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Estimates of carbon in frozen soils doubled

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, according to the Executive Director of the Global Carbon Project at CSIRO, Dr Pep Canadell.

In a paper published in *Global Biogeochemical Cycles*,¹ Dr Canadell and his co-authors concluded from modelling studies that frozen high-latitude soils contain vast quantities of carbon, about twice as much carbon as is currently in the atmosphere, and that destabilisation of this frozen 'carbon pool' could influence carbon-climate feedbacks.

'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. '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.'

'The potential for significant feedbacks from permafrost carbon could be realised with only a small fraction of currently frozen carbon released to the atmosphere,' says Dr Canadell. '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.'

¹ Tarnocai C, Canadell JG *et al.* (2009) Soil organic carbon pools in the northern circumpolar permafrost region. *Global Biogeochemical Cycles* **23**, GB2023. www.agu.org/journals/gb/gb0902/2008GB003327/

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