

A thermal map of Europe and surrounding regions, with colors ranging from dark blue (cooler) to bright yellow and orange (warmer). The map shows a clear temperature gradient from north to south. A solid red vertical bar is located on the far left edge of the image.

# TAKING CLIMATE ACTION

how space-based heat data can  
power adaptation planning



# Insights from space

Space4Climate help create climate services and actionable insights from space.

Chaired by the UK Space Agency, Space4Climate led a project highlighting the need for space-based heat data in effective climate adaptation planning.

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The project explores how satellite climate data and insights can be made easily accessible to those developing planning policy – empowering public bodies to make and meet their climate action plans.

**“This project will help us understand how we can provide decision-makers with vital space-based insights to help deal with the effects of climate change and improve lives around the world.”**

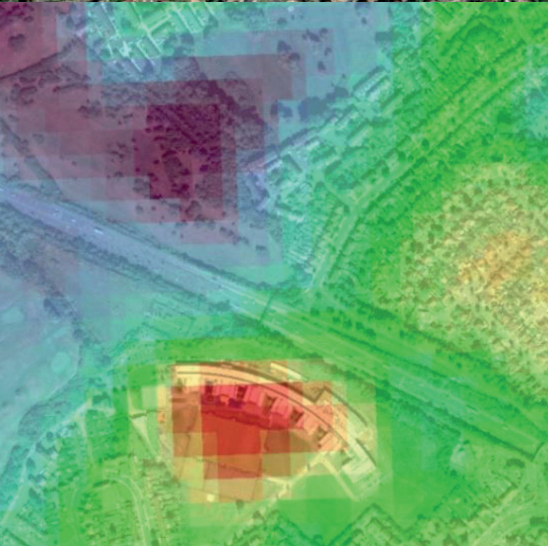
BETH GREENAWAY – HEAD OF EARTH OBSERVATIONS AND CLIMATE, UK SPACE AGENCY, CHAIR SPACE4CLIMATE



The spatial heat distributions in the data are provided by the National Centre for Earth Observation’s team at the University of Leicester, identifying areas of greatest risk from high temperatures.

**“Decision-makers need information at their fingertips which requires a ready supply of high quality data and an expert interface.”**

PROF JOHN REMEDIOS – DIRECTOR OF THE NATIONAL CENTRE FOR EARTH OBSERVATION



**“UK research science is at the forefront of producing and interpreting climate data from space. We now need to enable decision-makers to access the most appropriate, validated and relevant insights to help them act and plan for climate impact.”**

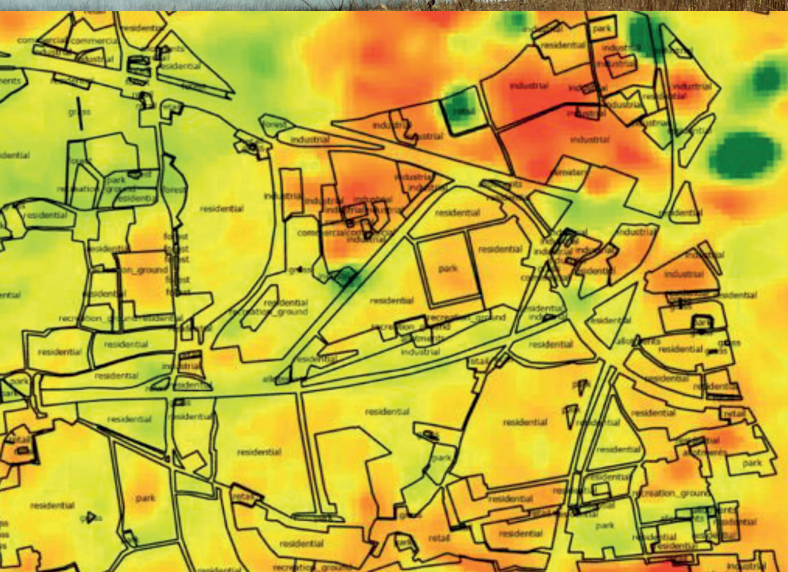
PROF JOHN REMEDIOS – DIRECTOR OF THE NATIONAL CENTRE FOR EARTH OBSERVATION

Land surface temperature effect from a Multi-Use Games Area (MUGA) at a school site. The effect is only visible in the heat data

# “Heat is a killer.”

– DONNA LYNDSEY

INNOVATION LEAD, ORDNANCE SURVEY



Urban Heat Islands derived from National Centre for Earth Observation earth observation data is highlighted using OS derived polygons

# The Climate Change Committee has declared heat adaptation a top priority.

Adapting to heat events helps protect people's health, wellbeing, and productivity.

Mitigating risks also supports agriculture, infrastructure, and the environment – including the preservation of natural carbon sinks.



## 22

As of 2018, the 20 warmest years on record globally have been in the past 22 years.



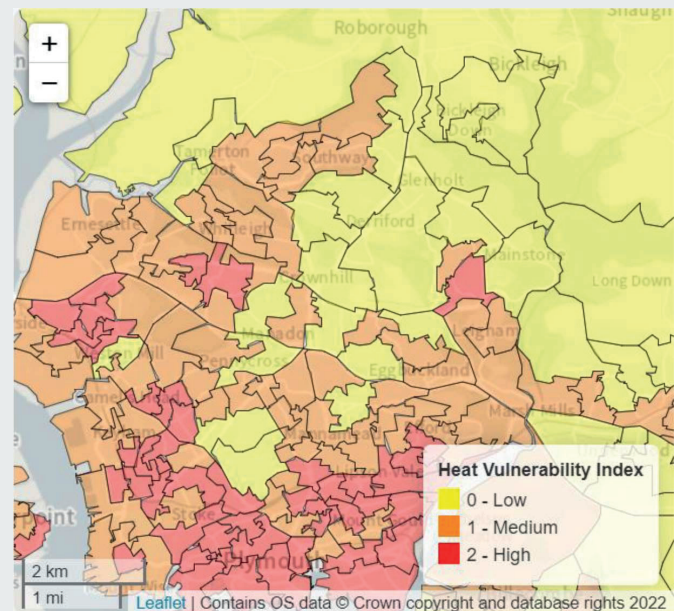
## 4°C

The planet could warm by more than 4°C by 2100 with potentially drastic consequences.

## Identifying populations at risk

Our case study in Plymouth highlights regions of the city that have a higher deprivation score, combined with a higher heat discomfort index. This could be used to:

- Identify where cool spaces or areas of refuge are needed in order to protect vulnerable communities during heatwaves.
- Target education campaigns about heat risk.





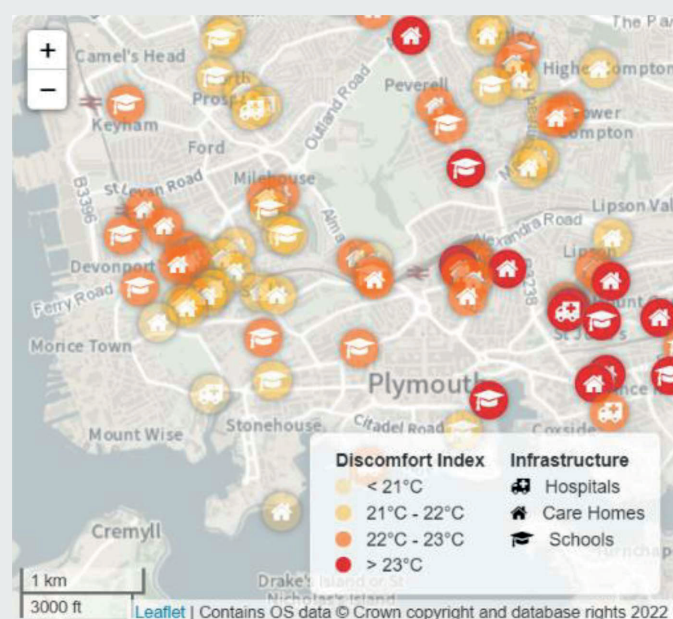
## CASE STUDY

### Identifying infrastructure at risk

Here we combine [OS AddressBase Premium](#) with NCO's discomfort index to show which buildings in Plymouth may be impacted by the [Urban Heat Island \(UHI\)](#) effect.

This could be useful for targeting buildings that require adaption, such as retrofit green or cool roofs.

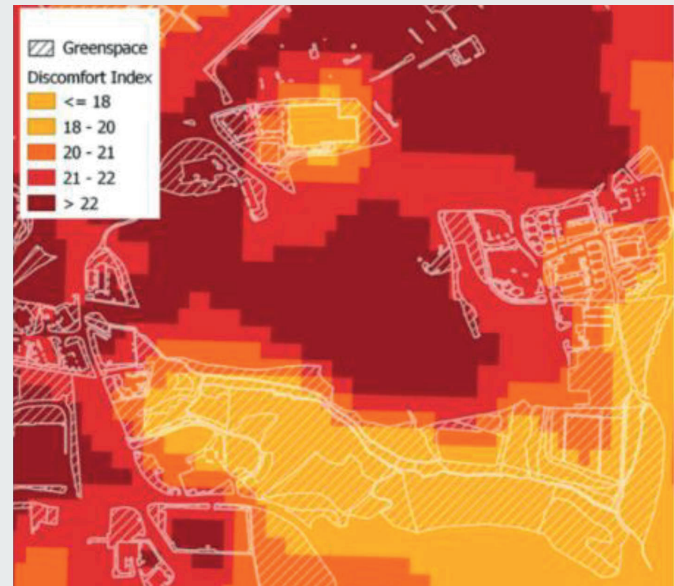
By supplementing this data with [OS Topographic Area](#), we could also determine available roof space and estimate installment costs.



## Visualising Greenspace

Greenspaces with trees alleviate the UHI effect. In this illustration, we've combined NCEO's discomfort index with [OS Greenspace](#) to understand the relationship between greenspaces and discomfort. This could be used to:

- Inform decisions about where to plant trees to most efficiently reduce discomfort.
- Monitor tree planting projects over time to ensure these programs are working as intended.



# Making the discovery

Ordnance Survey carried out research into the benefits of space-based heat data, interviewing public sector customers.



**88%** see real value of heat data in their work, citing potential uses such as:

“Making safer / more comfortable places to live. Ensuring the land management measures being proposed will be resilient to future change.”

“At times of excessive heat, it can focus resources to those most in need – including emergency services.”



“Optimising where we target tree planting.”

“Heat forecast could be useful for identifying drought conditions or other heat-related stress-inducing conditions for livestock and crops, and hence, farmers.”

“Allowing us to get a much better understanding of where, and who for, heat risk is most significant - so we can work with partners to plan and mitigate.”

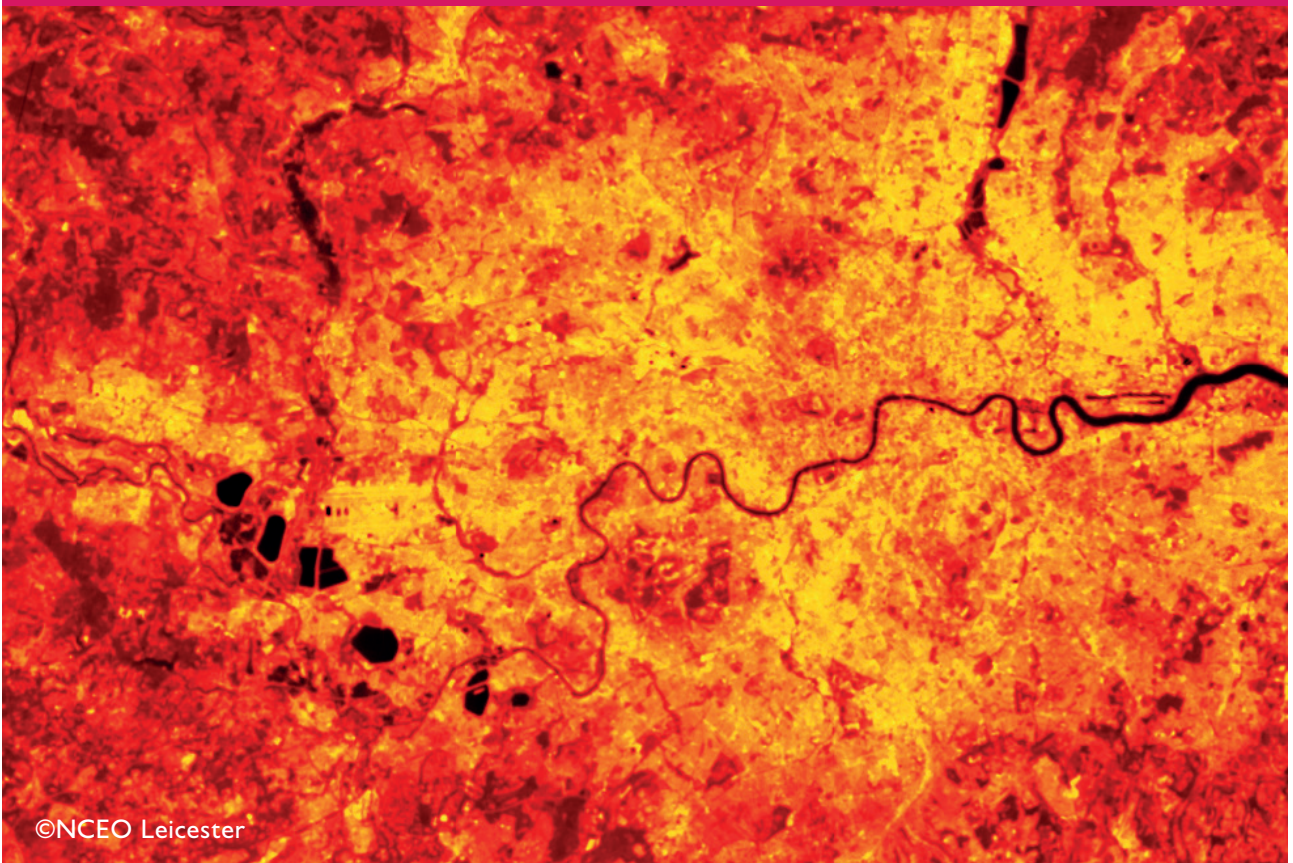


“Answering questions around public health and how we manage the impacts of climate change, planning for biodiversity and natural capital gain, how urban planning policy could mitigate the climate crisis and many other areas.”

**85%** of those interviewed however, weren't previously aware of the heat data, or had any form of access to it.

The challenge then, is connecting the right information with the right people.

Heat-related fatalities in England are projected to increase with climate change, especially under higher warming scenarios. These fatalities also have high economic costs, estimated in this study as a range from £323 million to £9.9 billion per year by the 2050s. The likelihood of a major unprecedented heatwave event in the next decade is considered high.

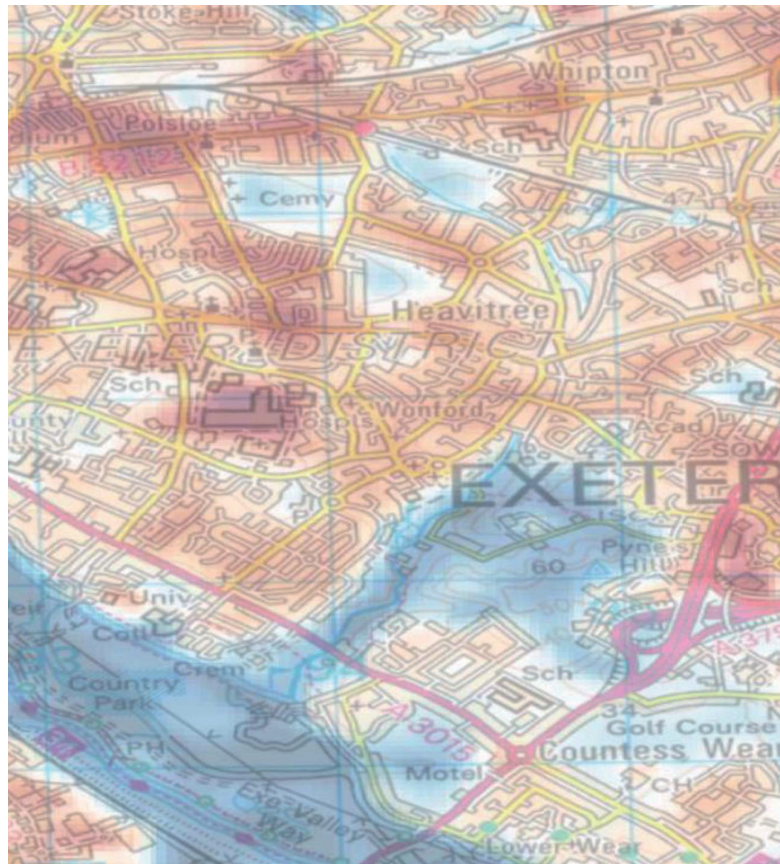


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# Sustainable solutions

Space4Climate's project has uncovered the need – and desire – to use space-based climate data in heat adaptation. Making the data easily accessible could help:

- Protect the most vulnerable communities, infrastructure and environments
- Add cooling green and blue spaces onto the map for maximum impact
- Enable the success of climate solutions to be monitored and best practice shared



Together with our Partners, we're highlighting how valuable heat data is to taking effective climate action.

Visualising the data helps bring insights to life for real-world benefits.

“The map is a very powerful instrument to make data legible.”

DONNA LYNDAY – INNOVATION LEAD, ORDNANCE SURVEY

“It's essential we get high quality scientific products into the hands of the right people.”

PROF JOHN REMEDIOS – DIRECTOR OF THE NATIONAL CENTRE FOR EARTH OBSERVATION

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