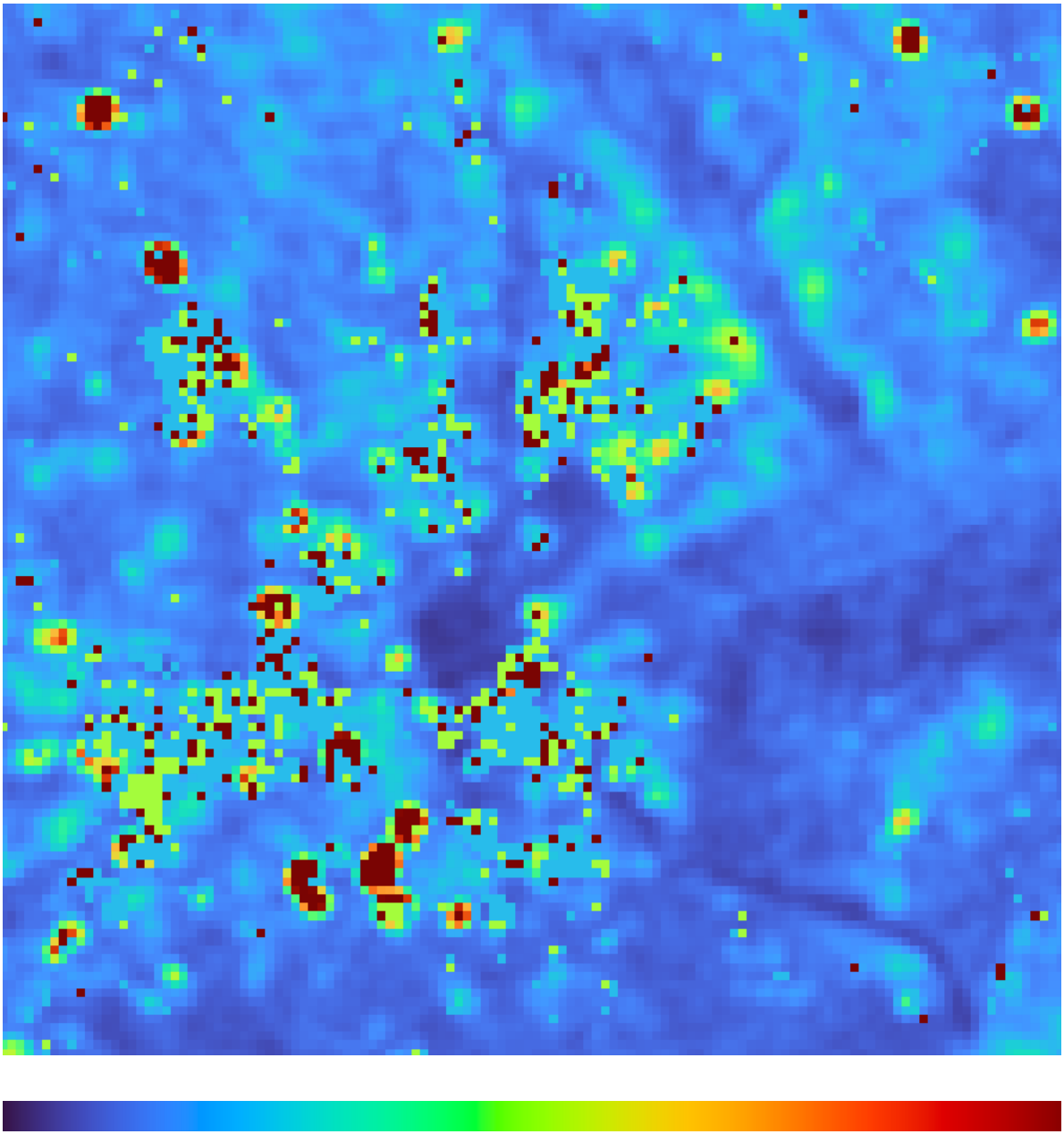
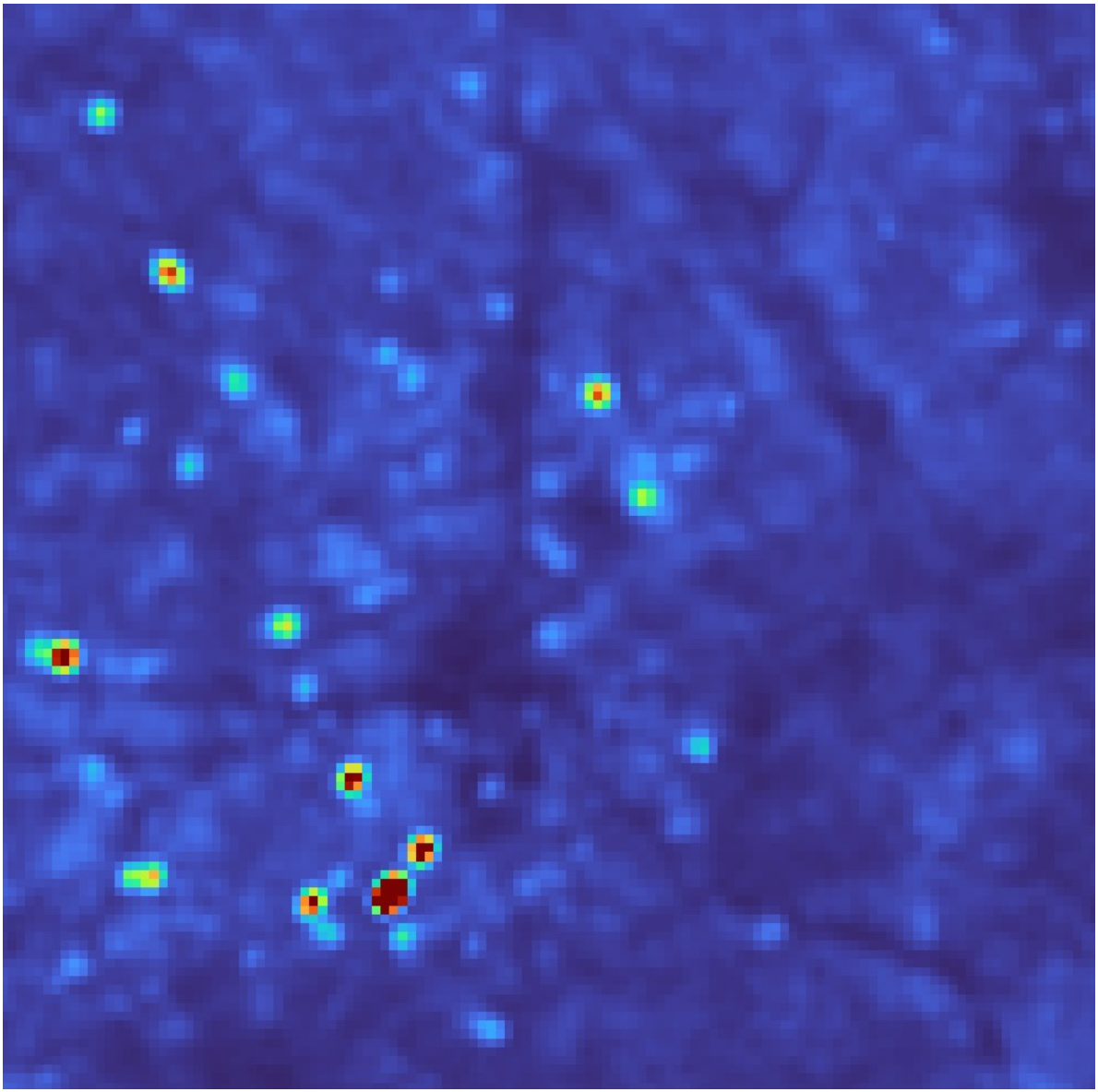
Spatial Disaggregation of Rwandan Building Exposure & Vulnerability via Conditional Census-Constrained Clustering (C4) using Earth Observation Data: A Preliminary Result

28 July 2024

2022 Mean Sentinel-1 SAR GRD VV Band (10-meter)



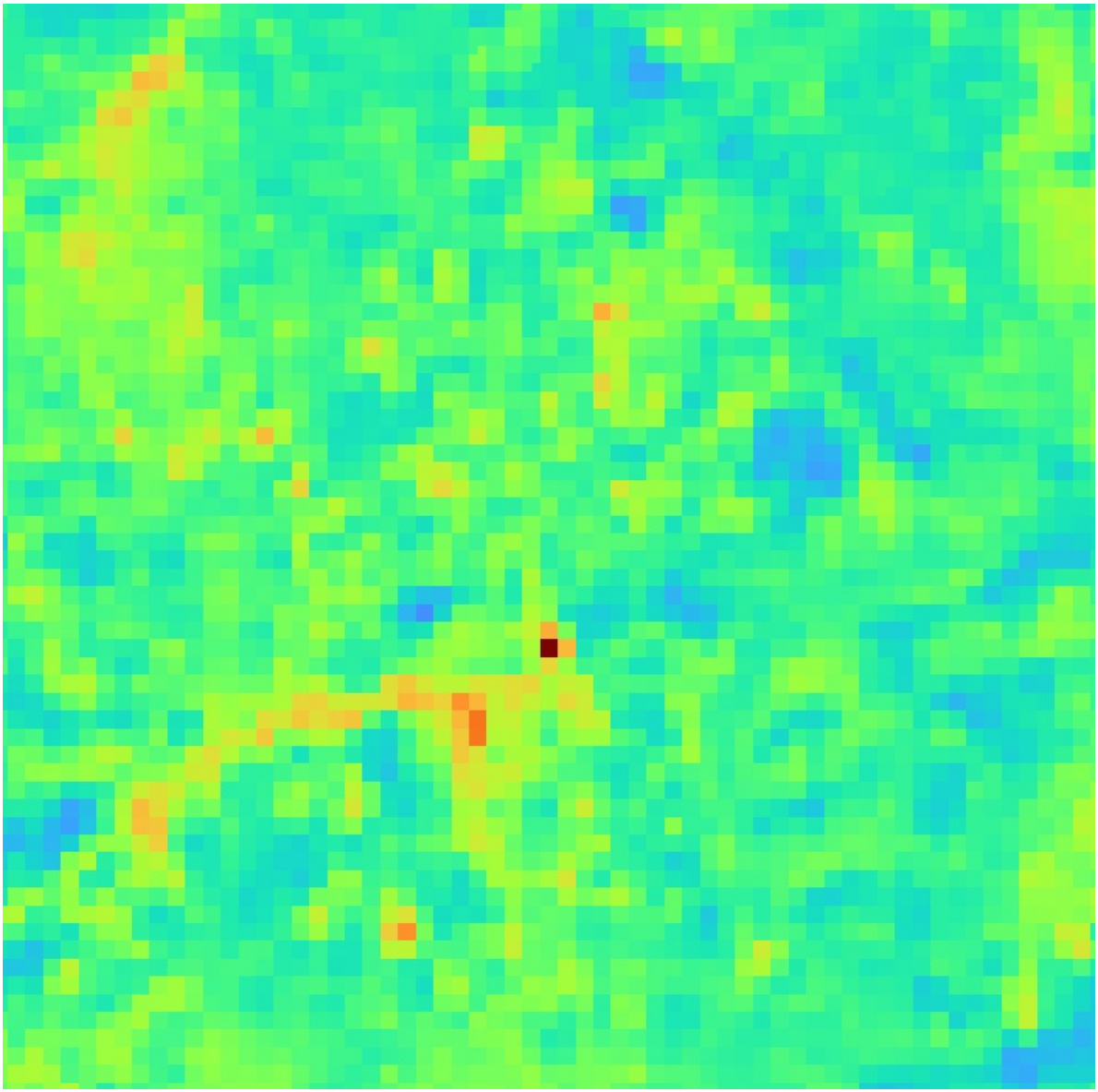
2022 Mean Sentinel-1 SAR GRD VH Band (10-meter)



0 0.5

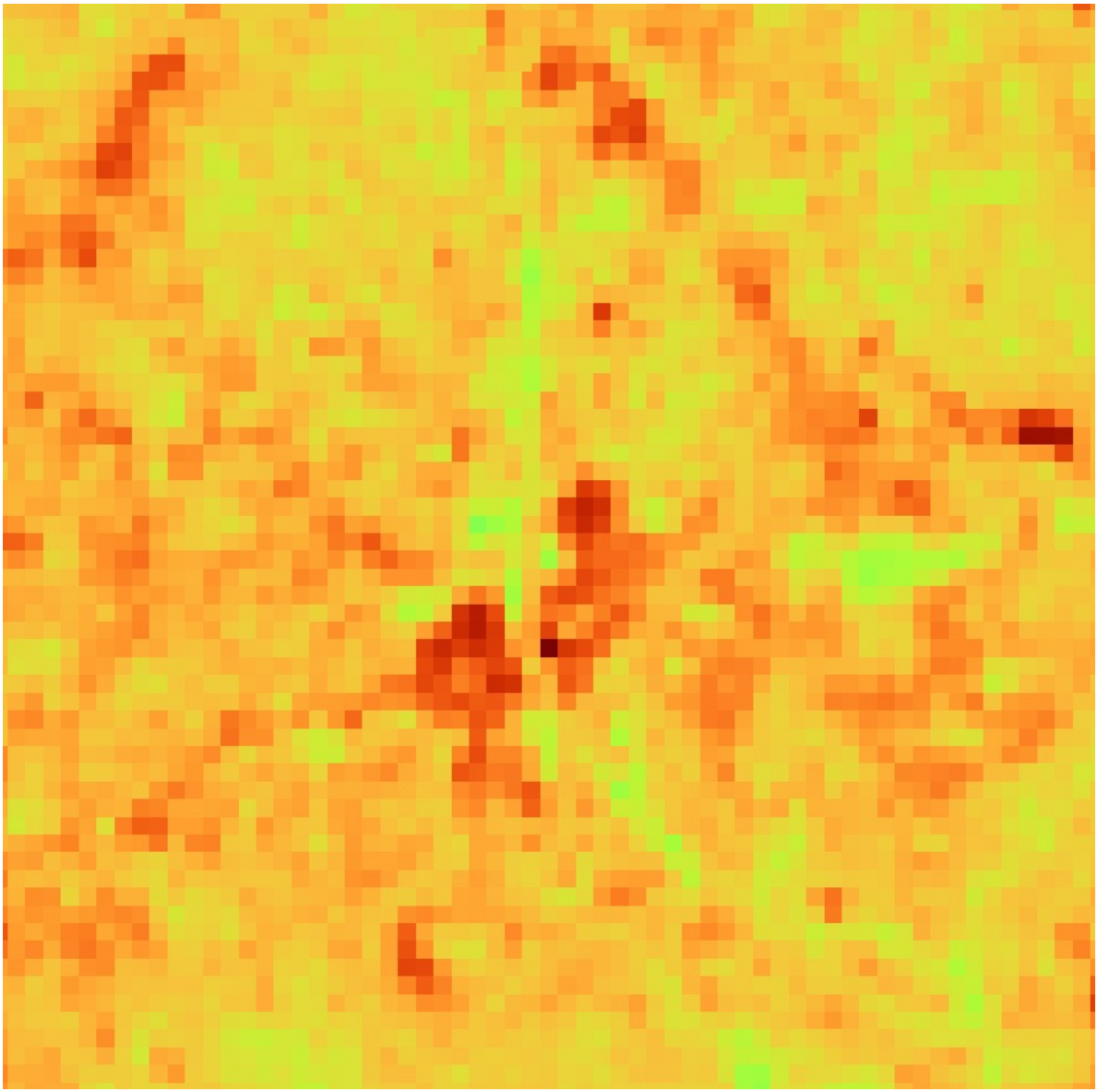
2022 Median Sentinel-2 MSI Red, Green, Blue (RGB) Bands (10-meter)

2022 Median Sentinel-2 MSI Red1 Band (10-meter)



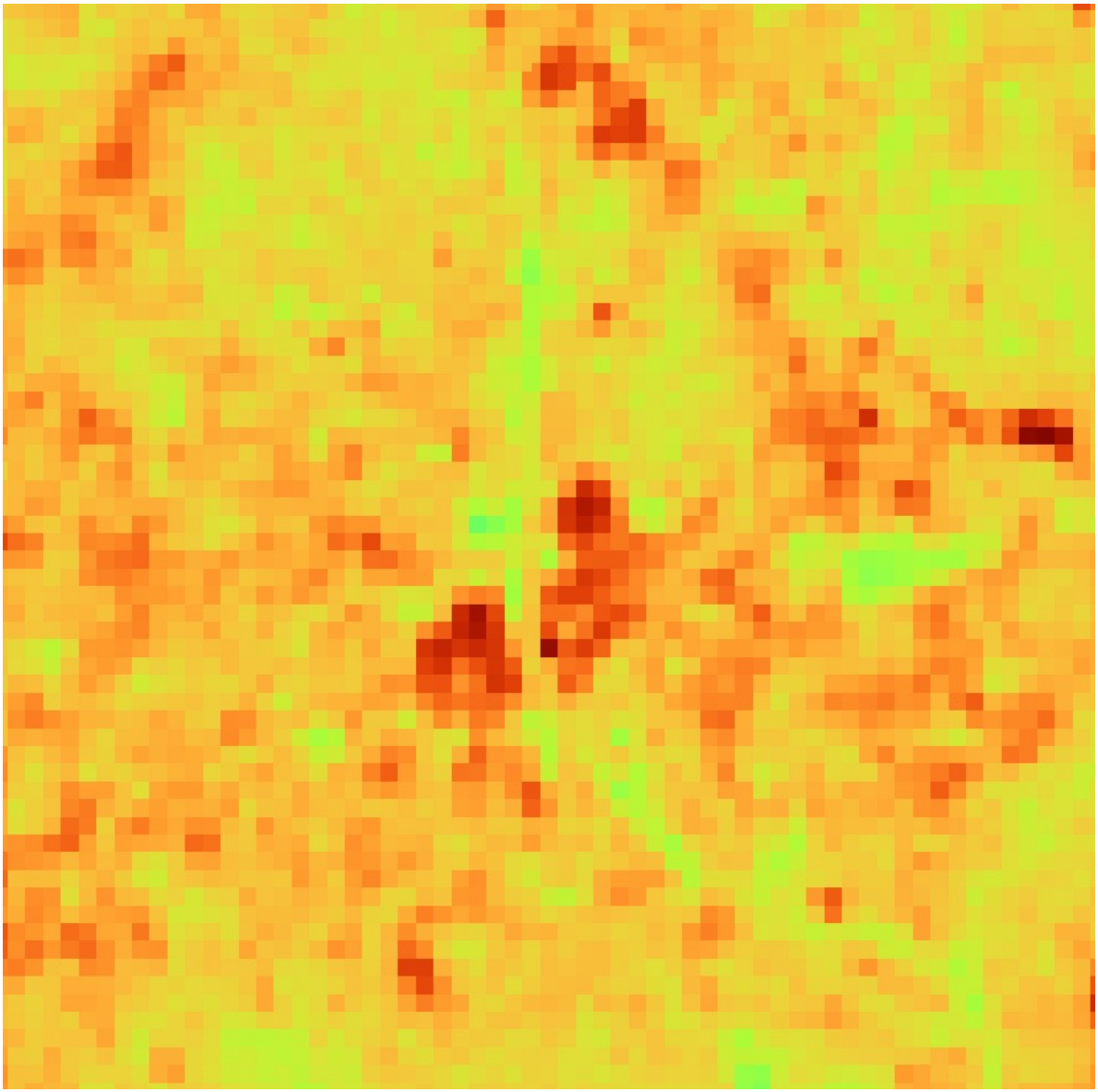
0 3,500

2022 Median Sentinel-2 MSI Red2 Band (10-meter)



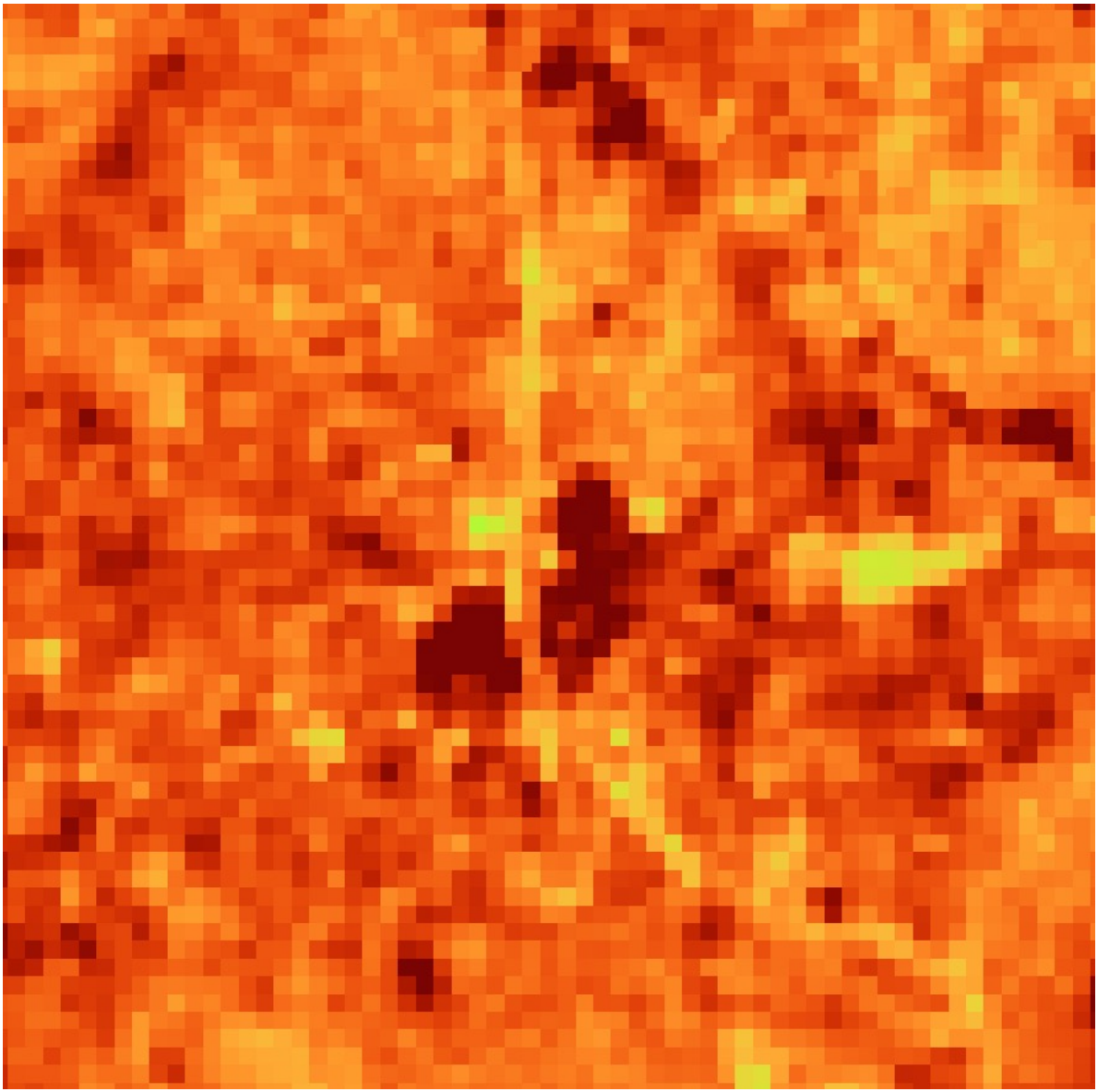
0 3,500

2022 Median Sentinel-2 MSI Red3 Band (10-meter)



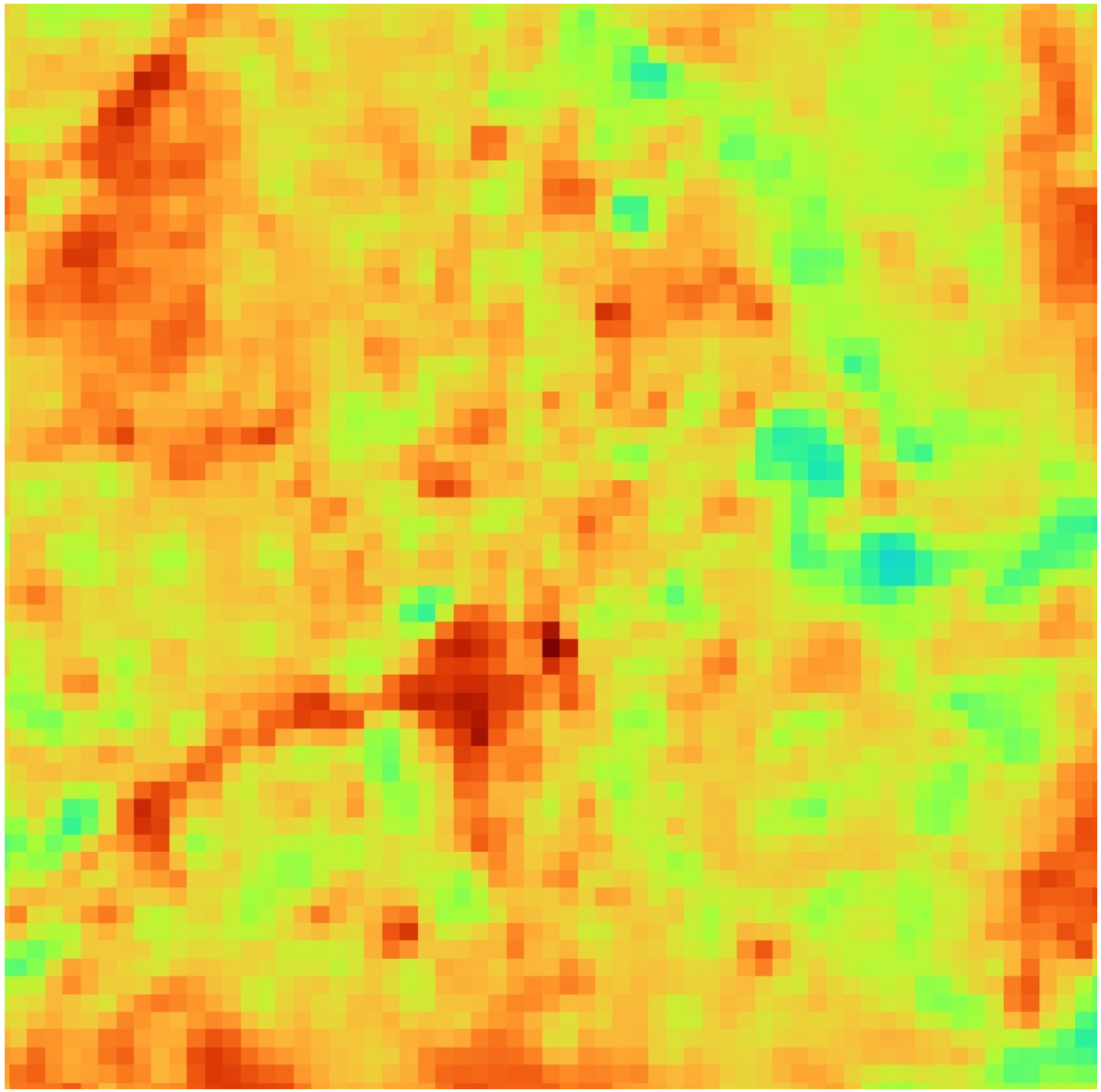
0 4,000

2022 Median Sentinel-2 MSI Red4 Band (10-meter)



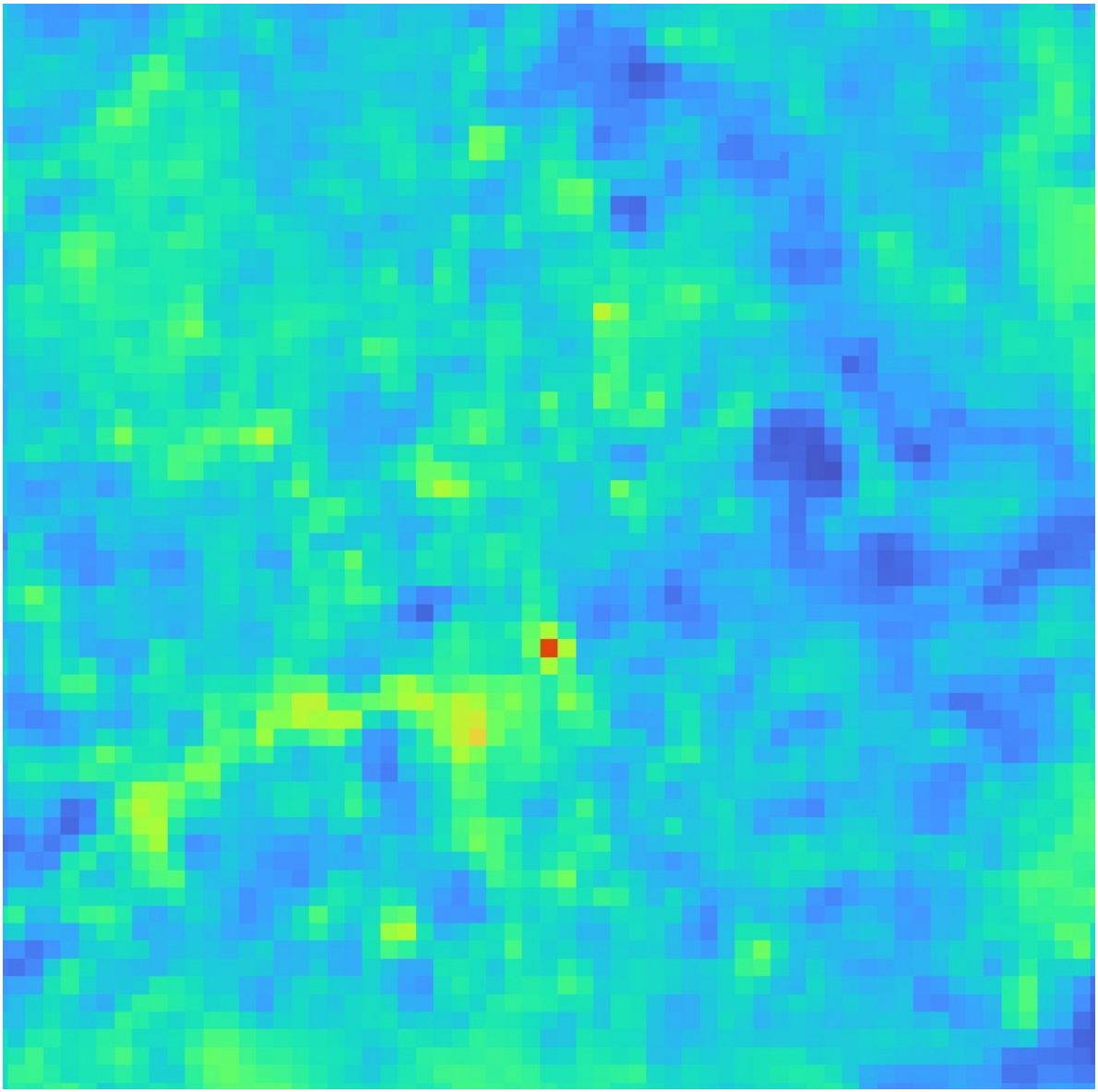
0 3,500

2022 Median Sentinel-2 MSI SWIR1 Band (10-meter)



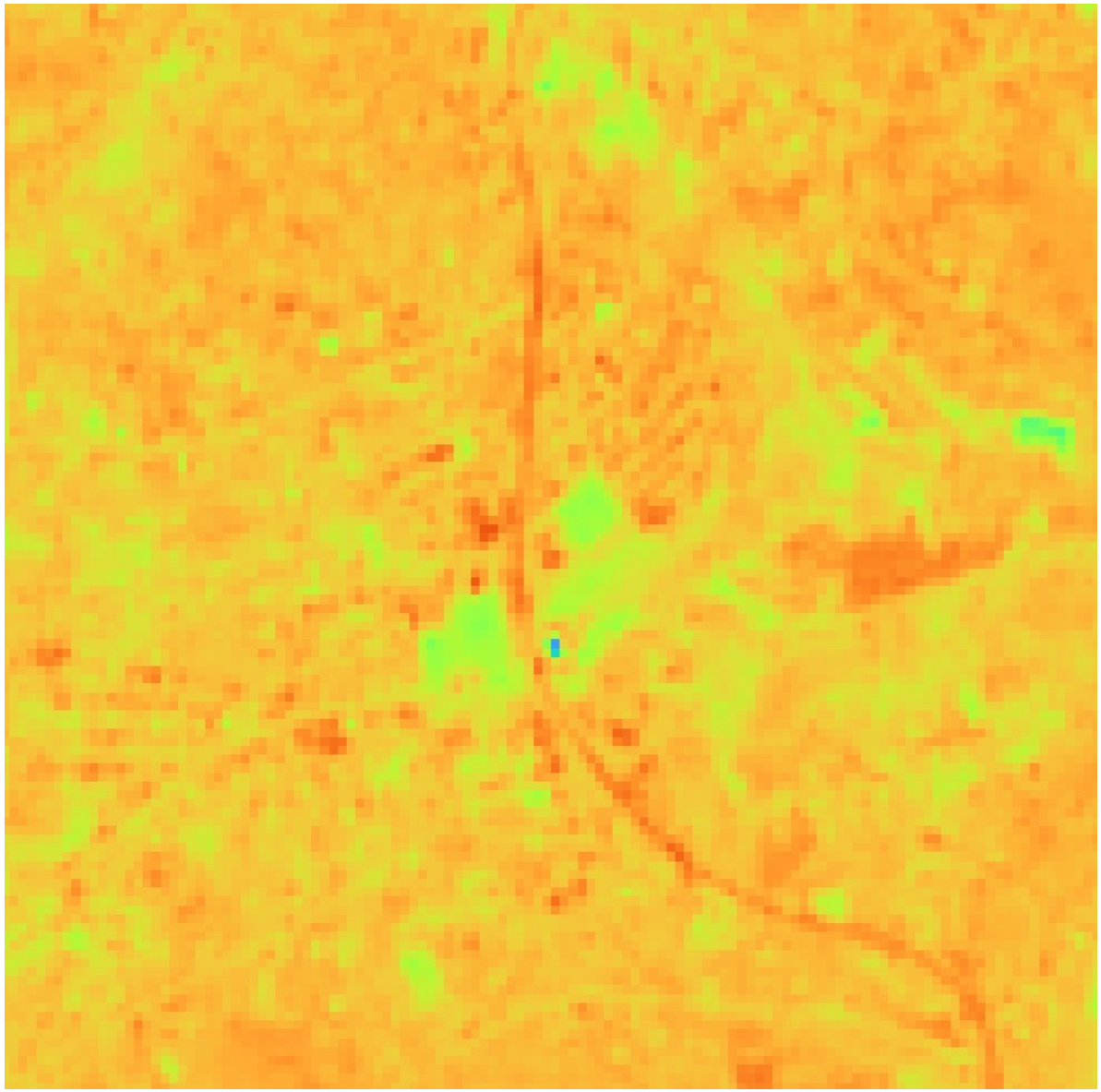
0 4,000

2022 Median Sentinel-2 MSI SWIR2 Band (10-meter)



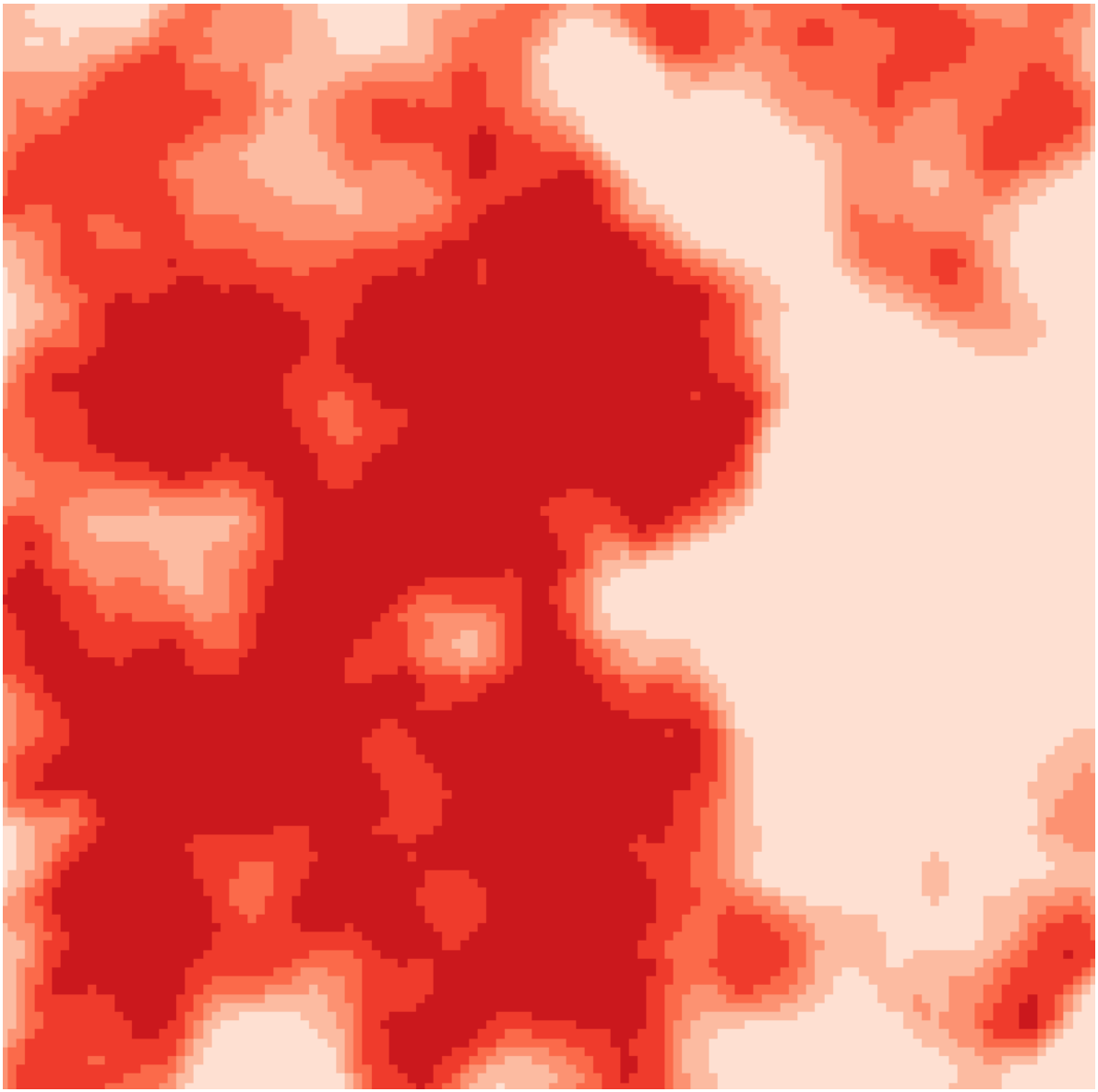
0 6,200

2022 Median Sentinel-2 MSI NIR Band (10-meter)



0 7,300

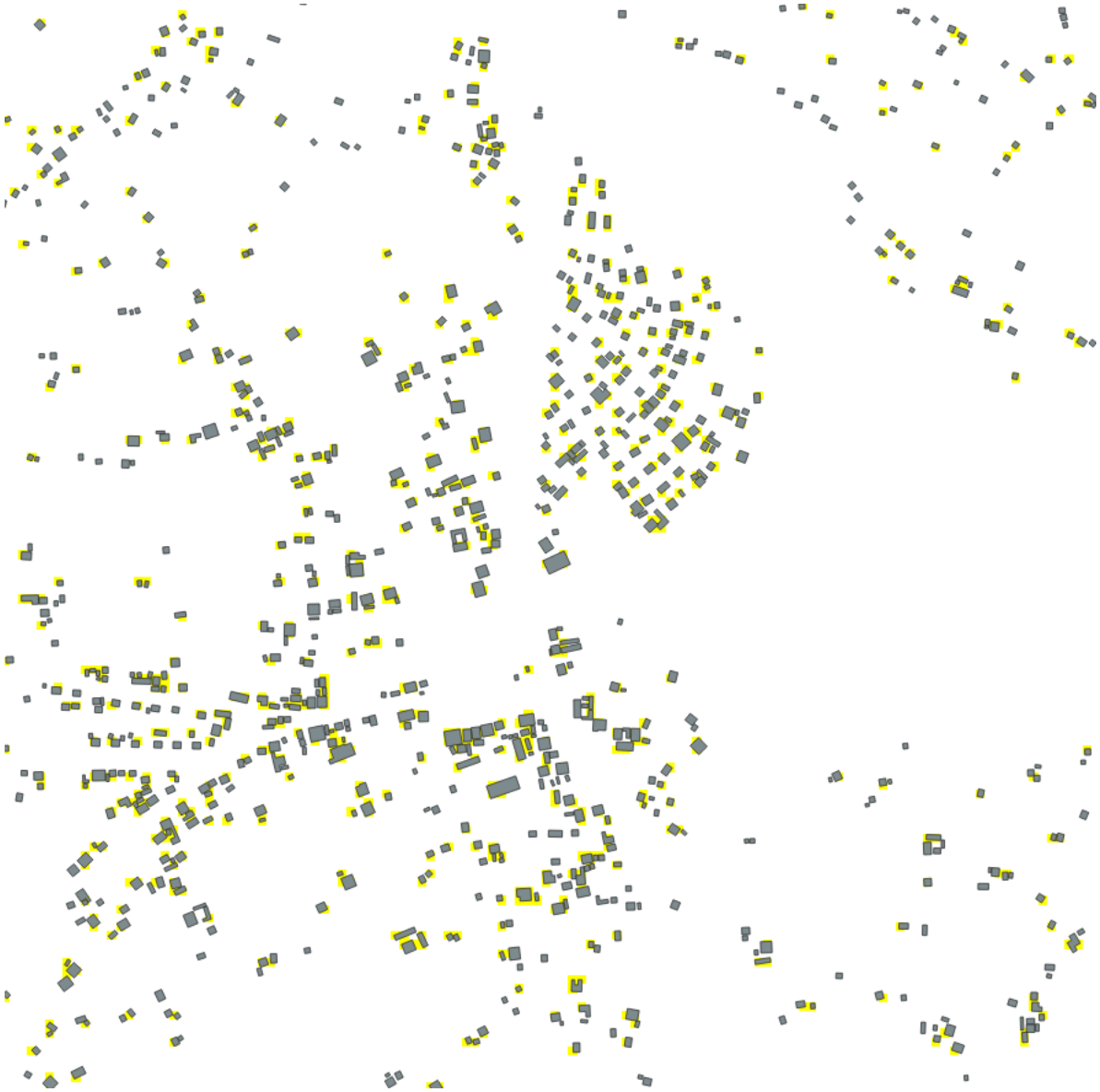
2022 Mean Probability of Dynamic World Land Cover being “Built” (10-meter)



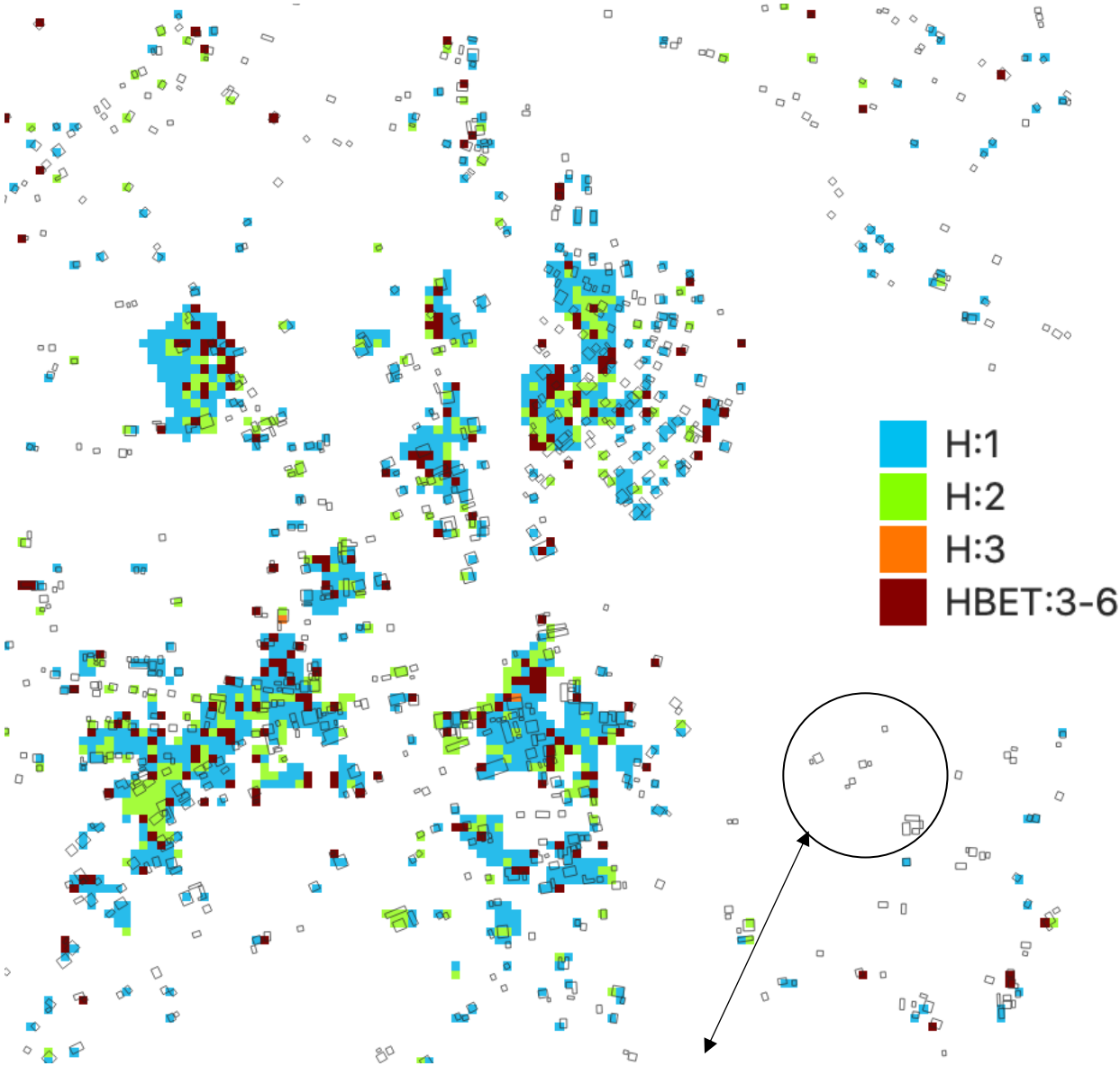
0 1

2022 Locations of Most Frequent Dynamic World Land Cover being “Built” (10-meter)

2014-2021 Microsoft Rwandan Building Footprint (Rasterized at 10-meter)



C4 Output: 2022 Building Height Map (10-meter)



Notice that we do not have predictions here. In fact, Microsoft Rwanda Bldg Footprint 2014-2021 (as shown) is not our "ground truth" as it just serves as a mere reinforcing belief to our approach whether a building could probably be in this location. When you check the Slide 12 and 13, the near-real-time Dynamic World Map even confirms the low likelihood of building presence here.

C4 Output: 2022 Building Roof Material Map (10-meter)

C4 Output: 2022 Building Wall Material Map (10-meter)

C4 Output: 2022 Building Macro-Taxonomy Map (10-meter)