

Permafrost carbon content double the old estimates

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Frozen sediments (permafrost) in Eastern Siberia. Photo by: Sergei Zimov

New research indicates that the amount of frozen organic carbon locked away in the world's permafrost regions – a major potential source of atmospheric carbon dioxide (CO2) and methane (CH4) – is double what has been previously estimated.

In a paper published in the latest edition of *Bioscience*, an international team of scientists says whereas some of the CO2 produced as a result of decomposition of previously frozen vegetation would be absorbed by increased, global warming-induced plant growth, it is likely the net effect would be a significant net increase in atmospheric CO2.



Involving collaboration between scientists from Australia, Russia, the US, the UK, Canada and Europe the three-year study concluded that accounting for carbon stored deep in the permafrost more than doubles – to more than 1500 billion tonnes – previous estimates of the world's high-latitude carbon inventory.

"This is equivalent to twice the current amount of CO2 in the world's atmosphere," says co-author, CSIRO's Dr Pep Canadell, from The Centre for Australian Weather and Climate Research – a partnership between CSIRO the Australian Bureau of Meteorology.

"With temperatures in the higher latitudes estimated to rise by as much as eight degrees by the end of this century, the world could experience a major melt of large tracts of permafrost in Canada, Russia, Alaska, Norway, Sweden, Finland and Greenland," he says.

"However, accurately predicting the magnitude and effect of thawing permafrost on the world's climate is difficult for several reasons.

"While global carbon models may include simple permafrost dynamics they do not adequately represent the broader consequences, such as the decomposition of organic matter in thawing permafrost and the transformation of landscapes."

Dr Canadell says that despite such limitations, scientists now know that even the release of a small fraction of this vast frozen reservoir of carbon would significantly accelerate climate change.

"At current rates of warming in the higher latitudes, the evidence indicates that this is likely to happen," he says.

To read and/or download the paper: Vulnerability of Permafrost Carbon to Climate Change: Implications for the Global Carbon Cycle, go to:



www.bioone.org/perlserv/?reque ... &issn=0006-3568&ct=1

Provided by CSIRO

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