

Permafrost carbon feedbacks threaten global climate goals

May 17 2021



Credit: CC0 Public Domain

Since it was first signed more than five years ago, the Paris Agreement has set the bar for the global effort to reduce greenhouse gas emissions, with more than 70 countries taking on ambitious nationally determined

contributions that exceed initial commitments laid out in the agreement. However, a new paper released today in *Proceedings of the National Academy of Sciences* argues that the carbon budget these commitments are based on does not take into account the latest science on Arctic feedback loops, and calls for global leaders to rethink emissions goals.

"Arctic warming poses one of the greatest risks to our climate, yet it has not been adequately incorporated into existing climate projections and policies," said Dr. Sue Natali, lead author and director of Woodwell Climate's Arctic Program. "To build effective policy to address the climate crisis, it is essential that we recognize the full scope of the problem."

Over the past decade, rapid Arctic warming has resulted in record-breaking Siberian heatwaves, extreme northern wildfires that release massive amounts of carbon into the atmosphere, the loss of Arctic sea ice, and an acceleration of permafrost thaw. Arctic permafrost, which has been accumulating and storing carbon for thousands of years, contains approximately twice the amount of carbon that is currently in the Earth's atmosphere, and is releasing that carbon into the atmosphere as it thaws. Those emissions exacerbate warming, which triggers more thaw, potentially leading to an exponential increase in emissions and warming in the coming years. This new paper shows current carbon budgets fail to account for these [carbon emissions](#) from permafrost and the dangerous climate feedback loops they will set off.

"Based on what we already know about abrupt thaw and wildfire, these feedback loops are likely to substantially exacerbate the permafrost thaw feedback and resulting carbon emissions," said Woodwell researcher and paper co-author Dr. Rachael Treharne. "Unless our models account for these anticipated effects, we'll be missing a major piece of the carbon puzzle."

In order to keep the Earth's temperature below 1.5° or 2°C, the paper recommends [decision-makers](#) incorporate the latest science on Arctic carbon emissions into [climate models](#) and carbon budgets used to inform policy, and update risk assessments to determine how quickly we need to reduce emissions to meet climate goals.

"The science alone is not enough," said Dr. Philip Duffy, president and executive director of the [Woodwell Climate Research Center](#) and commentary co-author. "We urgently need communication between scientific and policy communities to make sure our climate policies are effective in addressing the scale and scope of the climate crisis."

More information: Susan M. Natali et al., Permafrost carbon feedbacks threaten global climate goals, *PNAS* (2021).

www.pnas.org/cgi/doi/10.1073/pnas.2100163118

Provided by Woodwell Climate Research Center

Citation: Permafrost carbon feedbacks threaten global climate goals (2021, May 17) retrieved 2 May 2024 from <https://phys.org/news/2021-05-permafrost-carbon-feedbacks-threaten-global.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.