

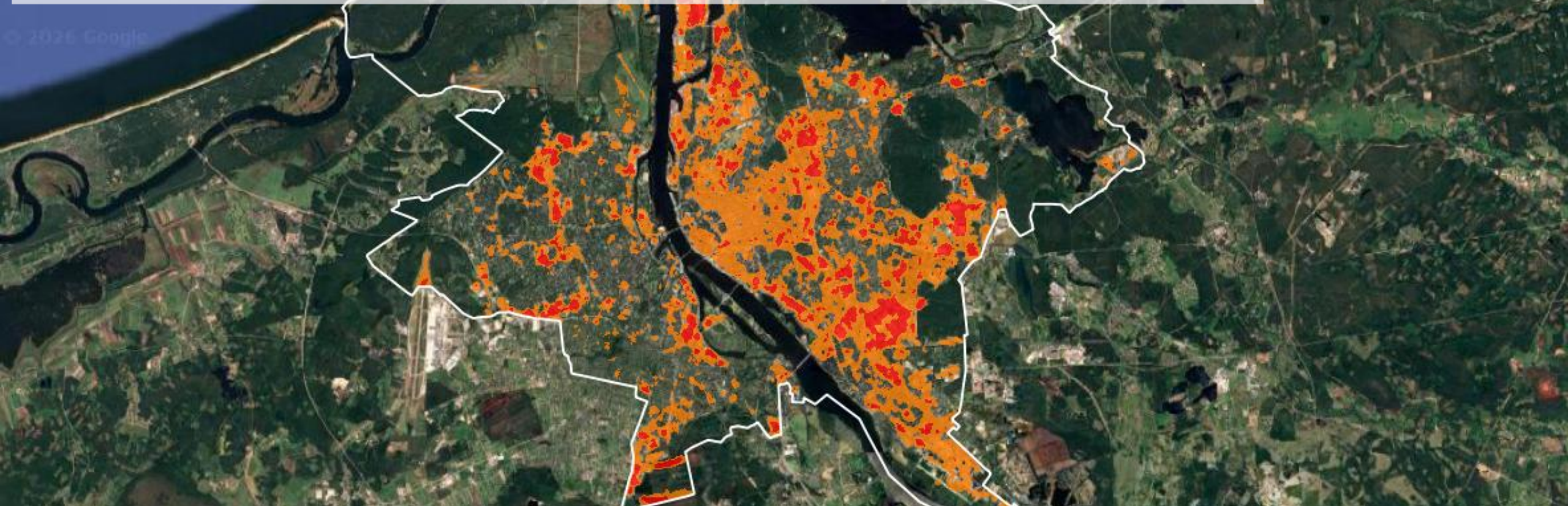


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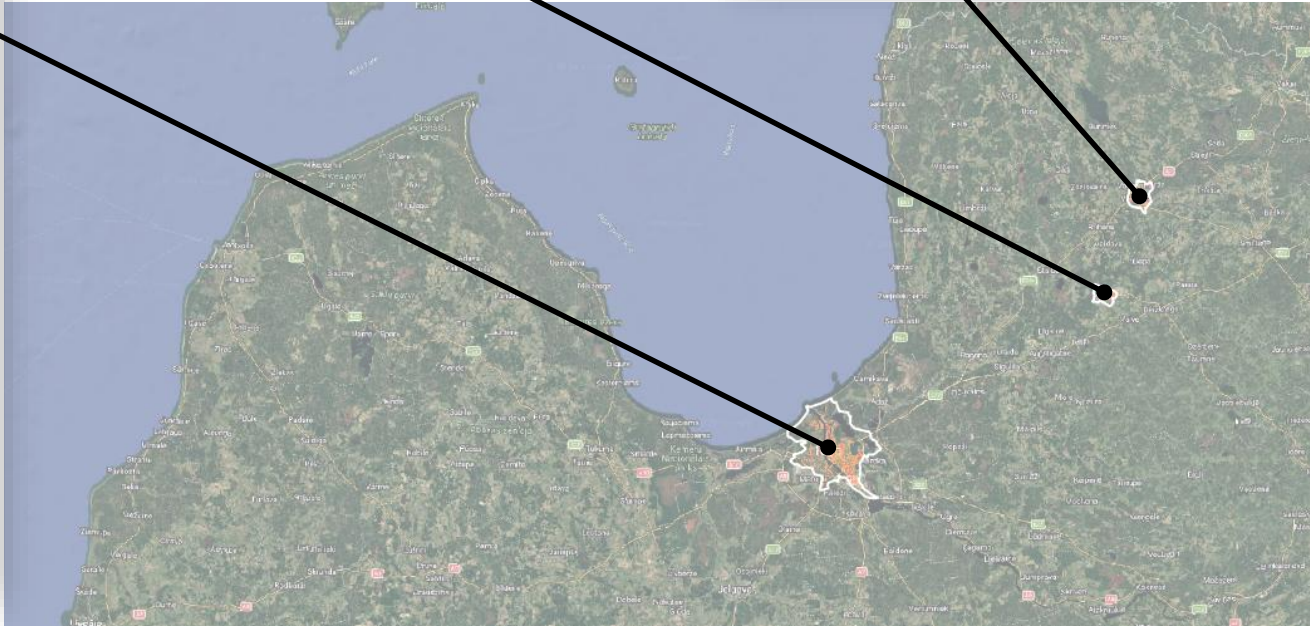
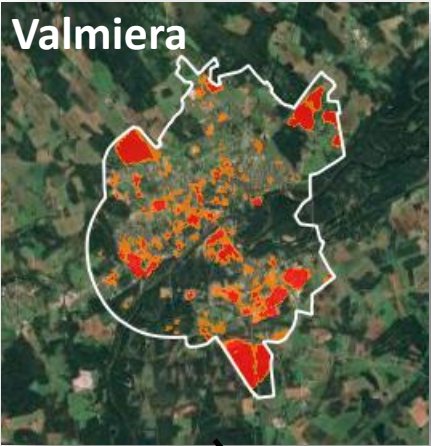
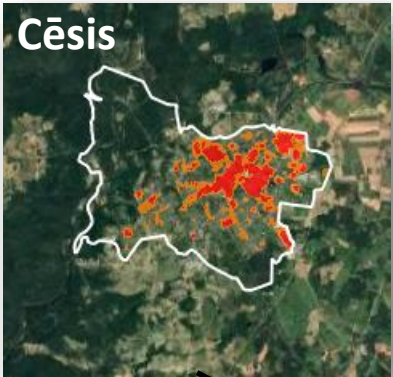
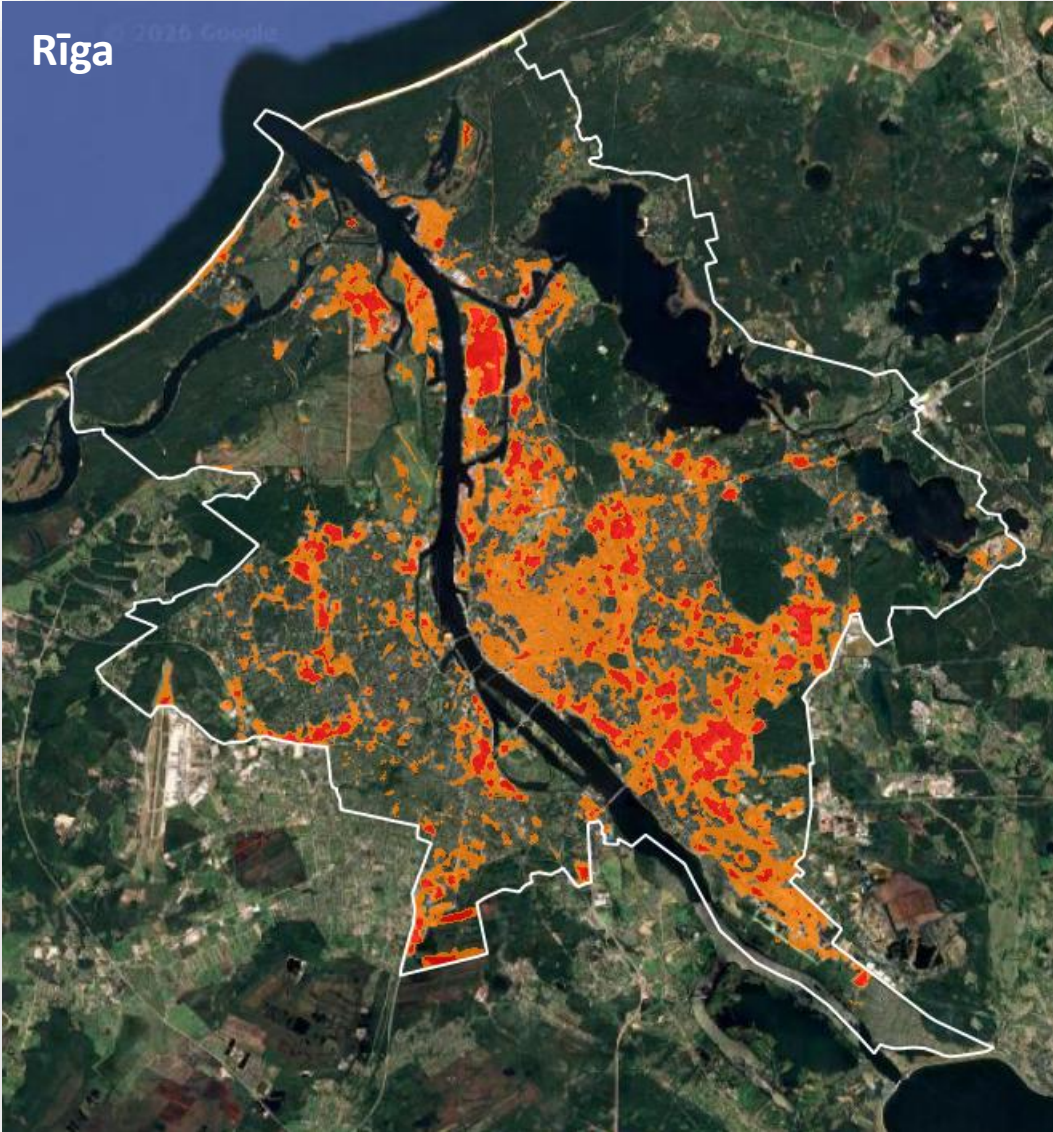


LATESTadapt Urban Heat Island and Green Space Assessment

Dainis Jakovels
E: dainis.jakovels@vri.lv



LATESTadapt pilot cities and heat island mapping

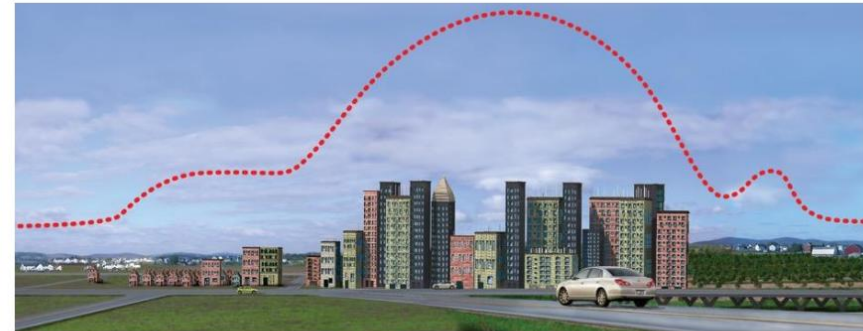


Urban heat island: definition and methodology

A **heat island** is a place with a higher temperature than the surrounding environment, which is considered a reference.

Urban Heat Islands

- Urban areas experience higher temperatures than outlying areas. This difference in temperature is what constitutes an urban heat island (UHI).
- Difference in temperature has to do with changes in radiative and thermal properties of impervious surfaces i.e., heat-absorbing buildings and pavement.
- Temperatures vary within cities due to the spatial distribution of water, soil, vegetation, and impervious surfaces.



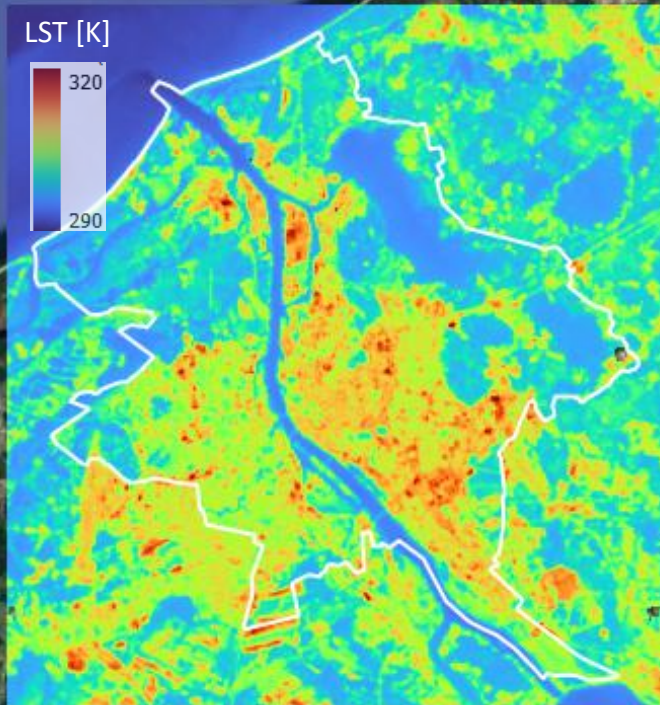
Land surface temperatures in cities, particularly densely-developed cities, tend to be elevated in comparison to surrounding areas. Credit: [NASA](#)

McCartney & Mehta, NASA, 2022

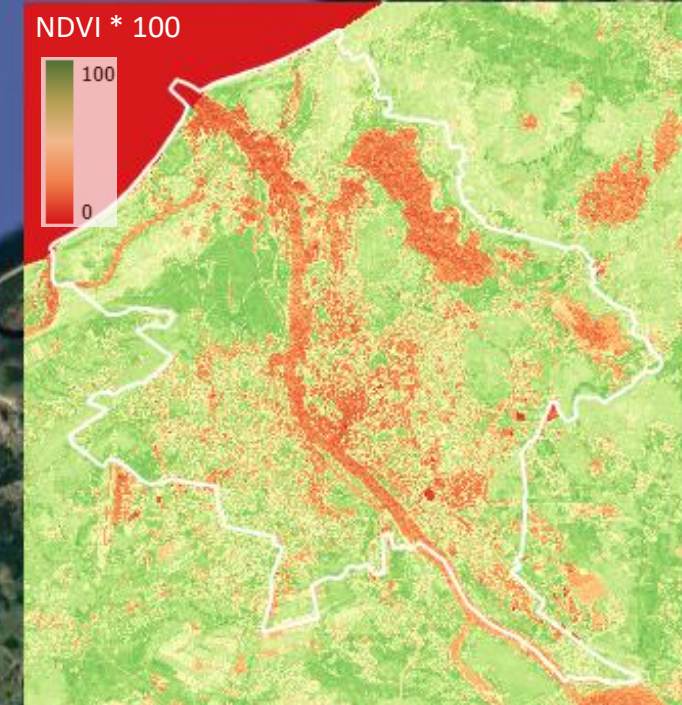
Satellite data products used as an input

A **heat island** is a place with a higher temperature than the surrounding environment, which is considered a reference.

Land Surface Temperature (LST) from
Landsat satellite TIRS sensor
(100 m/pix resolution)

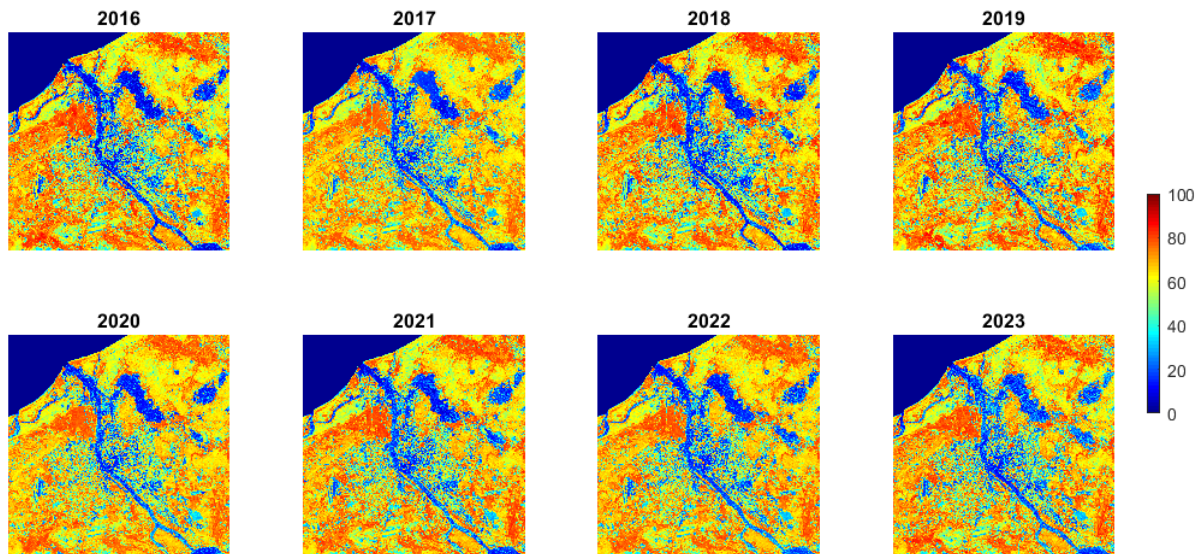


Vegetation index (NDVI) from
Sentinel-2 satellite MSI sensor
(10 m/pix resolution)

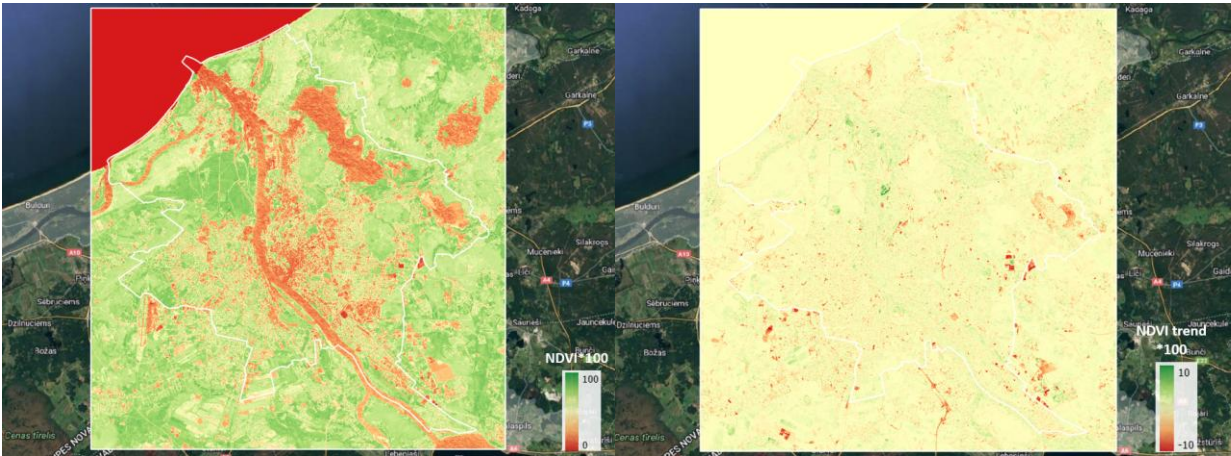
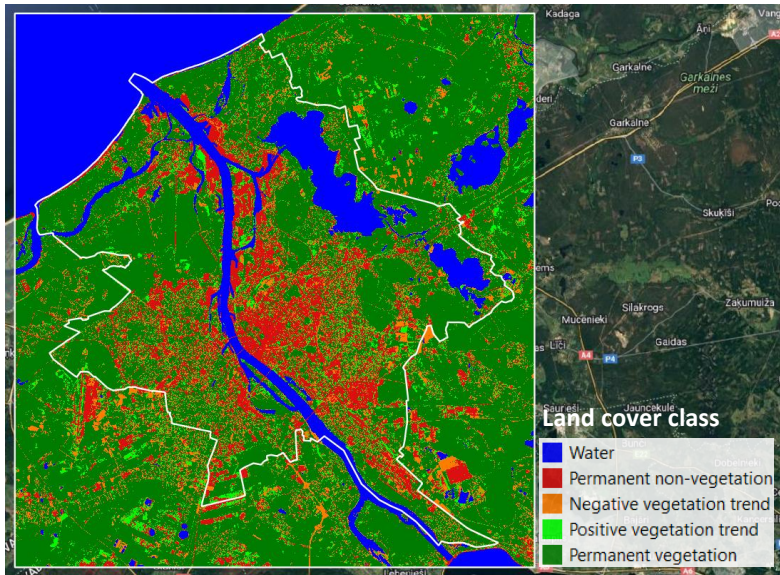


Green area mapping from satellite data

Yearly NDVI maximum values

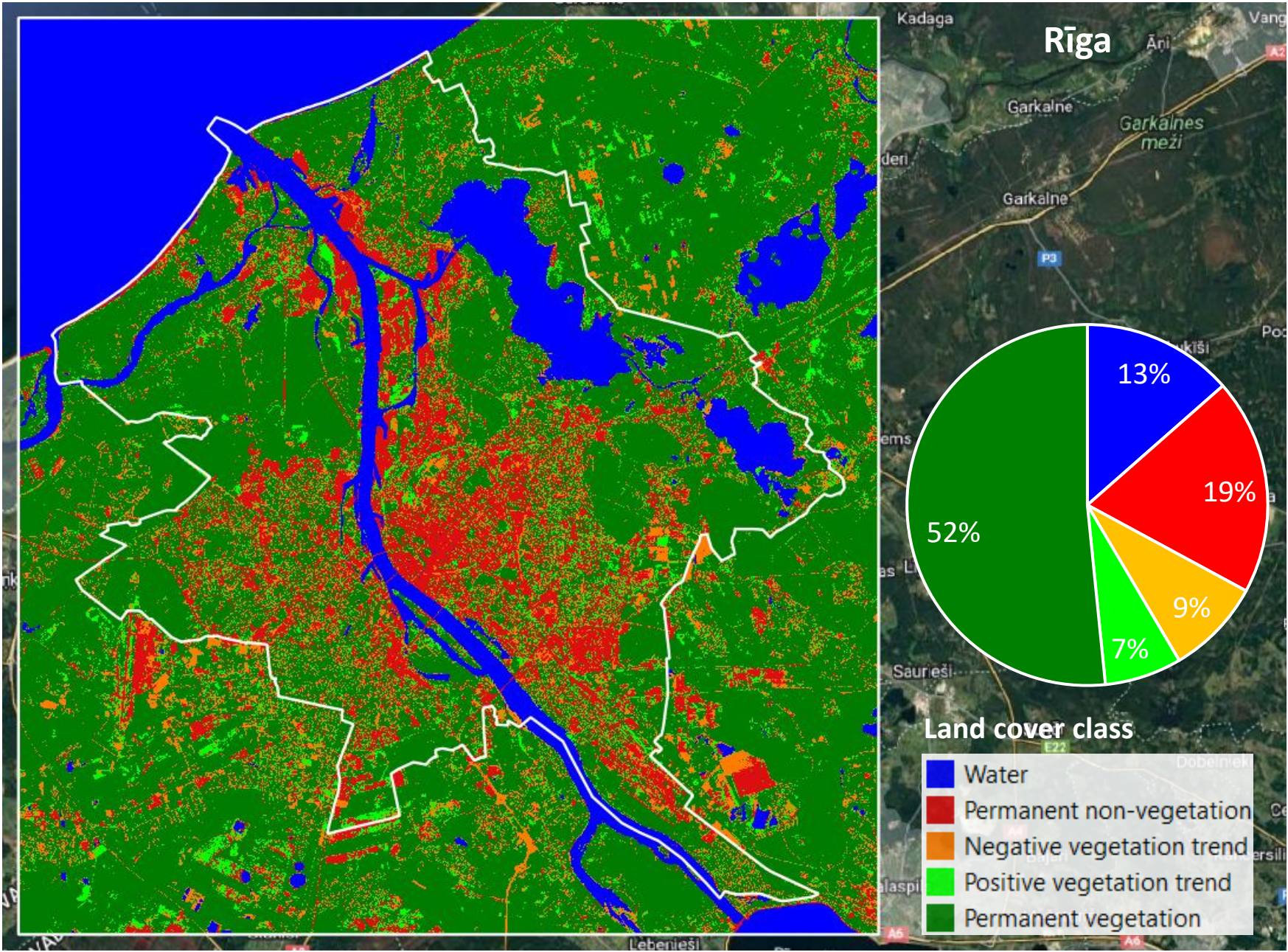


Land cover classification 2016-2023

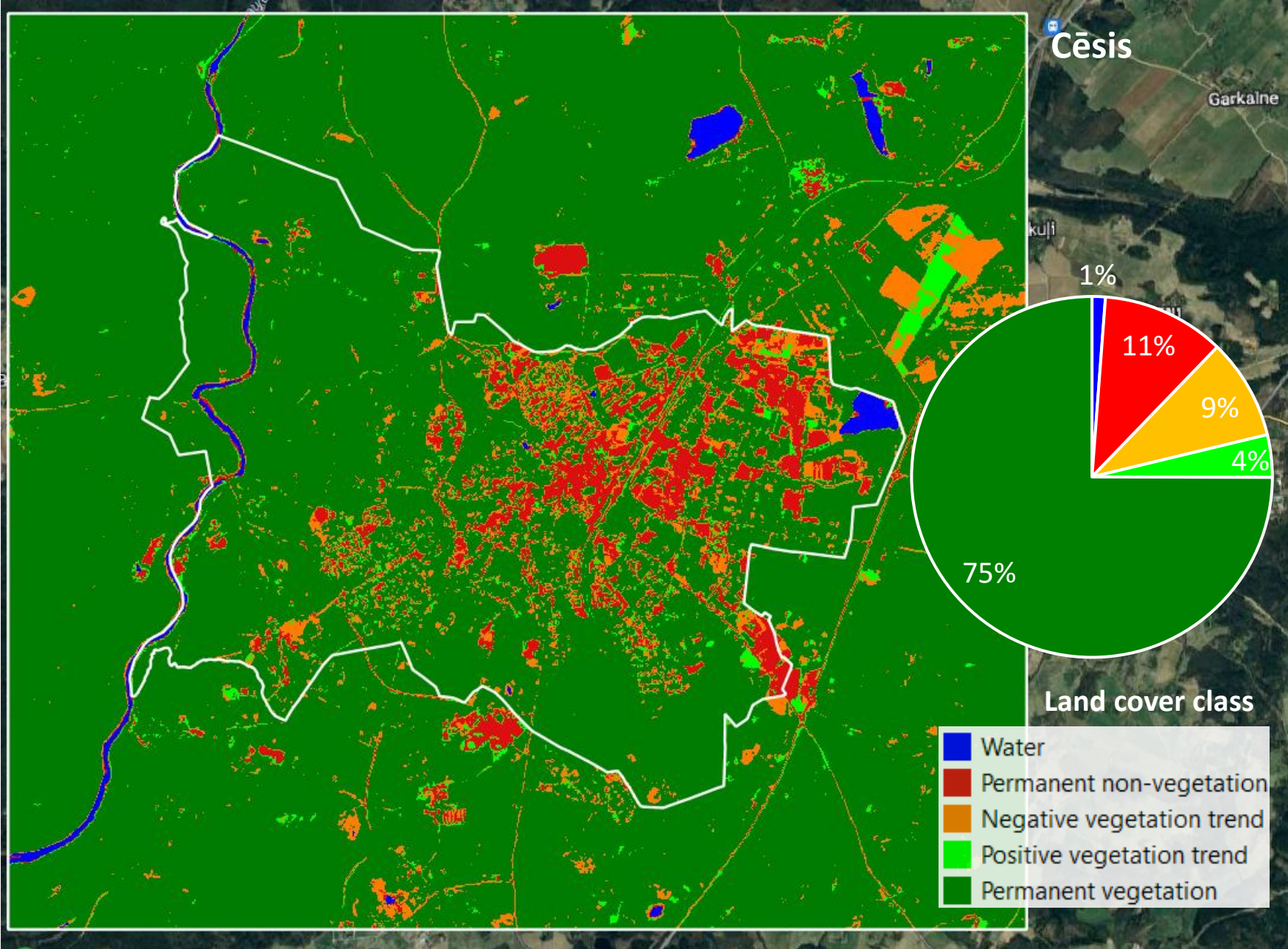


Regression analysis for vegetation change trend assessment 2016-2023

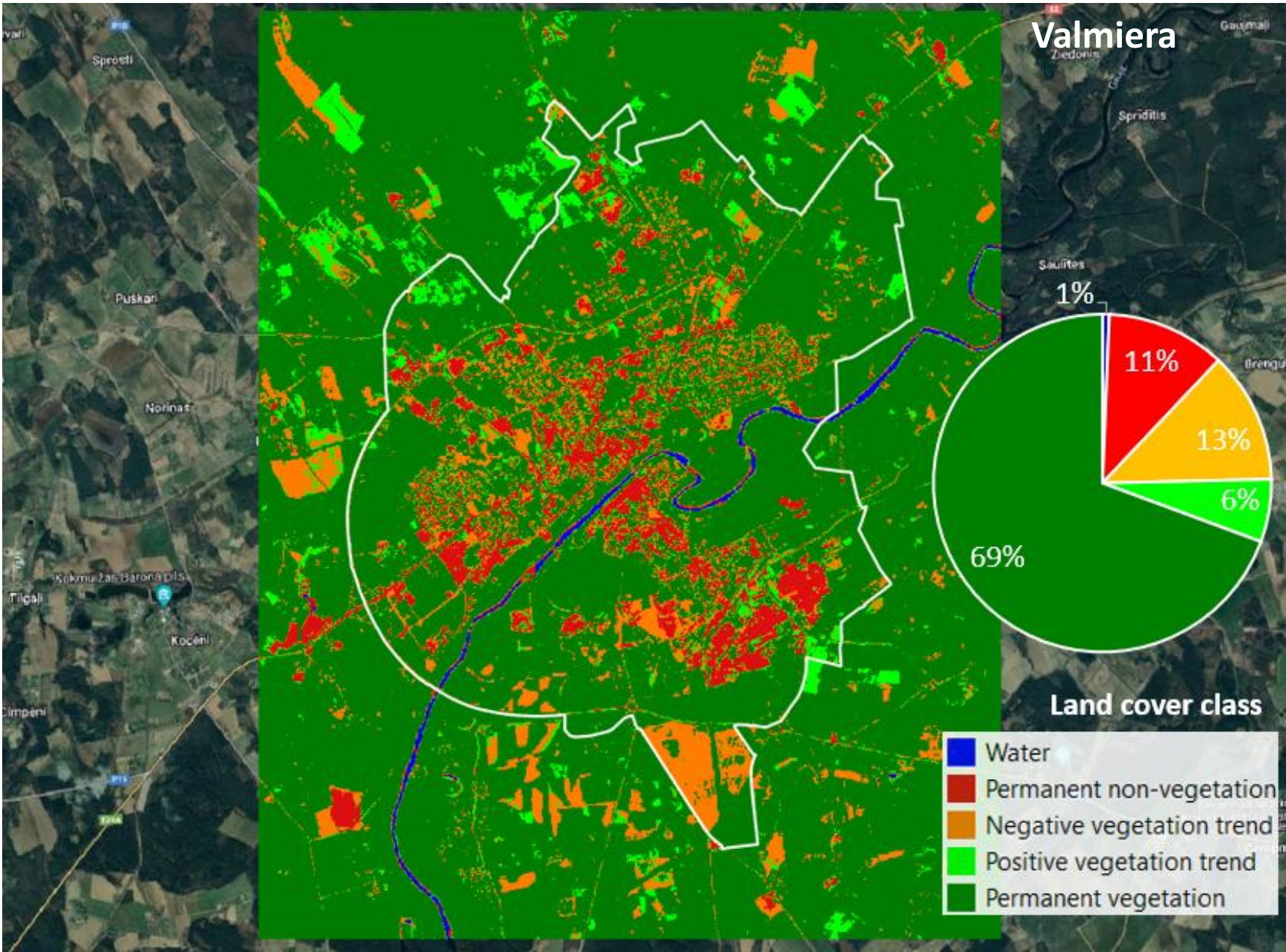
Green area mapping from satellite data



Green area mapping from satellite data

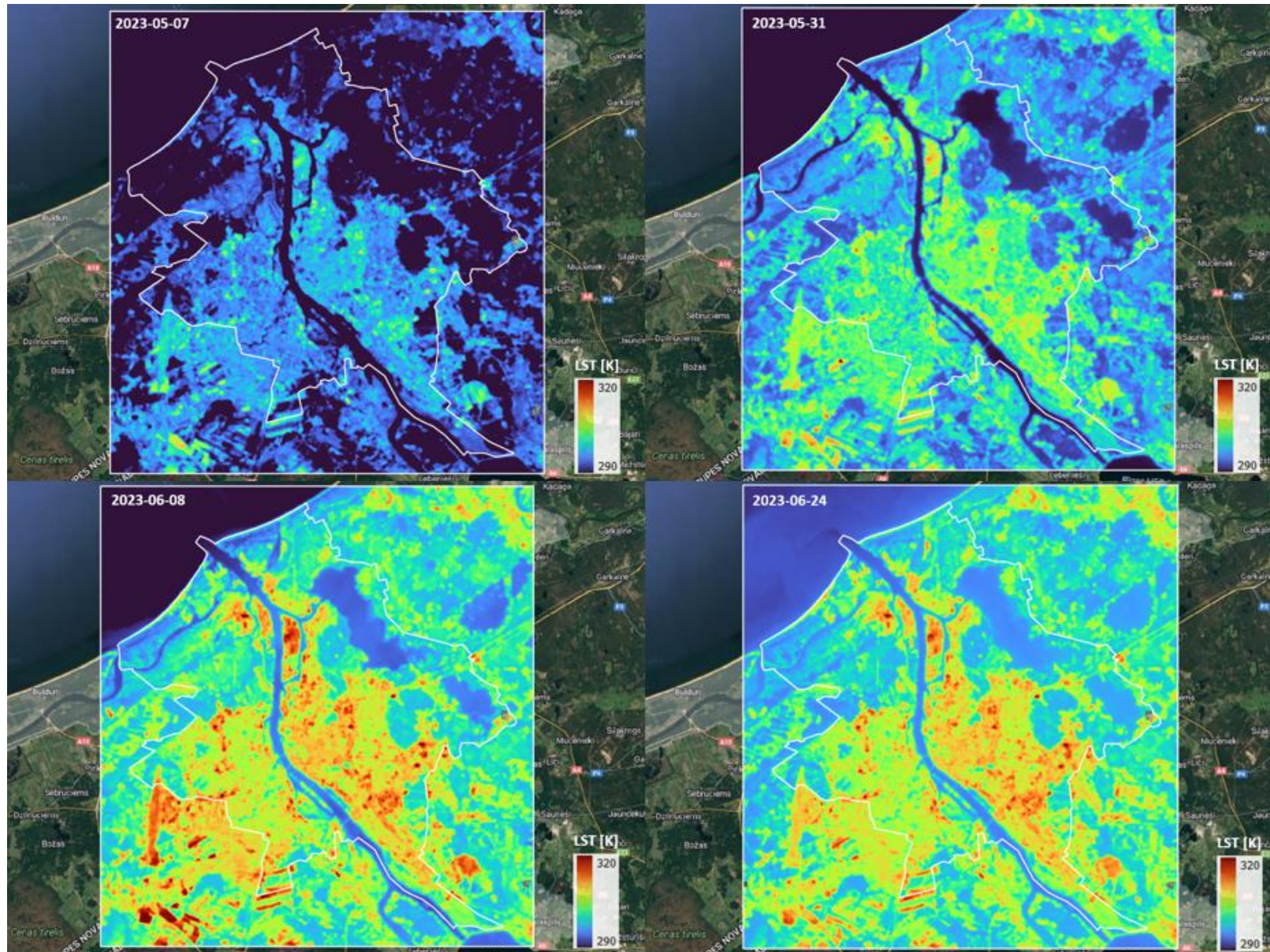


Green area mapping from satellite data



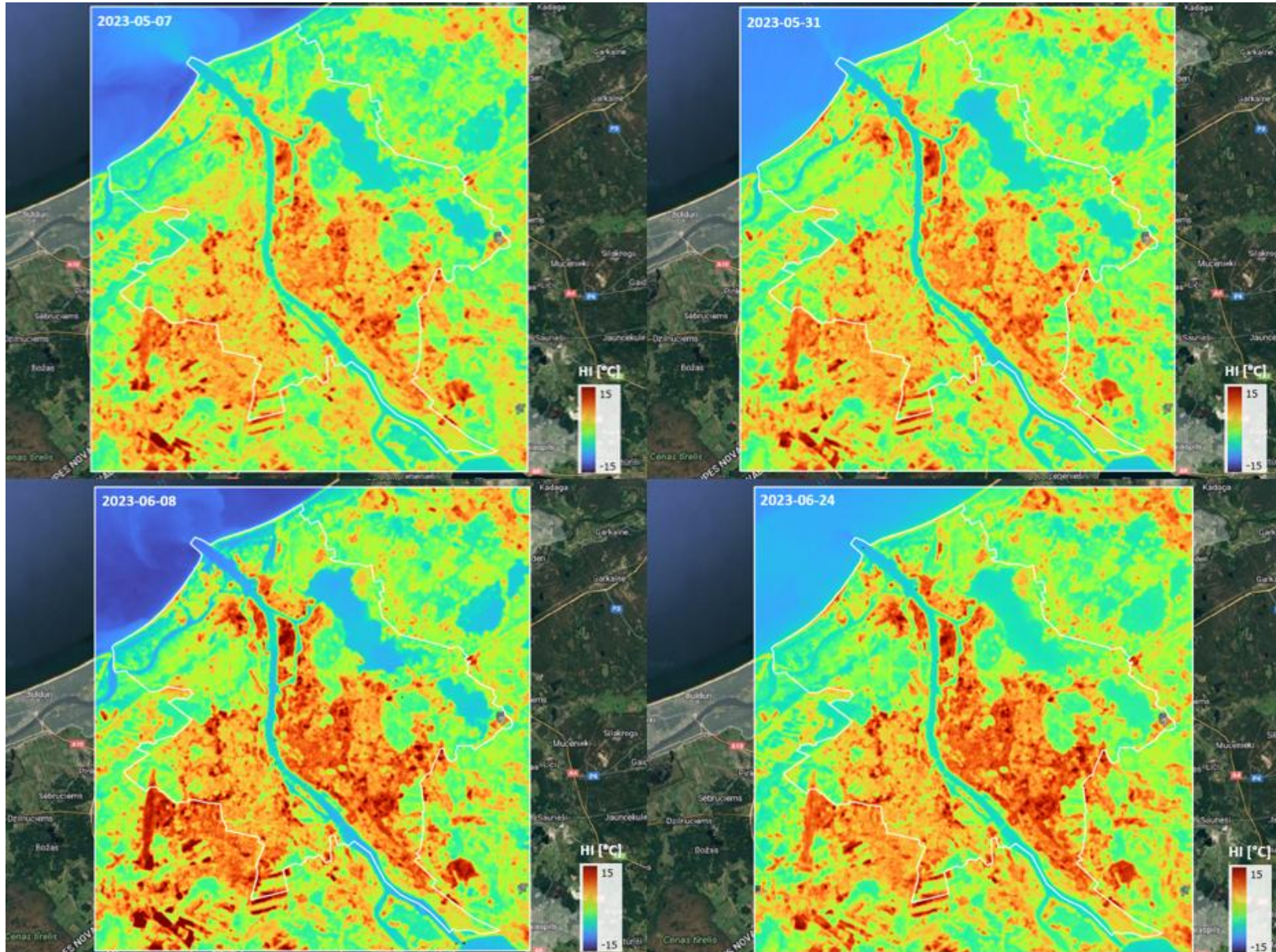
Heat island mapping from satellite data

Land surface temperature (LST)



Heat island mapping from satellite data

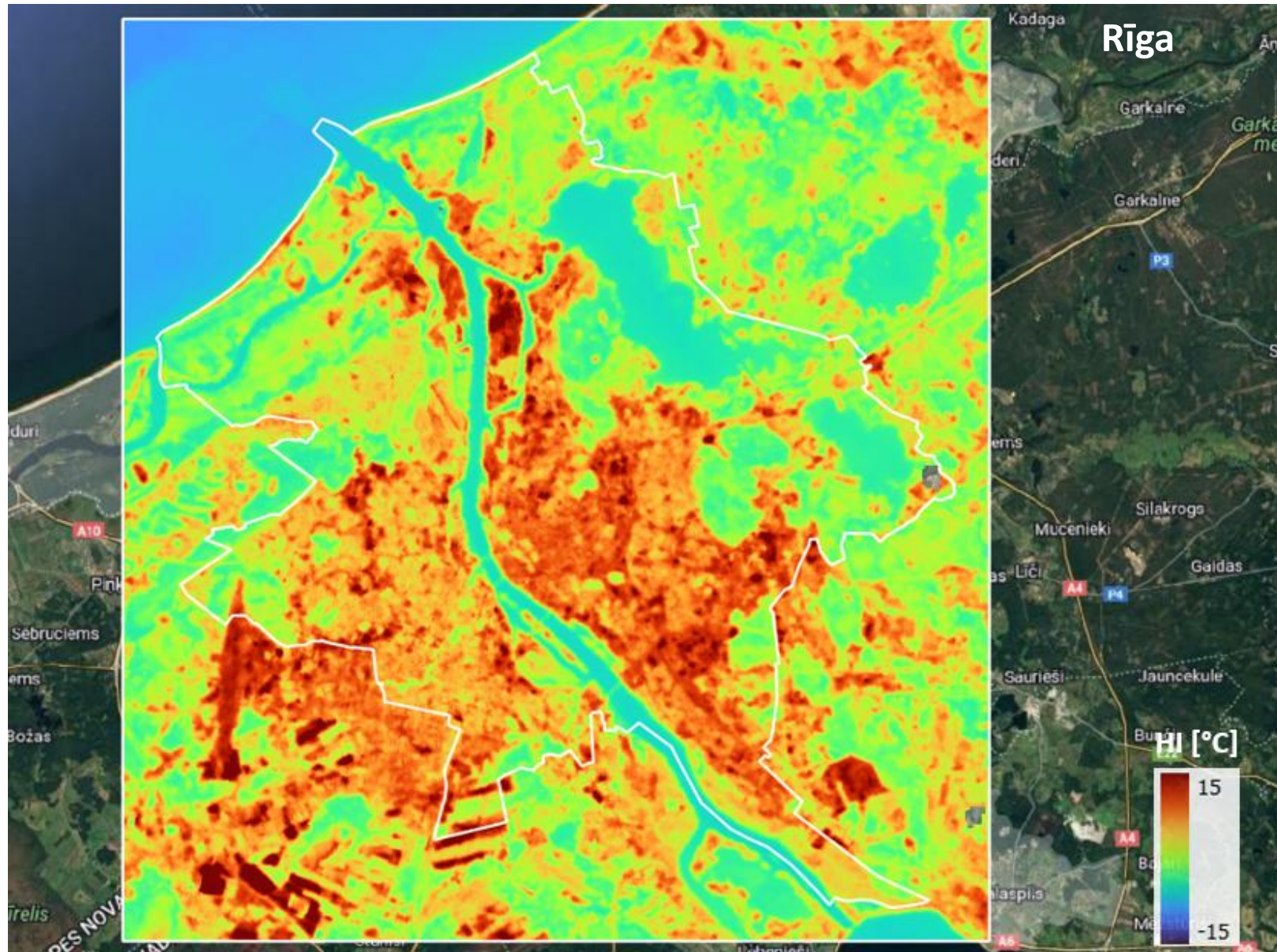
Land surface temperature (LST) difference between the point of interest and the reference



$$SUHI_{diff} = LST - LST_{med}$$

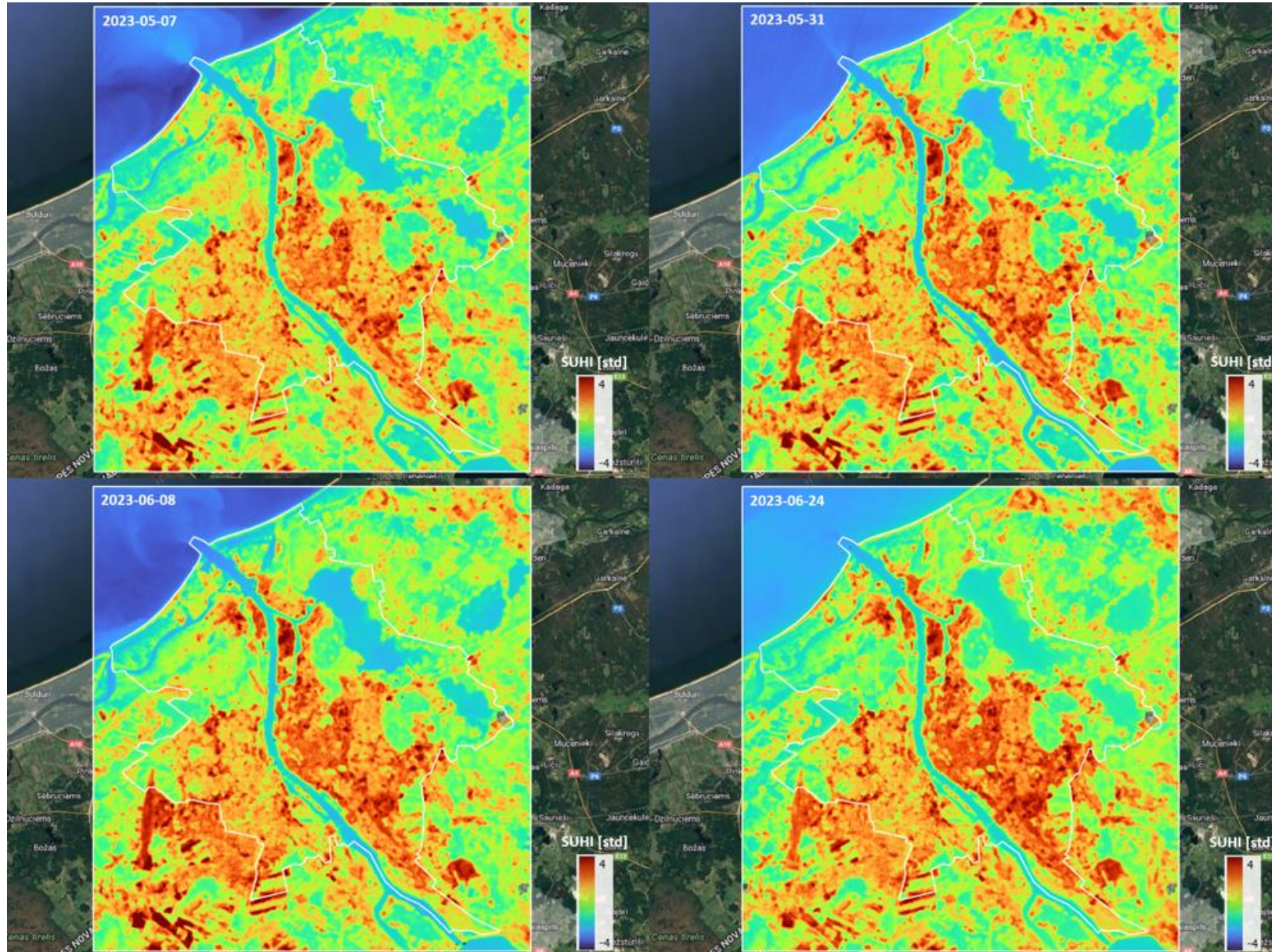
Heat island mapping from satellite data

Land surface temperature (LST) difference between the point of interest and the reference



Heat island mapping from satellite data

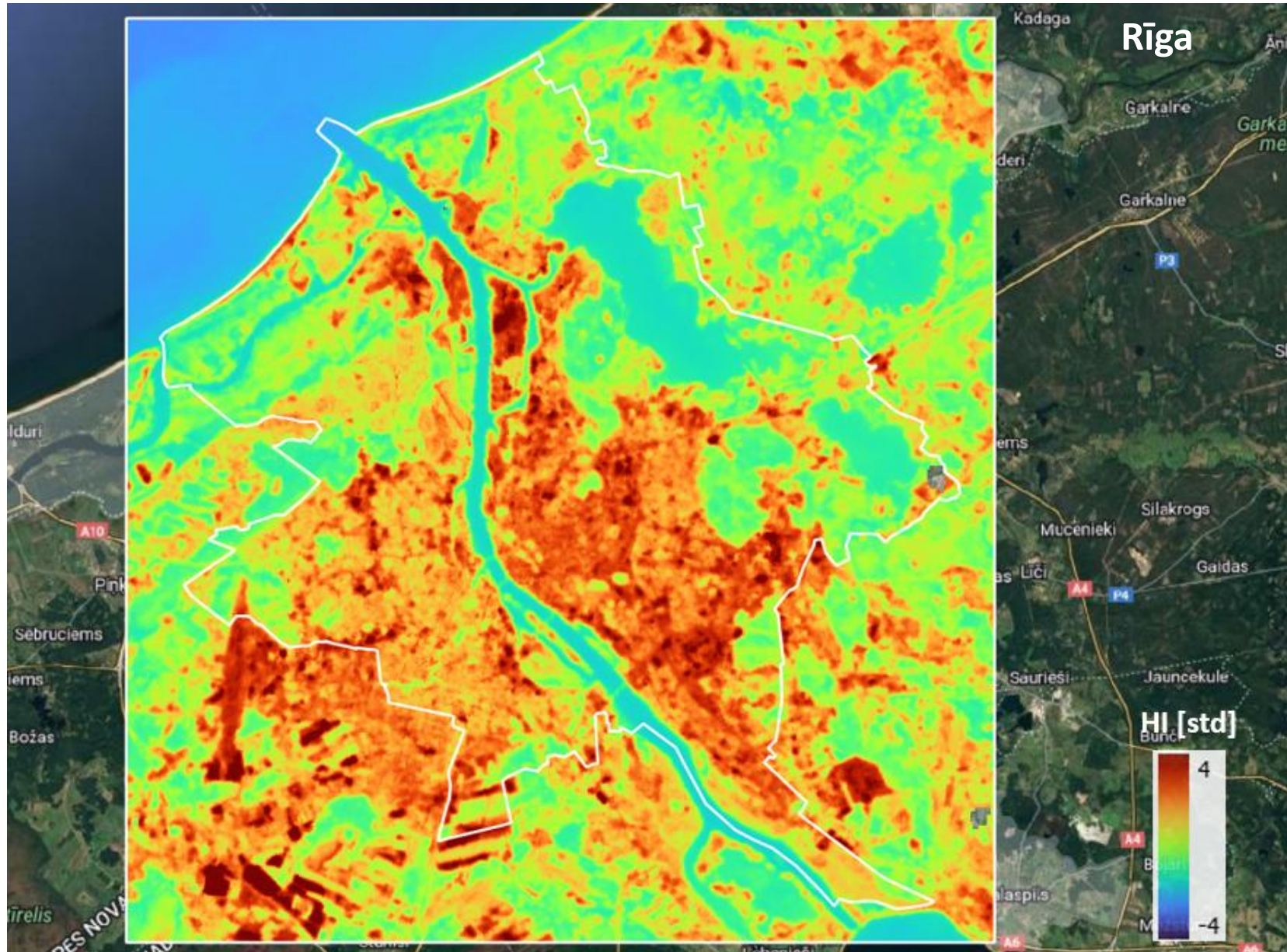
Land surface temperature (LST) **normalised** difference between the point of interest and the reference



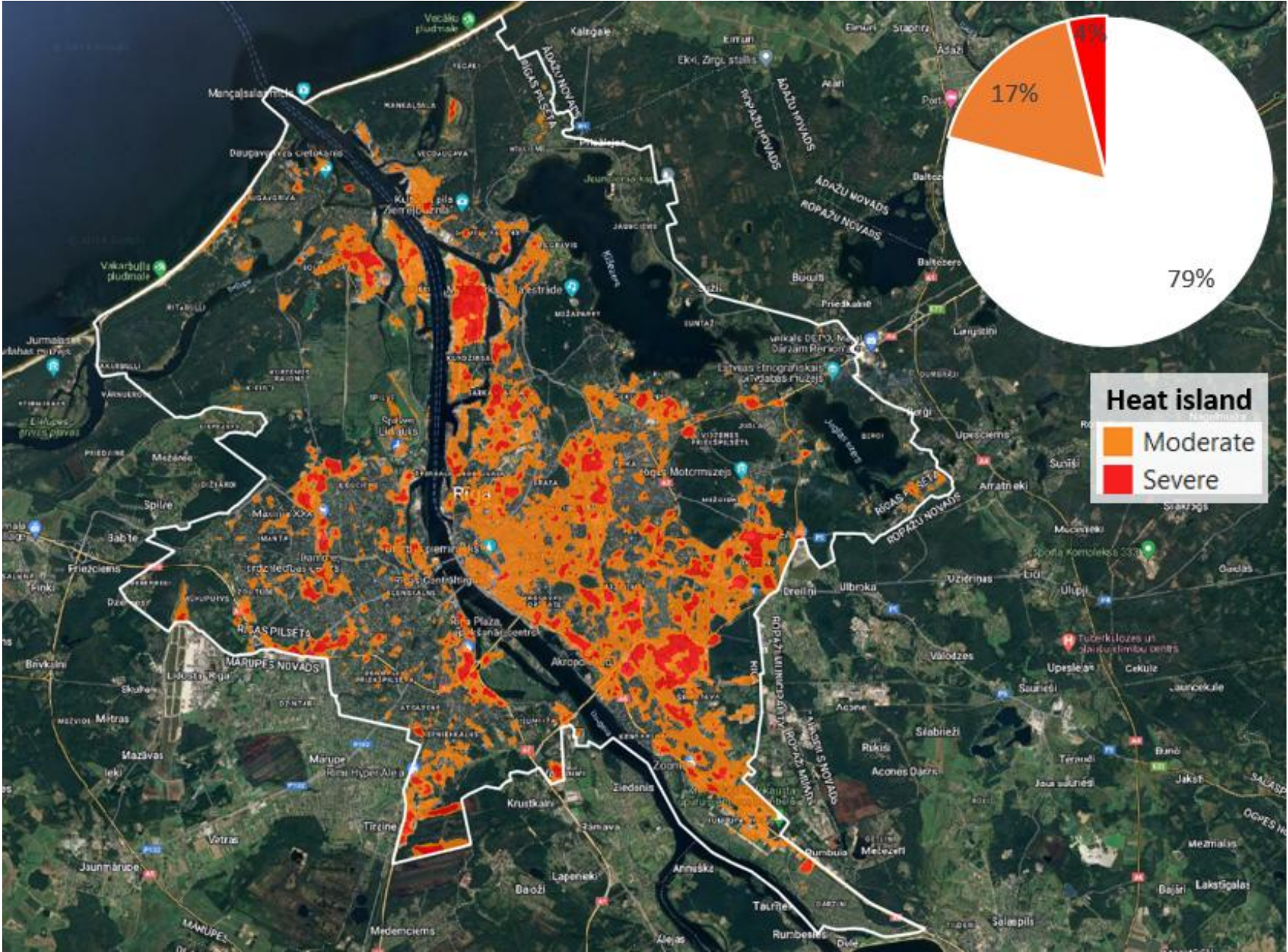
$$SUHI_{std} = \frac{LST - LST_{med}}{LST_{std}}$$

Heat island mapping from satellite data

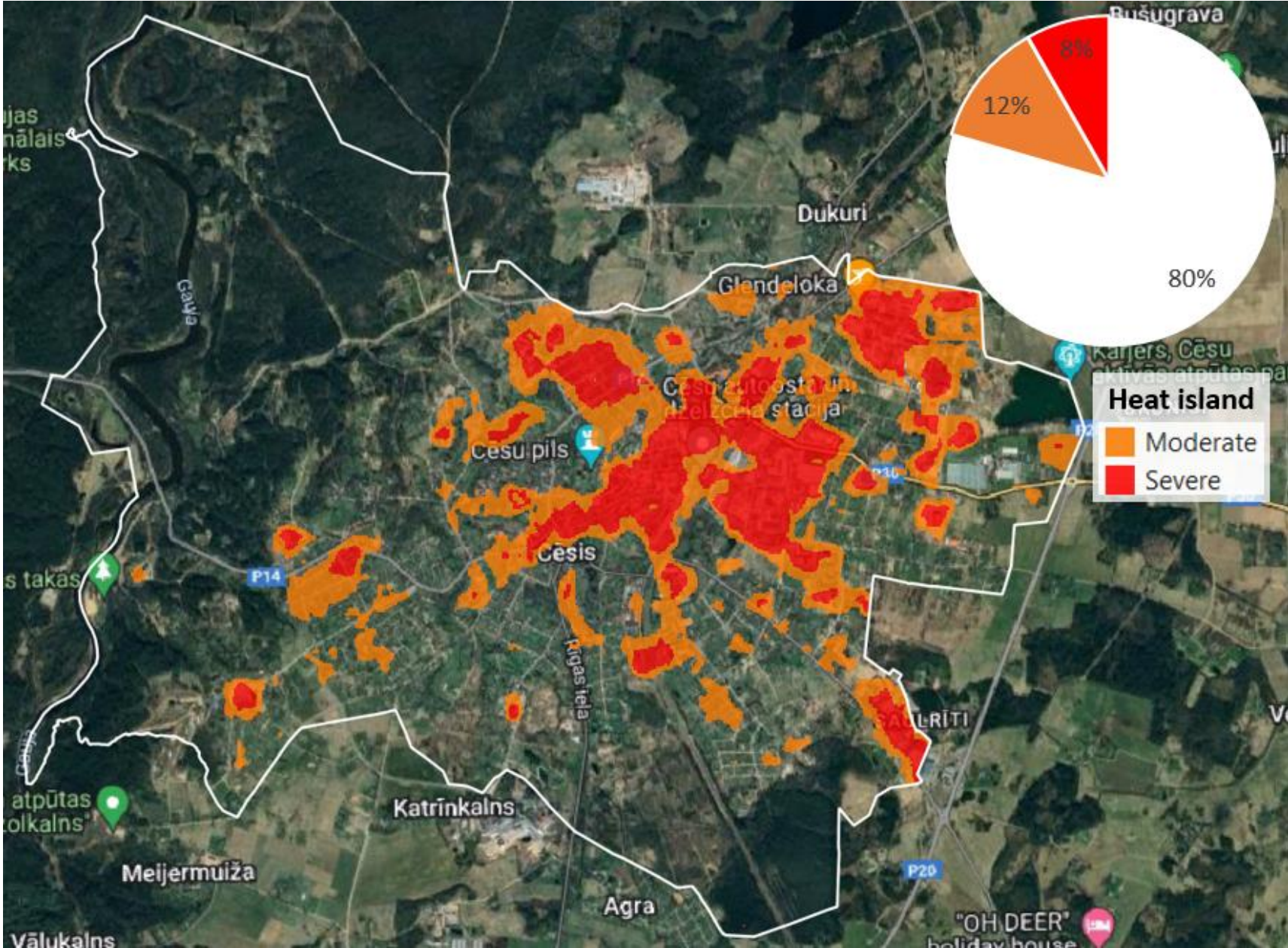
Land surface temperature (LST) normalised difference between the point of interest and the reference



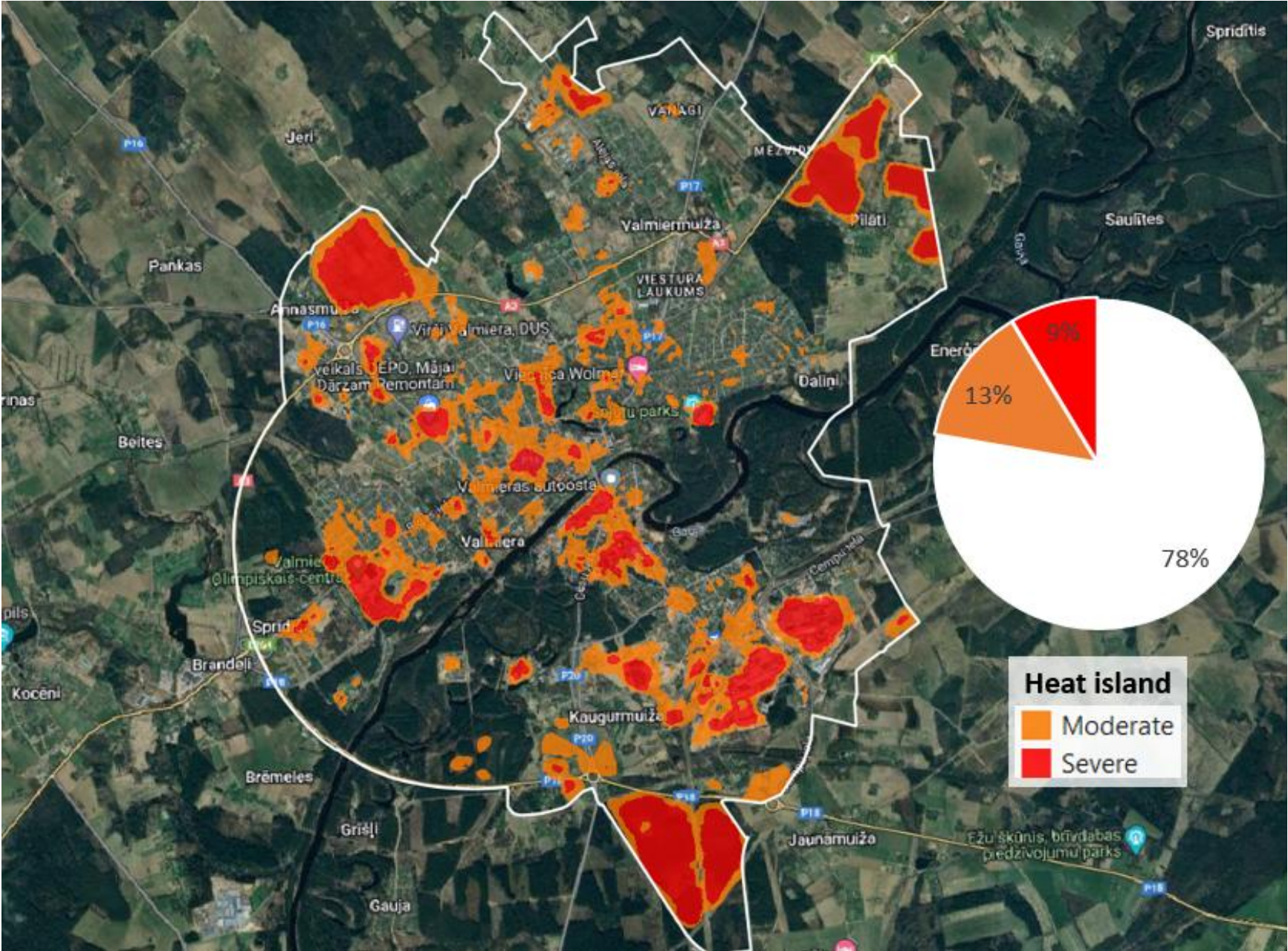
Heat island mapping from satellite data



Heat island mapping from satellite data

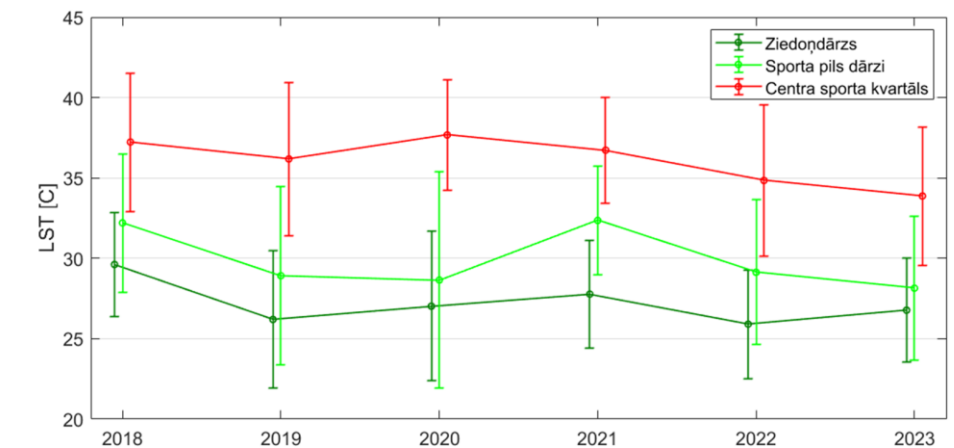
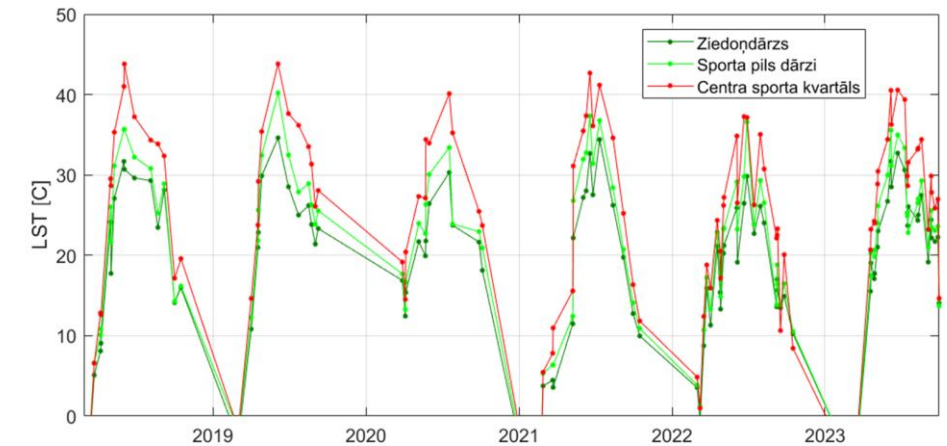
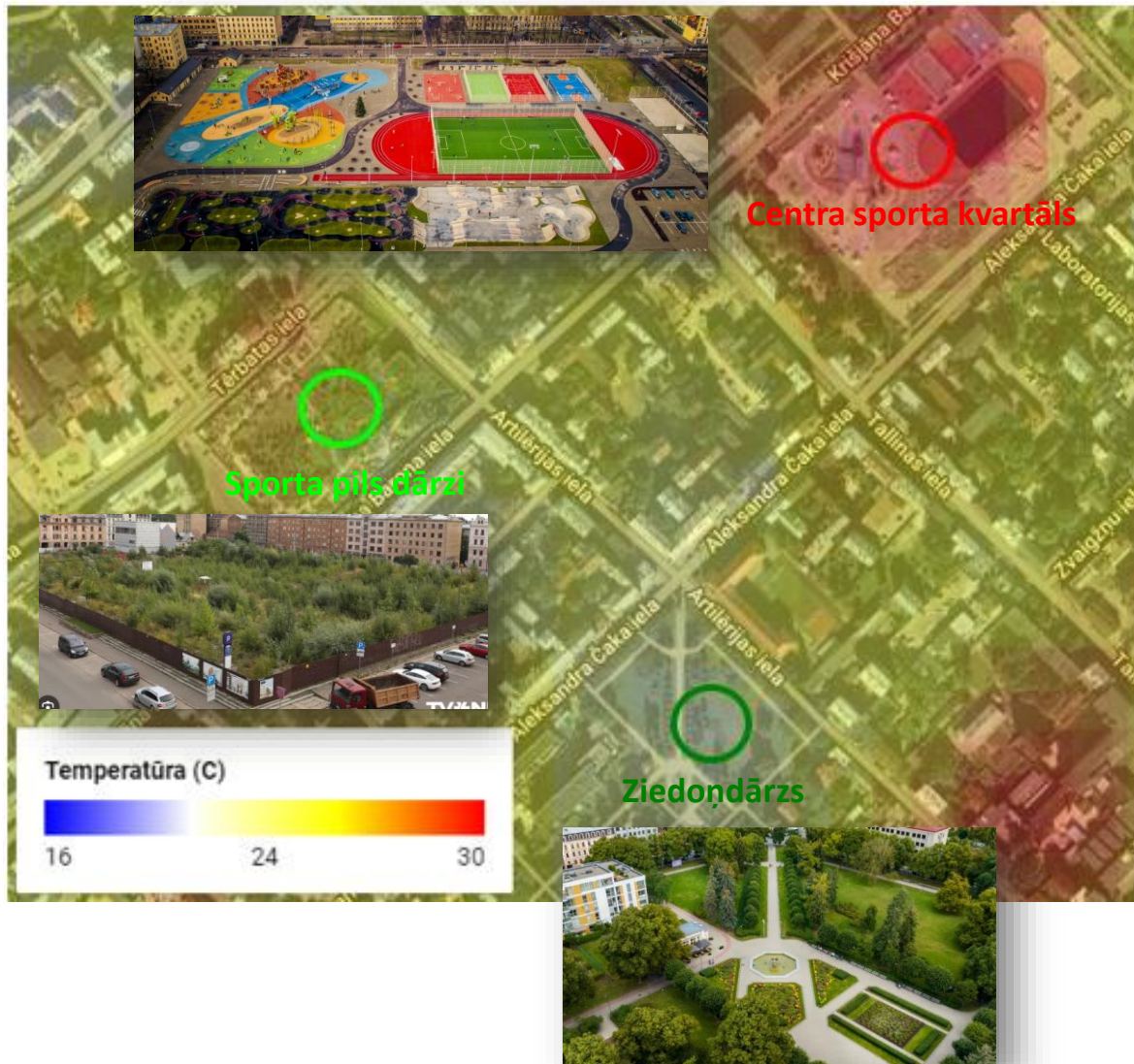


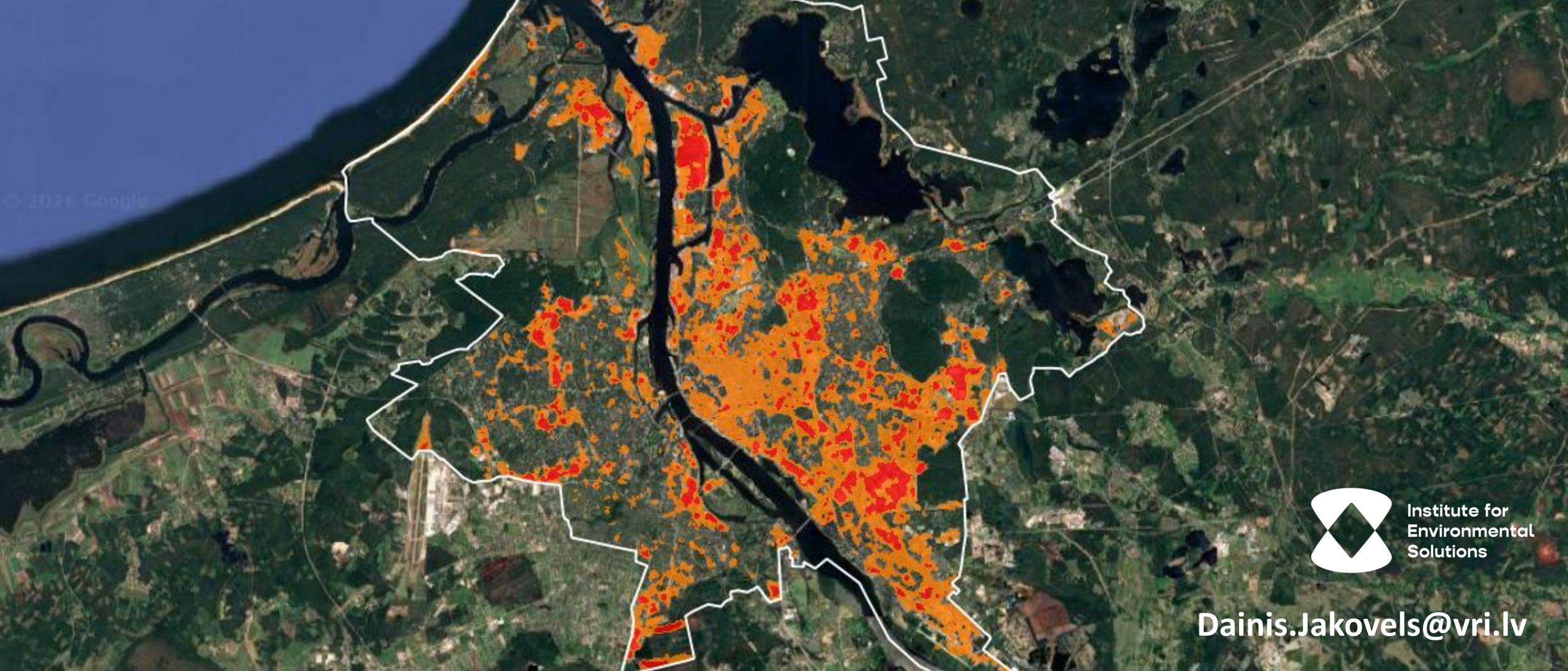
Heat island mapping from satellite data



Heat island mapping from satellite data

Land surface temperature (LST) monitoring in points of interest





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