

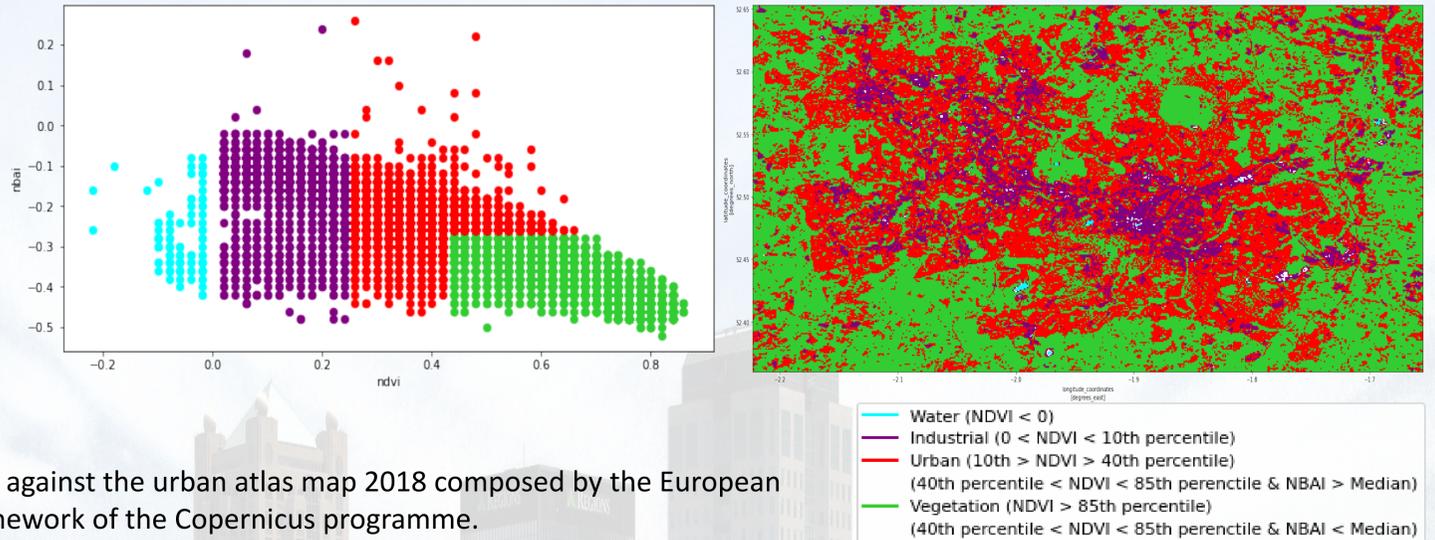
The urban heat island (UHI) is an area of industrial or urban cover that suffers generally higher temperatures than neighbouring rural regions. With approximately 50% people worldwide living in urbanised areas, UHIs can have significant societal and infrastructural impacts. The UHI effect can be attributed to many factors. These include changes to Earth's albedo, a reduction in evapotranspiration and other effects from a decline in vegetation, a reduction in wind flow through urban geometries when compared with rural surroundings, and an increase to anthropogenic heat.

Classification:

In order to investigate the UHI an appropriate rural background temperature must first be created. Within previous literature there is no single way this is done, so during this project a land use style classification was implemented by investigating the normalised difference vegetation index (NDVI) and the normalised built area index (NBAI). Percentiles were derived empirically for each of the classifications.

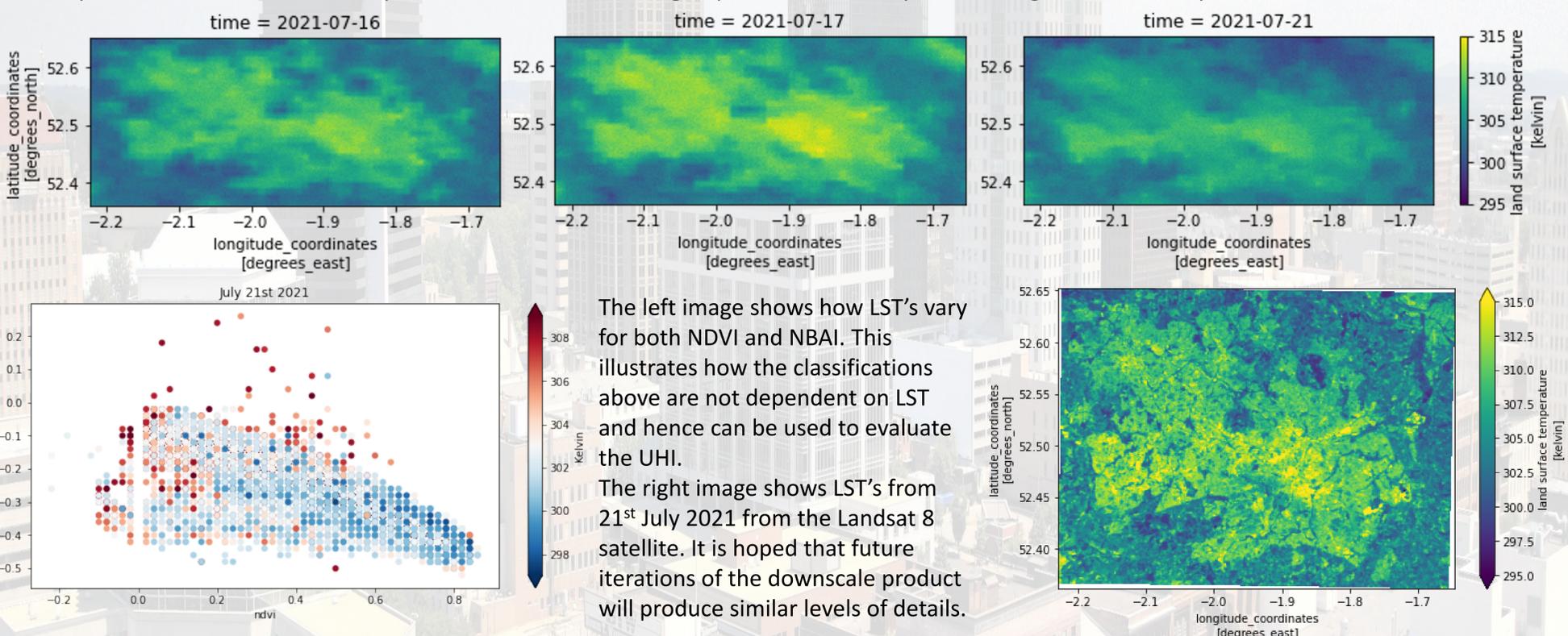
These classifications were then compared against the urban atlas map 2018 composed by the European Environment Agency (EEA) under the framework of the Copernicus programme.

The rural background temperature was then created by taking the median LST from the vegetation classification.



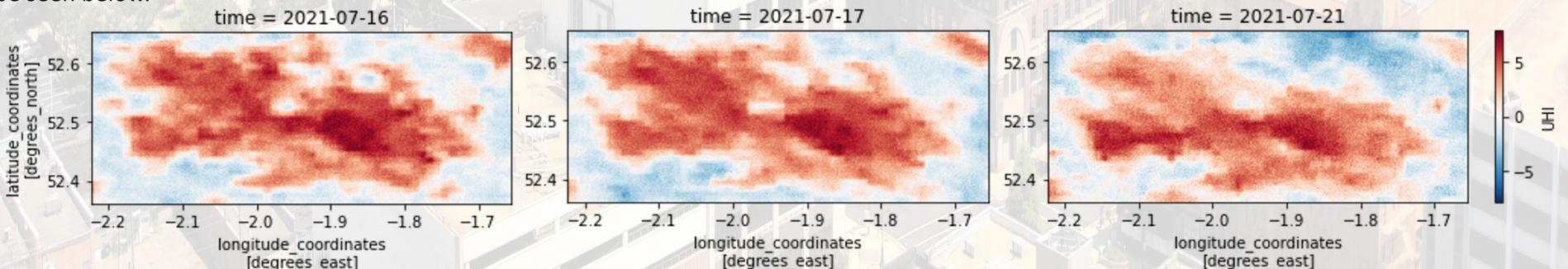
Land Surface Temperatures:

The LST values within this project come from a downscale product created from Sentinel 2 and Sentinel 3 data by the land surface temperature group at University of Leicester. LST's were analysed for various dates during July 2021 for both daytime and night-time. The daytime scenes are shown below.



Analysing the Urban Heat Island:

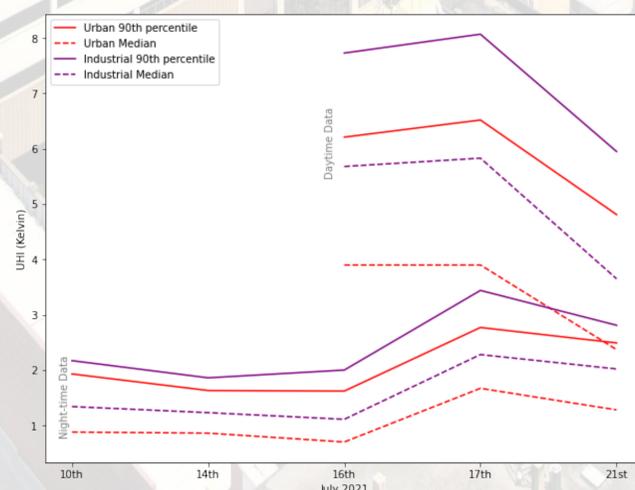
The UHI can be analysed through subtracting the rural background temperature from the LST values. The daytime scenes from throughout July 2021 can be seen below.



DAYTIME:

The median UHI experienced by the Urban classification during July 2021 was 3.3K and for the Industrial classification it was 5.1K. By considering the 90th percentile of pixels, the UHI temperatures rose to 6.1K and 7.5K respectively.

The right image shows how both the median and 90th percentile UHI changed over the analysed days.



NIGHT-TIME:

The median UHI experienced by the Urban classification during July 2021 was 1K and for the Industrial classification it was 1.5K. By considering the 90th percentile of pixels, the UHI temperatures rose to 2.3K and 2.7K respectively.