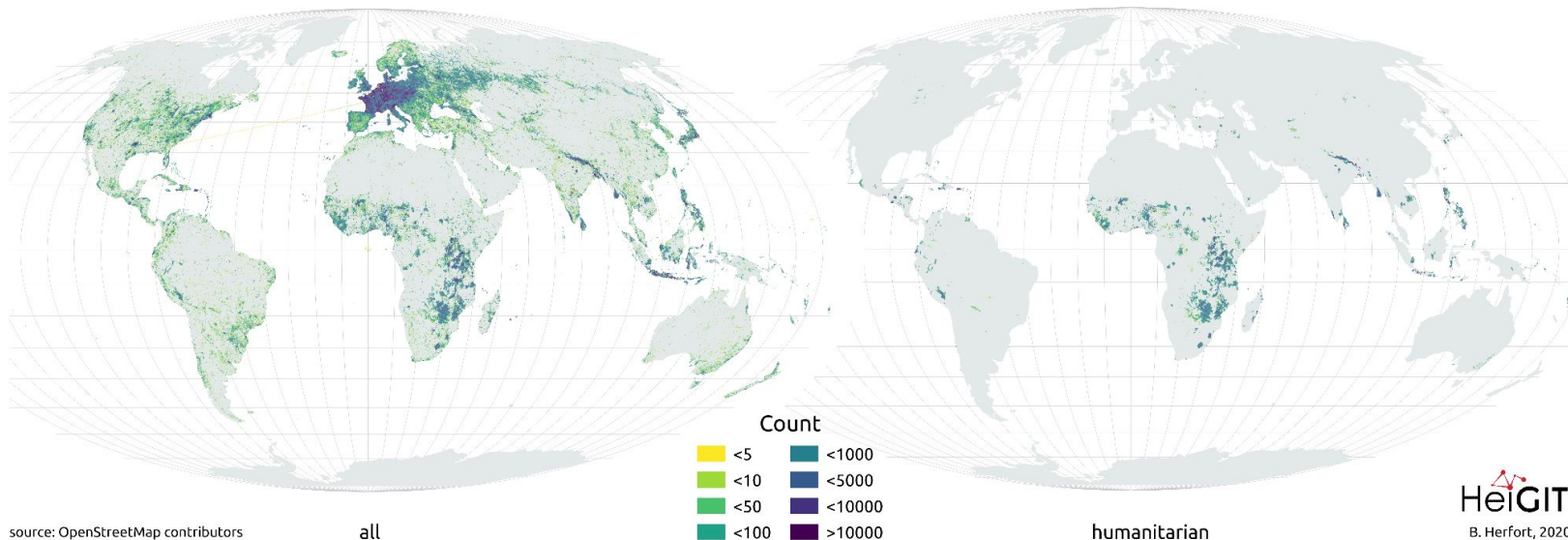
Highway Contributions (creation) in OpenStreetMap since 2008-01-01



<https://www.nature.com/articles/s41598-021-82404-z>

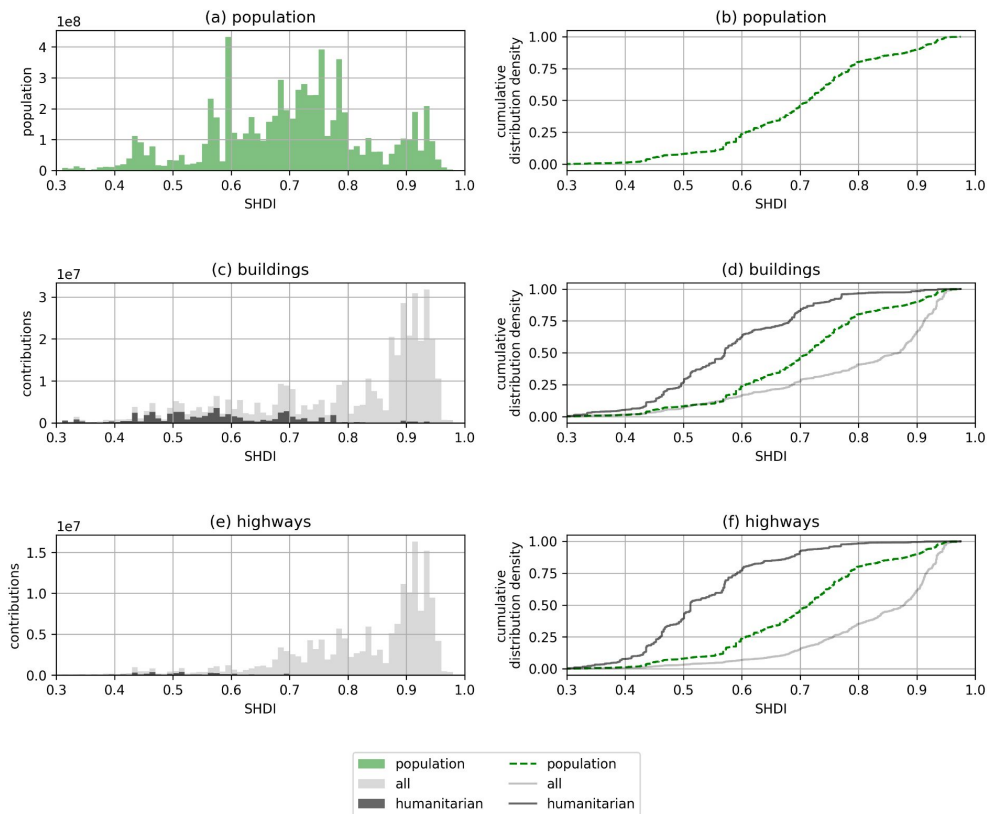
Spatial distribution and bias of mapping in OSM

Building Contributions (creation) in OpenStreetMap since 2008-01-01



<https://www.nature.com/articles/s41598-021-82404-z>

Spatial distribution and bias of mapping in OSM



- 20% of all humans lived in regions of very high human development (SHDI of >0.8), these regions accounted for 60% of buildings and 65% of highways created in OSM
- regions with medium human development (SHDI of 0.55 to <0.7) made up for the creation of 15% of buildings and 11% of highways in OSM in overall, but represented ~36% of the global population
- regions with low human development (SHDI <0.55) we counted 10% of the global population, 11% of building creations and 5% of highway creations in OSM

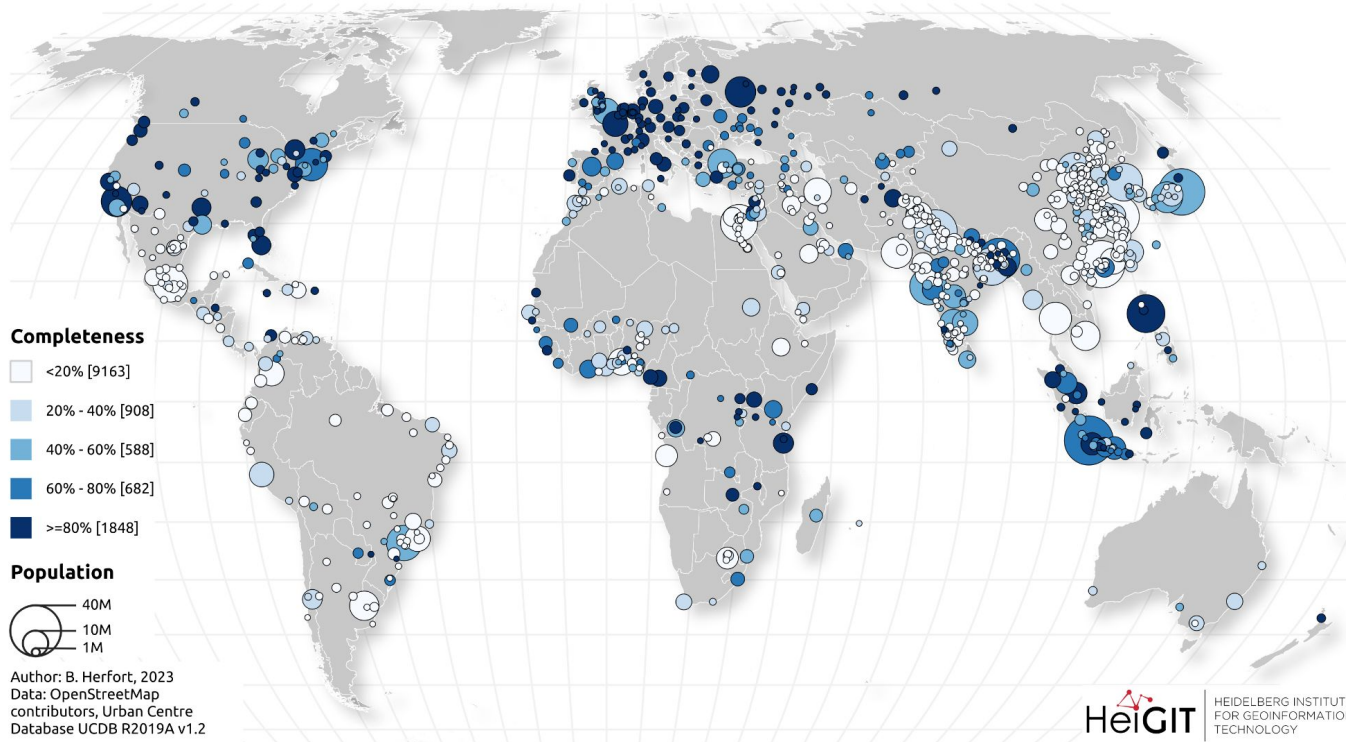
<https://www.nature.com/articles/s41598-021-82404-z>

Implications I

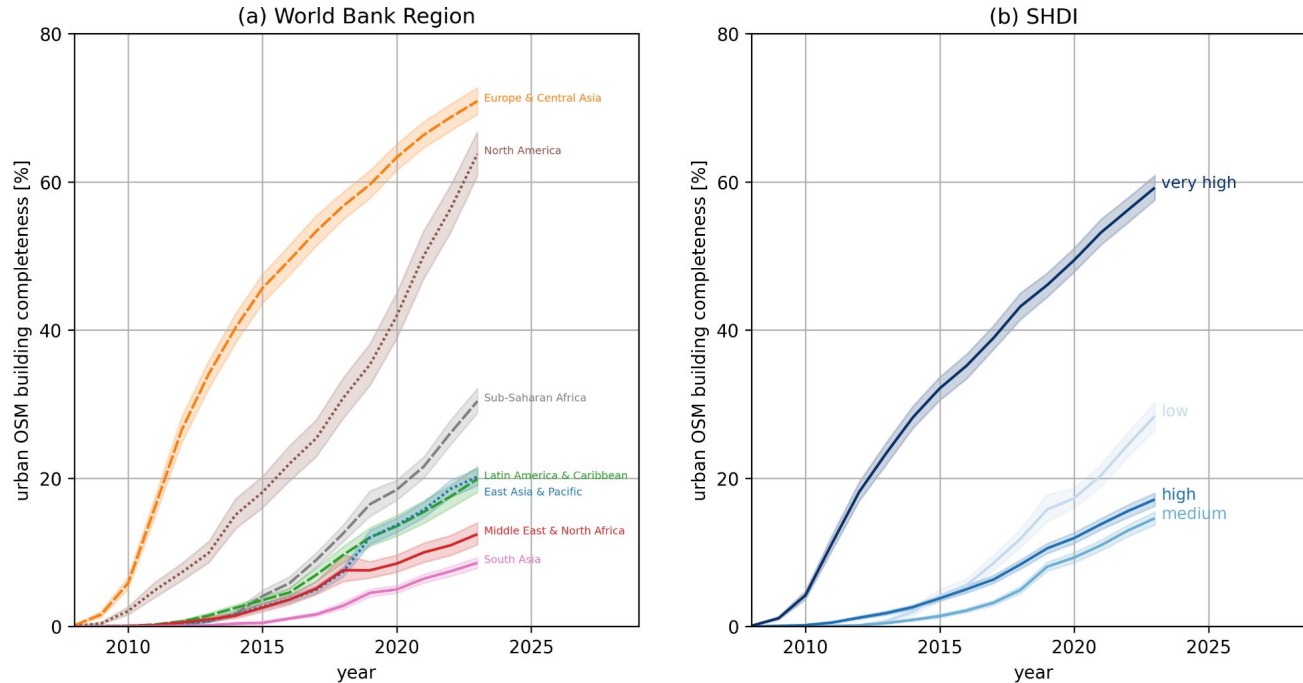
- humanitarian mapping efforts of the previous decade have already made OSM more inclusive, contributing to diversify and expand the spatial footprint of the areas mapped.
- our analysis quantifies the mismatch between the distribution of mapping activity in OSM vis-à-vis the distribution of the global population on the Earth's surface
- balancing the unequal spatial and temporal contribution patterns in OSM goes beyond creating a more comprehensive geographic database.

How complete is OSM building stock in urban areas?

OpenStreetMap Building Completeness in Urban Centers

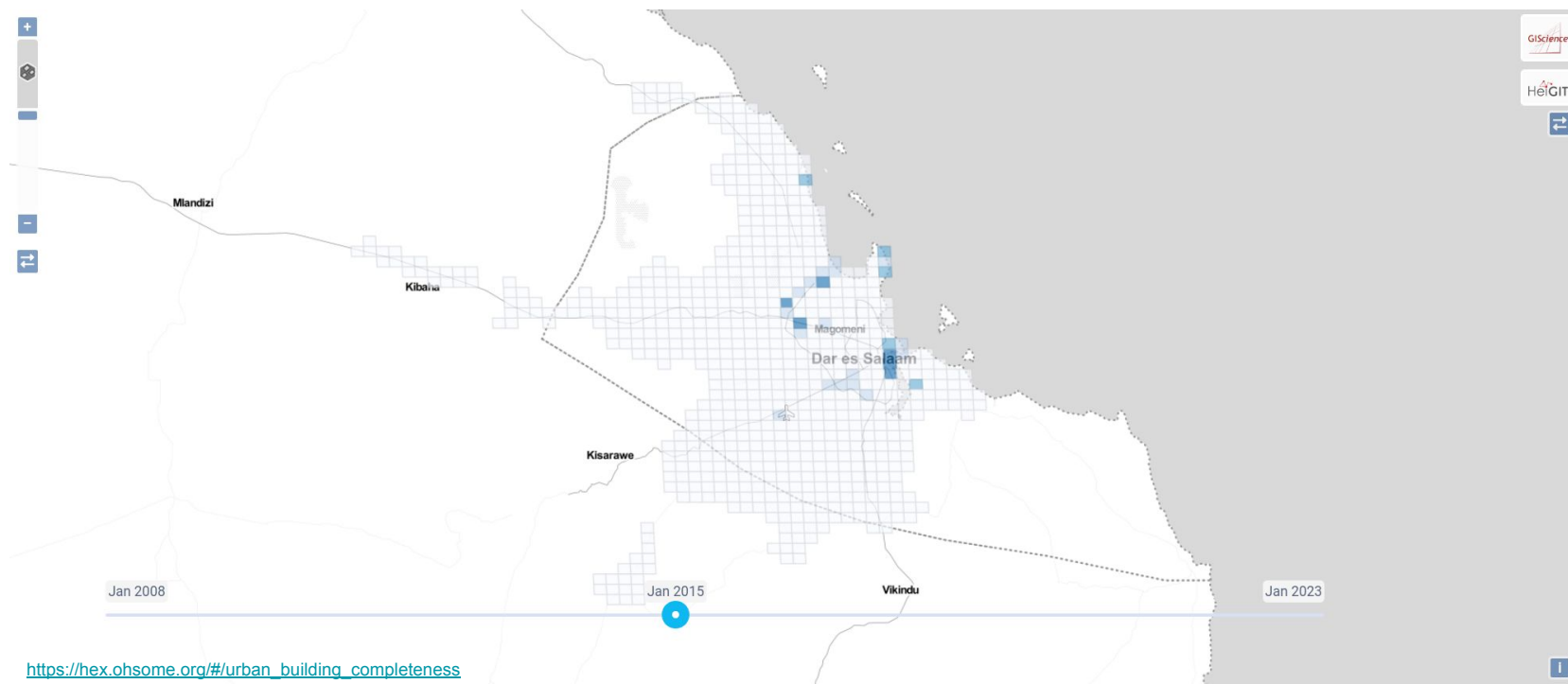


How complete is OSM building stock in urban areas?

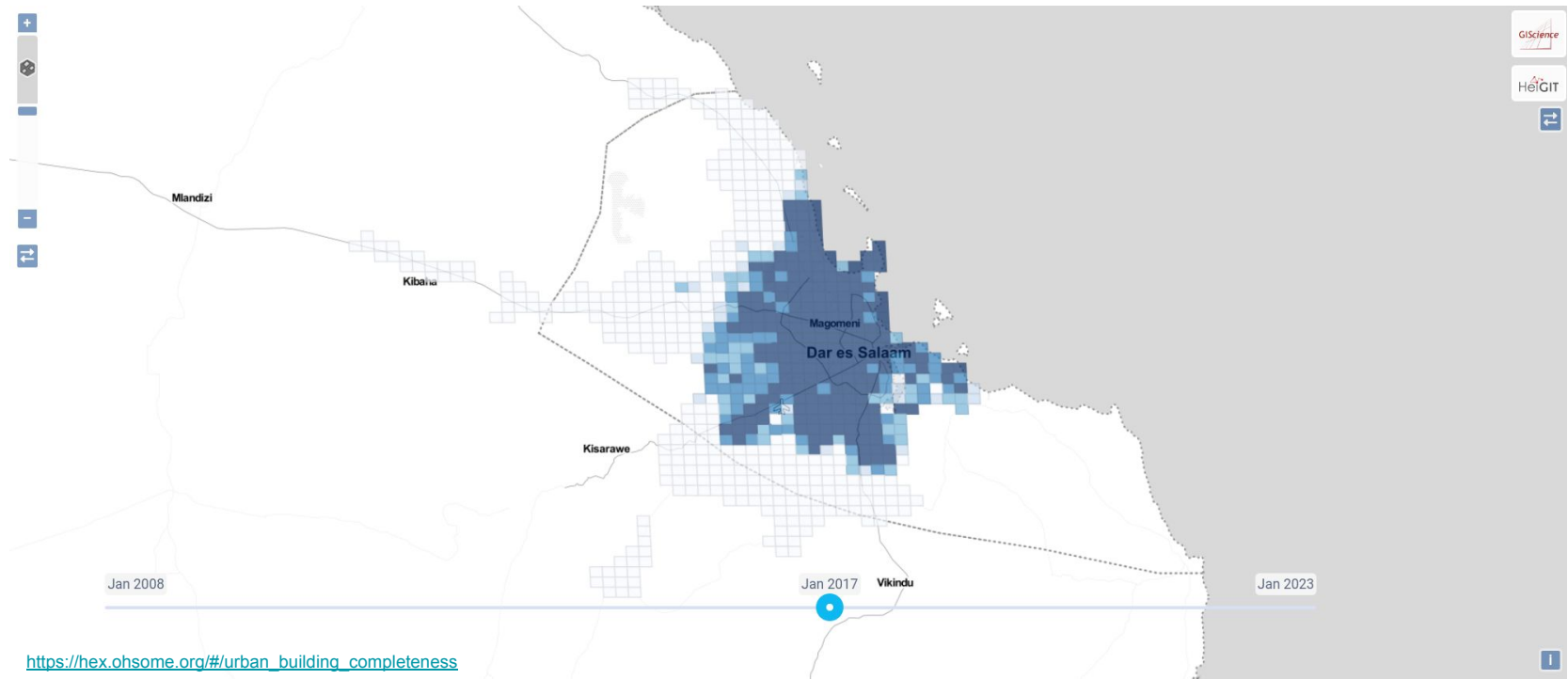


<https://www.researchsquare.com/article/rs-1913150/v1?redirect=/article/rs-1913150>

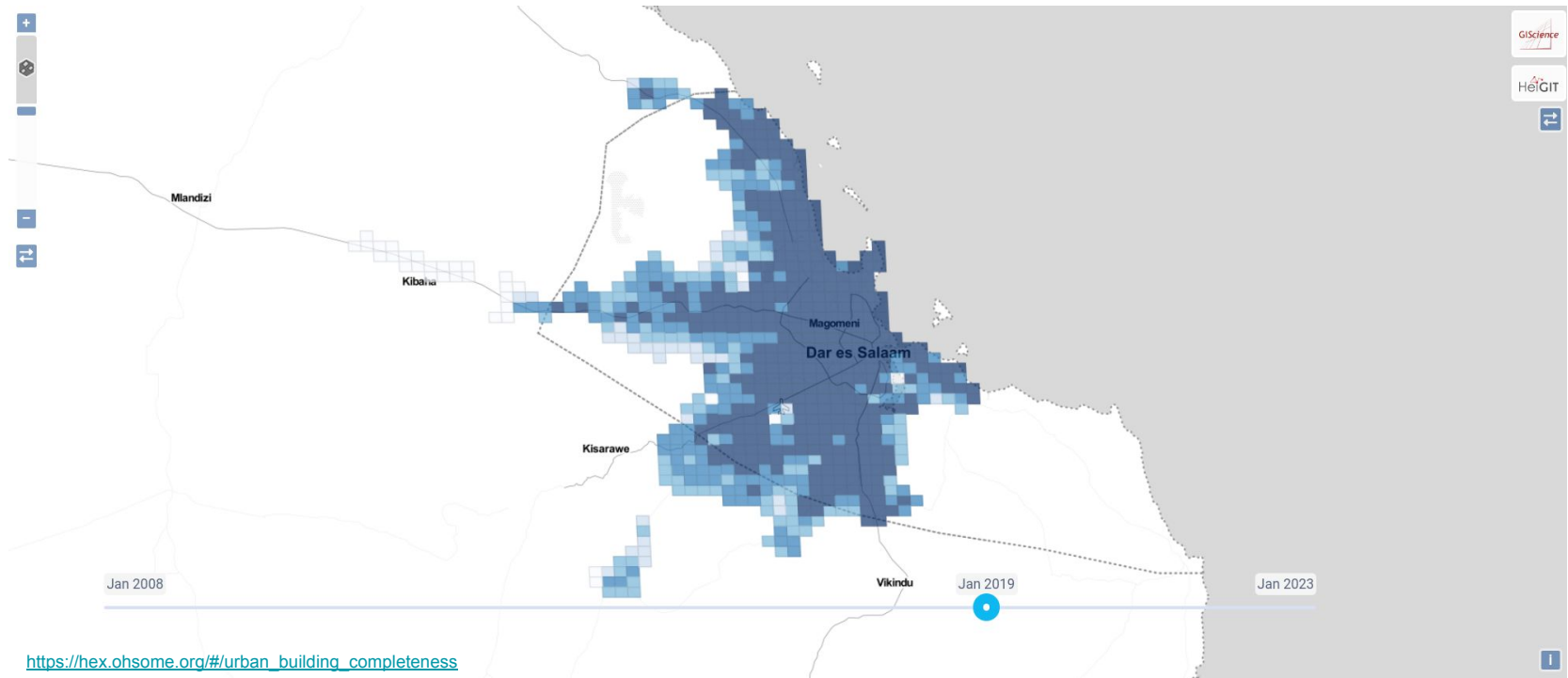
What drives the OSM building completeness within a city?



What drives the OSM building completeness within a city?



What drives the OSM building completeness within a city?



Implications II

- to assess the potential negative impact of missing data, as a OSM data user you should investigate if your study is subject to spatial bias caused by OSM's uneven spatial coverage at multiple scales.
- once the biases in OSM's coverage are known and can be accounted for researchers will be able to draw the right conclusions and will avoid misleading recommendations for decision makers
- as a OSM data producer, you should use completeness maps to decide where future mapping activities should take place to ensure that "nobody is left behind" as encouraged by the SDGs.
- the cultural openness and social nature of OSM should be considered a strength especially when comparing to (building footprint) datasets derived using proprietary, black-box machine learning approaches for which bias and fairness are often still unknown

Contact



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further links and resources:

- <https://heigit.org/>
- <https://github.com/GIScience/global-urban-building-completeness-analysis>
- monitoring humanitarian OSM Stats: <https://humstats.heigit.org/>
- OSM data quality tool → ohsome quality analyst: <https://oqt.ohsome.org/>
- research paper: [The evolution of humanitarian mapping within the OSM community](#)