Spring News 2021

Rising temperatures threaten 'human liveability' in the tropics

In a recent study published in Nature Geoscience, lead researcher Yi Zhang (Princeton University) warns that rises in temperature and humidity in the tropics threatens people's future survival.

Focusing on the tropical region between 20°N and 20°S (including parts of Mexico, India and Libya), the study concluded that if governments fail to restrict global temperature rise to 1.5°C above pre-industrial levels, environmental conditions could hit the limit of human adaptation.

https://www.theguardian.com/science/2021/mar/08/global-heating-tropical-regions-human-livability#img-1

Humans have a steady core temperature of about 37°C. Heat is lost through the skin by evaporation to the air enabling the body to cool itself. In conditions of extremely high temperature and humidity (in excess of 35°C wet bulb temperature) the body will be unable to cool itself.

"If it is too humid our bodies can't cool off by evaporating sweat – this is why humidity is important when we consider livability in a hot place. High body core temperatures are dangerous or even lethal."

Yi Zhang (Princeton University) Nature Geoscience

Through the study of historical records and simulations, the research team discovered a clear link between 'liveable conditions' (based on heat and humidity) and mean temperature increase. This enabled scientists to suggest that in the tropics even a 1°C rise in global temperatures could have adverse health effects equivalent to a rise of several degrees of temperature increase. A 1.5°C global temperature increase or more could have very serious impacts on human health rendering some environments unliveable.

Currently, about 40% of the world's population live in the tropics and this is predicted to rise to 50% by 2050. In addition to mitigation, societies are going to need to adapt to these changes through improvements in cooling infrastructure, such as the use of cool-air shelters. Given that much of the region consists of low-income countries (LICs), this represents a huge challenge for the future.

This is just one of several recent reports focusing on the impacts of extreme temperatures and heatwaves associated with climate change. Scientists have suggested that future heatwaves could have serious impacts on countries such as India and China. Parts of the Middle East could also become uninhabitable. Between 1979 and 2017, the global number of potentially fatal humidity and heat events doubled. In the coming decades, up to 3 billion people could find themselves living at the edge of intolerable temperature conditions.

Further information

The Guardian (https://www.theguardian.com/science/2021/mar/08/global-heating-tropical-regions-human-livability)

Nature Geoscience (https://www.nature.com/ngeo/)

Global wildfires spread may be a sign of things to come

In a special report published in the *Guardian* (20 February 2021), scientists using data from the Global Fire Emissions Database discovered that wildfires are spreading to areas of forest and grasslands that were previously less prone to burning.

https://pixabay.com/photos/fire-smoke-bushfire-bush-trees-671555/

In Australia wildfires have affected parts of the south-east destroying forests in areas not previously used to experiencing fires. Similar events have occurred elsewhere in the world including California, Siberia and even in the Pantanal wetlands in South America. In contrast, in Africa there has been a decline in seasonal savannah fires.

Scientists suggest that these changes in the distribution and frequency of wildfires are the result of several factors including global heating (leading to the creation of tinderbox conditions) and land use change, converting grasslands into commercial farms and urban areas. Whilst natural grasslands are resilient to fires, other types of vegetation are not. In Portugal, for example, eucalyptus plantations have created inflammable fuel for fires to spread.

Climate change is considered to be a major factor. In Australia, exceptionally high temperatures and a two-year period of drought were blamed for the serious fire outbreaks in 2019/20.

"There is no question that climate change was a very significant factor in the extreme fire activity of the last season. We have always had droughts and heatwaves leading to extreme fire weather conditions, but our background long-term temperature trend is now 1°C over the pre-industrial level, with much hotter and longer heatwaves than before. Our droughts are now hotter leading to drier fuels more able to burn quickly."

Dr Pep Canadell (Chief Scientist, Climate Science Centre, Australia)

The drying effects associated with climate change are considered to be important in accounting for increases in wildfires in California (an eightfold increase in the area of burning in the last 20 years), Portugal, the Mediterranean and the Brazilian Amazon.

Forest fires contribute significantly to greenhouse gas emissions as stored carbon is released into the atmosphere. This acts as a positive feedback further increasing temperatures and vegetation drying.

Further information

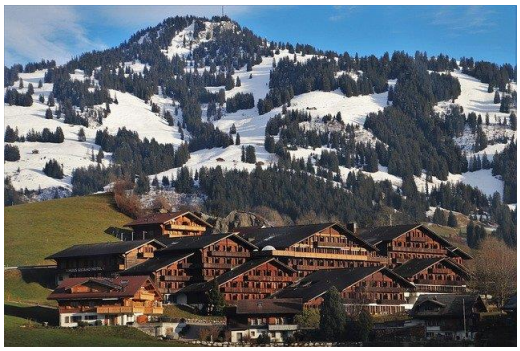
Guardian (20 February 2021)

Climate Science Centre, Australia (https://www.csiro.au/en/research/environmental-impacts/climate-change/Climate-Science-Centre)

Global Fire Emissions Database (https://www.globalfiredata.org/)

Alpine ecosystems at risk from early melting

Scientists from the University of Manchester have discovered that the annual melt of snow in the European Alps is occurring earlier each spring putting fragile alpine ecosystems at risk.



https://pixabay.com/photos/alpine-village-snow-mountains-high-4676673/

In a report published in the journal of the International Society for Microbial Ecology, researchers suggest that increasing temperatures are threatening microbial organisms in the soil that are a vital part of the ecosystem, recycling the nutrients upon which all plants and animals depend. Additionally, these microbial communities control how much carbon is stored in the soil thereby reducing carbon emissions.

In the winter, snow acts as an insulating blanket enabling the microbial organisms to continue to work during the intense cold. Melting snow can leave the microbes exposed to extreme cold in late winter and early spring reducing their efficacy. By the end of the century, the annual melt could occur up to 130 days earlier which could have alarming impacts on soil microbial organisms.

Further information

International Society for Microbial Ecology (https://www.isme-microbes.org/)

The full article can be read here (https://www.nature.com/articles/s41396-021-00922-0)

London – the UK's capital for green roof development

Green roofs have been used for centuries to insulate homes, particularly in cold environments such as northern Scandinavia and Iceland. However, they are becoming increasingly popular options in more temperate environments such as the UK.

https://pixabay.com/photos/stone-house-house-turf-roof-4193002/

In the past decade, London has emerged as a green roof 'hot spot', witnessing a doubling of green roof space. This is largely the result of a 2008 policy by the Greater London Authority requiring large developments to consider installing a green roof. Nearly 50% of green roofs in the UK are in London.

In central London, 40% of the roof space across the 27-hectare Kings Cross estate has been turned into living roofs, with plants, ponds and terraces for public access.

Living roofs can help to cool indoor air temperatures by up to 4°C reducing demand for air conditioning and thereby reducing greenhouse gas emissions. Additionally, they provide spongy surfaces to absorb water, thereby reducing the risk of flash flooding.

https://pixabay.com/photos/skyscraper-building-complex-1697170/

An EU-financed survey conducted by the Greater Manchester Combined Authority and the network Business in the Community found that green roofs improved air quality, reduced noise and provided food and shelter for insects and birds.

Further information

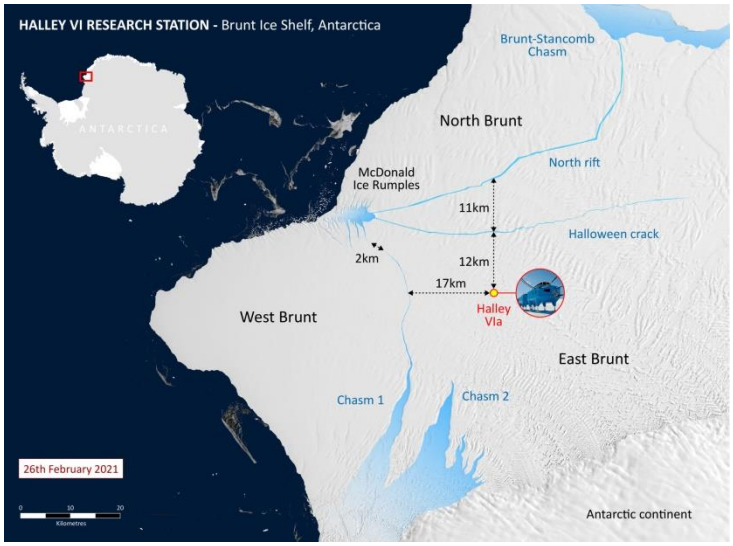
Kings Cross roof garden (https://www.kingscross.co.uk/green-infrastructure)

Huge iceberg breaks off Antarctica . . . but is it a sign of climate change?

In late February 2021, a huge iceberg the size of Greater London broke away from the Brunt ice shelf on Antarctica. The separation occurred just 20km from the British Antarctic Survey's Halley Station. Despite the close proximity of the break, there were no personnel at the research station so no risk to life. Four years ago, the Halley Station was moved inland away from the crack.

https://www.bas.ac.uk/media-post/brunt-ice-shelf-in-antarctica-calves/

Cracks in the ice shelf first appeared over a decade ago, with fresh cracks appearing within the last month. Having studied the ice cracks over the past five years, Adrian Luckman, Professor of Geology at the University of Swansea commented that such calving events were entirely natural events. "With three long rifts developing on the Brunt Ice Shelf, we have all been anticipating that something exciting was going to happen". Further calving events may well occur in future weeks caused by the instability resulting from the latest break.



https://www.bas.ac.uk/media-post/brunt-ice-shelf-in-antarctica-calves/

The floating Brunt Ice Shelf, which is up to 150m thick, flows westwards towards the open sea at a rate of up to 2km per year, calving at irregular intervals. Scientists believe this to be a natural process and not related to climate change.

Further information

British Antarctic Survey (https://www.bas.ac.uk/media-post/brunt-ice-shelf-in-antarctica-calves/)

The Guardian (https://www.theguardian.com/world/2021/feb/26/iceberg-size-of-greater-london-breaks-off-antarctica)