

Permafrost warming in parts of Alaska 'is accelerating'

By Matt McGrath

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Houses like this one near Fairbanks have collapsed because of permafrost melt

One of the world's leading experts on permafrost has told BBC News that the recent rate of warming of this frozen layer of earth is "unbelievable".

Prof Vladimir Romanovsky said that he expected permafrost in parts of Alaska would start to thaw by 2070.

Researchers worry that methane frozen within the permafrost will be released, exacerbating climate change

The professor said a rise in permafrost temperatures in the past four years convinced him warming was real.

Permafrost is perennially frozen soil that has been below zero degrees C for at least two years.

It was assumed it would be stable for this century but it seems that's not true any more

Prof Vladimir Romanovski, University of Alaska

It's found underneath about 25% of the northern hemisphere, mainly around the Arctic - but also in the Antarctic and Alpine regions.

It can range in depth from one metre under the ground all the way down to 1,500m.

Scientists are concerned that in a warming world, some of this permanently frozen layer will thaw out and release methane gas contained in the icy, organic material.

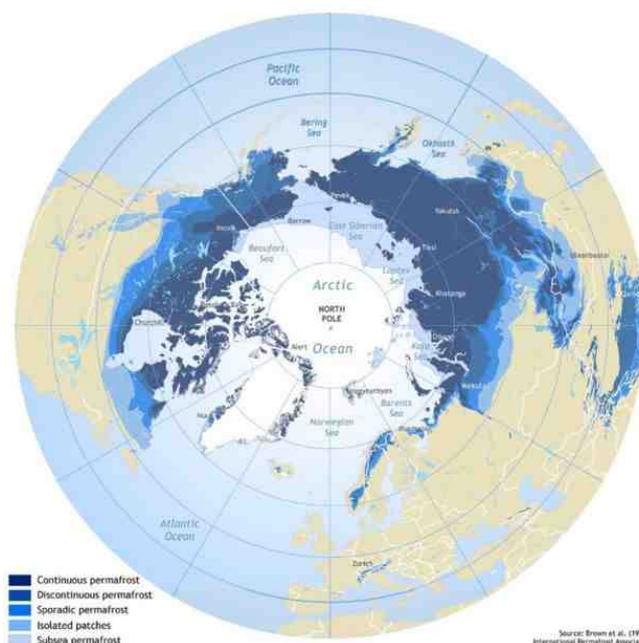
Methane is a powerful greenhouse gas and researchers estimate that the amount in permafrost equates to more than double the amount of carbon currently in the atmosphere.

Melting fast

Worries over the current state of permafrost have been reinforced by Prof Romanovsky.

A professor at the University of Alaska, he is also the head of the Global Terrestrial Network for Permafrost, the primary international monitoring programme.

He says that in the northern region of Alaska, the permafrost has been warming at about one-tenth of a degree Celsius per year since the mid 2000s.



"When we started measurements it was -8C, but now it's coming to almost -2.5 on the Arctic coast. It is unbelievable - that's the temperature we should have here in central Alaska around Fairbanks but not there," he told BBC News.

In Alaska, the warming of the permafrost has been linked to trees toppling, roads buckling and the development of sinkholes.

Prof Romanovsky says that the current evidence indicates that in parts of Alaska, around Prudhoe Bay on the North Slope, the permafrost will not just warm up but will thaw by about 2070-80.

"It was assumed it would be stable for this century but it seems that's not true any more," he told BBC News.

'Convincing' case

He says the current permafrost evidence has convinced him that global warming is real and not just a product of natural variation.

"Ten years ago, if you asked permafrost scientists around the globe I would say 98% would say: 'The thawing at Prudhoe Bay won't happen by the end of this century'," Prof Romanovsky explained.



This "drunken forest" of collapsed black spruce is also a sign of the melting permafrost

"But now I think it is very possible, and I changed my opinion right during the last four years. I was in the 98%, but now I say it's possible.

"About 10 years ago when I looked at our records, I said that they all show that permafrost temperatures should cool down a bit on multi-decadal timescales.

"I told myself that if it would not cool down I would 100% believe in global warming, and now I believe 100% that we have this very serious trend of warming," he said.

While engineering can prevent the thawing of permafrost underneath important structures, there is little that can be done to prevent the general melting of the layer.

Scientists believe that the thawing will be gradual, with no major tipping point. There are many unknown factors about the rate of thawing and whether the impacts will be the same across all Arctic regions.

There are also concerns about the bubbling of methane from undersea permafrost in the shallow waters off the Russian Arctic, but researchers say they do not know yet how significant this might be.

There is also a worry about giant sinkholes, some of which appeared in Siberia last year. Experts say that melting permafrost may have unleashed enough methane to cause the ejection of material that formed the holes.

Indirect impacts

Another expert in the field acknowledged that while the problems in Alaska were serious, scientists were getting a better handle on the amounts of carbon that were likely to be released.

However, Prof Ted Schuur from Northern Arizona University recognised that, despite the scientific progress, the fact was that thawing would occur and methane would leach into the atmosphere.

"Even if we stopped all emissions today, the Arctic has momentum where there is going to be more warming, more permafrost degradation and some carbon coming out already - we have started the ball rolling in some senses."

"It is probably not triggering a runaway climate effect but it adds to our problem. It accelerates the problem, of climate change. To me that is worrisome because it makes the problem harder."

Prof Schuur added that indirect impacts of warming were also speeding the thaw. In Alaska in 2015, there were near-record wildfires, which he said heightens the exposure of permafrost to warmer air.

He believes that political negotiations on a new global climate deal, currently underway in Germany and set to conclude in Paris in December, are essential to the long term preservation of permafrost.

"The climate negotiators meeting in Bonn, and in Paris, won't immediately be able to change what happens with the fire season in Alaska next year, but we can slow the process down by focussing on human emissions and in my mind that's the best bet to have the most control.

"It's very hard to control these landscape global processes that are occurring in the Arctic."