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ABC Science

Permafrost melting a growing concern

Wednesday, 1 July 2009

Reuters

The amount of carbon locked away in frozen soils in the far Northern Hemisphere is double previous estimates and rapid melting could accelerate global warming, warns a new study.

Large areas of northern Russia, Canada, Nordic countries and Alaska have deep layers of frozen soil near the surface called permafrost.

Global warming has already triggered rapid melting of the permafrost in some areas, releasing carbon dioxide and methane.

As the world gets warmer, more of these gases are predicted to be released and could trigger a tipping point in which huge amounts of the gases flood the atmosphere, rapidly driving up temperatures, scientists say.

"Massive amounts of carbon stored in frozen soils at high latitudes are increasingly vulnerable to exposure to the atmosphere," says Dr Pep Canadell, executive director of [CSIRO](http://www.csiro.au) (http://www.csiro.au) 's Global Carbon Project.

"The research shows that the amount of carbon stored in soils surrounding the North Pole has been hugely underestimated."

The study is published in the latest issue of *Global Biogeochemical Cycle* (http://www.agu.org/journals/gb/_).

Canadell says a four-year study of the latest research on permafrost, data from new drilling projects and the release of previously unpublished data from the Russian Academy of Sciences had led to a rethink of carbon levels.

"Projections show that almost all near-surface permafrost will disappear by the end of this century exposing large carbon stores to decomposition and release of greenhouse gases," he says.

Extra warming

Canadell says if only 10% of the permafrost melted, this could lead to the release of an additional 80 parts per million of carbon dioxide equivalent into the atmosphere. This would equate to about 0.7°C of global warming.

According to the UN Climate Panel, average temperatures have already risen by about 0.7°C since the late nineteenth century and are forecast to rise another 1.8 to 4°C by 2100. Scientists say a rapidly warming planet will trigger more intense storms and droughts, rising seas and melting ice caps.

Canadell says that on a recent trip to northern China, the permafrost at its southern limit had all but



Frozen soil sediments in Siberia are rapidly thawing, say researchers (Edward A.G.Schuur, University of Florida)

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disappeared over the past 20 years.

Locals had told him the permafrost was once 20 centimetres below the surface and now it was several metres down.

He says computer models showed global warming could trigger an irreversible process of thawing.

For example, heat generated from increased microbial activity in the soil could lead to sustained and long-term emissions of carbon dioxide and methane.

In addition, lakes formed as permafrost thaws would draw heat to deeper layers and bring methane trapped in pockets below to the surface.

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