Media Release
The Centre for Australian Weather and Climate Research
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Permafrost melt poses major climate change threat

New research shows that the amount of carbon stored in frozen soils at high latitudes is double previous estimates and could, if emitted as carbon dioxide and methane, lead to a significant increase in global temperatures by the end of this century.

“Massive amounts of carbon stored in frozen soils at high latitudes are increasingly vulnerable to exposure to the atmosphere,” says the Executive Director of the Global Carbon Project at CSIRO, Dr Pep Canadell.

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

In a paper published in the latest edition of *Global Biogeochemical Cycles*, Dr Canadell says frozen high-latitude soils have the potential to release vast quantities of carbon and methane into the atmosphere and subsequently influence carbon-climate feedbacks.

“Warmer temperatures at high latitudes are already resulting in unprecedented permafrost degradation,” he says. “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.”

Models developed in collaboration with Dr Canadell show that global warming could trigger an irreversible process of thawing.

“A number of feedbacks increase the vulnerability of these soils. For example, heat generated from increased microbial activity could lead to sustained and long-term chronic emissions of carbon dioxide and methane.”

In addition, ‘thermokast lakes’ formed as permafrost thaws, would draw heat to deeper layers and bring methane to the surface.

Increased fire frequency will also trigger permafrost degradation and thermokast collapse.

“Using the new carbon pool estimates from this research, permafrost degradation could account for the entire upper range of carbon-climate feedbacks currently estimated by climate models,” Dr Canadell says.

“The potential for significant feedbacks from permafrost carbon could be realised with only a small fraction of currently frozen carbon released to the atmosphere. For example if only 10 per cent of the permafrost melts, the resultant feedback could result in an additional 80 ppm carbon dioxide equivalent released into the atmosphere, equating to about 0.7°C of global warming.”

The Centre for Australian Weather & Climate Research is a partnership between CSIRO and the Bureau of Meteorology.

Image available at: http://www.scienceimage.csiro.au/mediarelease/mr09-108.html

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