Climate Change - Arctic - Environment and Natural Resource Security
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Zombie fires and other strange events are happening in the Arctic – here's what you need to know

The climate crisis has been linked to unusual events happening in the Siberian tundra. So-called 'zombie fires' are adding to record-breaking carbon emissions. Methane gas explosions could have formed giant craters.

The Arctic is warming twice as fast as the rest of the world. Image: REUTERS/Kathryn Hansen/NASA

Emulating the 'flesh eating' zombies that rise from the dead in horror movies, scientists believe zombie fires could smoulder in peat, beneath the Arctic's icy surface, throughout the winter months. When spring comes, the fires reignite surface vegetation, emitting carbon dioxide from both the vegetation and the peat, which is a natural carbon dioxide store.

Record-high Arctic carbon emissions in 2019 were eclipsed this year as summer fires helped push the region's emissions more than a third higher[1] still, according to the Copernicus Atmosphere Monitoring Service (CAMS).

Millions of acres of Russia's Sakha Republic have been decimated by fire, as warming temperatures brought a summer wildfire season which started early and combusted with unusual intensity, exacerbating the climate crisis.

One of the mysterious craters discovered in the Siberian tundra. - Image: REUTERS/Vladimir Pushkarev/Russian Centre of Arctic Exploration

Under pressure

Climate change could also be behind the increase in cryo-volcanism – the sudden and explosive appearance of vast craters – across parts of the Siberian tundra.

Little is known about the series of at least nine giant craters[2] that have been found in the Yamal peninsula since 2013. The remote location, and the fact that within a year or two the craters fill with water to resemble the thousands of lakes dotting the landscape, make them hard to spot and even more difficult to study. The latest one – 30 metres deep and 20 metres wide – was discovered this summer.

[1] https://atmosphere.copernicus.eu/copernicus-reveals-summer-2020s-arctic-wildfires-set-new-emission-records

[2] https://edition.cnn.com/2020/09/04/world/craters-tundra-siberia-trnd-scn/index.html

What's the World Economic Forum doing about climate change?

Climate change poses an urgent threat demanding decisive action. Communities around the world are already experiencing increased climate impacts, from droughts to floods to rising seas. The World Economic Forum's Global Risks Report continues to rank these environmental threats at the top of the list.

To limit global temperature rise to well below 2°C and as close as possible to 1.5°C above pre-industrial levels, it is essential that businesses, policy-makers, and civil society advance comprehensive near- and long-term climate actions in line with the goals of the Paris Agreement on climate change.

Global warming can be beaten thanks to this simple plan

https://youtu.be/lux6fThkSW4

The World Economic Forum's Climate Initiative supports the scaling and acceleration of global climate action through public and private-sector collaboration. The Initiative works across several workstreams to develop and implement inclusive and ambitious solutions.

This includes the Alliance of CEO Climate Leaders, a global network of business leaders from various industries developing cost-effective solutions to transitioning to a low-carbon, climate-resilient economy. CEOs use their position and influence with policy-makers and corporate partners to accelerate the transition and realize the economic benefits of delivering a safer climate.

Contact us to get involved.

"As of now, there is no exhaustive theory for the formation of these craters," Evgeny Chuvilin, lead research scientist at Russia's Skoltech Centre for Hydrocarbon Recovery, told Newsweek[3]. "The explosive events behind them are too rare and too hard to catch in the act to study properly: a fresh crater usually 'lives' for just one to two years, and these are remote areas with little observation."

[3] https://www.newsweek.com/siberia-crater-climate-change-explosion-cryovolcanism-1529654?utm_term=Autofeed&utm_medium=Social&utm_source=Twitter#Echobox=1599227164

While the phenomenon needs more research, Chuvilin suggests that gases[4], chiefly methane, accumulate in the upper layers of permafrost. Over time, the intense pressure build-up is strong enough to burst through the frozen ground to form a crater, at the same time releasing methane emissions into the atmosphere.

A research team has analyzed five gas-emissions craters using remote sensing data and field surveys[5]. Marina O Leibman, of the Earth Cryosphere Institute at the Russian Academy of Sciences, believes extreme summer heat, such as the heatwave in 2012 and again in 2016, may have contributed to methane build-up and the formation of the craters.

Meltdown

At sea, as on land, the climate crisis is taking its toll on the Arctic, which is warming twice as fast as the rest of the world[6]. Higher temperatures have caused a dramatic reduction in sea ice, which animals like polar bears depend on to hunt for food.

Arctic sea ice has shrunk by almost 39% since 1980, according to the National Snow and Ice Data Centre. In the Antarctic region, sea ice has shrunk by more than 6% over the same period.

While these changes present new challenges for Arctic communities[7], the region's increasingly accessible conditions are inviting keen interest from shipping, mining and other commercial sectors, which could exacerbate the climate crisis.

Have you read?

- Arctic sea ice shrinks to second-lowest 'summer minimum' on record
- Plastic pollution is seeping into the Arctic, here's how we can prevent it
- Arctic heatwave: what warmer summers mean for the region's wildlife

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[4] https://www.researchgate.net/publication/342832646_Kratery_gazovogo_vybrosa_kak_novaa_geologiceskaa_opasnost_pri_osvoenii_Arktiki_Gas_blowout_craters_as_new_geological_hazard_during_development_Arctic

[5] https://www.researchgate.net/publication/291222184_NEW_PERMAFROST_FEATURE-DEEP_CRATER_IN_CENTRAL_YAMAL_WEST_SIBERIA_RUSSIA_AS_A_RESPONSE_TO_LOCAL_CLIMATE_FLUCTUATIONS

[6] https://www.noaa.gov/explainers/changing-arctic-greener-warmer-and-increasingly-accessible-region#:~:text=Unlike snow and ice which,driver of global weather patterns.

[7] https://www.noaa.gov/explainers/changing-arctic-greener-warmer-and-increasingly-accessible-region#:~:text=Unlike snow and ice which,driver of global weather patterns.