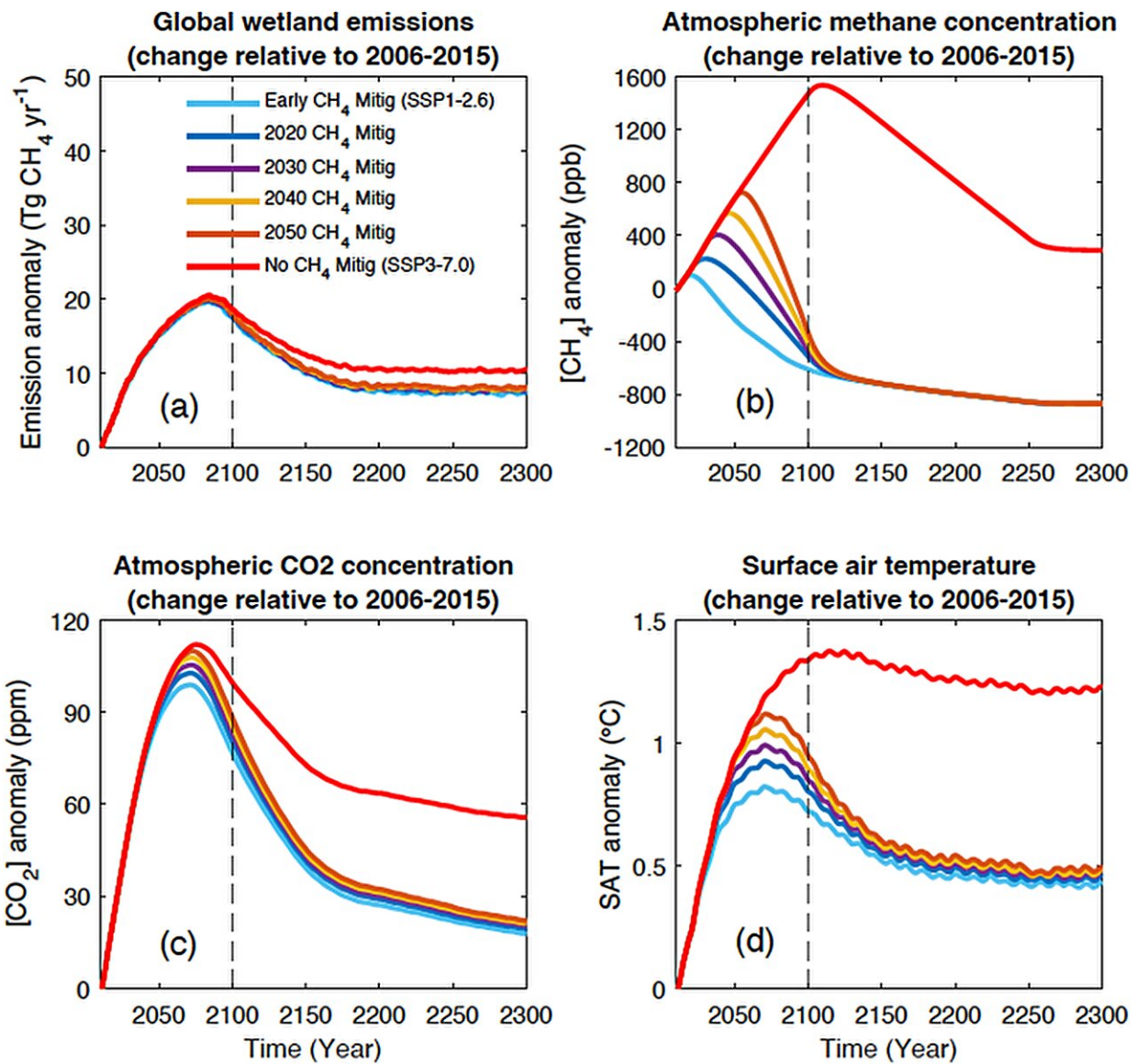


Delaying methane mitigation increases risk of breaching Paris Agreement climate goal, study finds

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Changes are shown for (a) global wetland CH₄ emissions, (b) atmospheric CH₄ concentration, (c) atmospheric CO₂ concentration, and (d) surface air temperature (SAT) relative to 2006-2015 for different initiation of CH₄ mitigation under the assumption that all non-CH₄ forcing agents (including CO₂) from anthropogenic sources evolve according to SSP1-2.6. The variability in the SAT curves is associated with the solar cycle. Credit: *Communications Earth & Environment* (2023). DOI: 10.1038/s43247-023-00898-z

A new study by Simon Fraser University researchers shows that efforts to reduce methane emissions are needed immediately if we are to meet global climate change goals.

A key element of the 2015 Paris Agreement, a legally binding international treaty on [climate change](#), is the commitment to limit average global temperatures increases to well below 2°C above pre-industrial levels, and pursue efforts to limit [global warming](#) to 1.5°C above pre-industrial levels. This requires reaching net-zero CO₂ emissions by or around 2050—and deep reductions in [methane](#) and other emissions.

The study, published in *Communications Earth & Environment*, suggests that global warming levels, relative to the pre-industrial period, could be limited below 2°C if global-scale methane [mitigation](#) efforts are initiated before 2030.

However, delaying methane mitigation to the year 2040, or beyond, would increase the risk of global warming levels exceeding 2°C above pre-industrial levels, even if net-zero carbon dioxide (CO₂) emissions were achieved.

Methane is second only to CO₂ in contributing to global temperature increases over the last two centuries. Over the past 40 years, more than

60% of global [methane emissions](#) have emerged because of anthropogenic activities such as fossil fuel exploitation, [livestock production](#), agriculture, and waste.

"We emphasize that actions associated with the Global Methane Pledge should not be delayed, because every year of delayed methane mitigation implies further global warming," says Kirsten Zickfeld, distinguished professor of climate science, director of SFU's Climate Research Lab, and member of the research team.

"While policymakers now accept the need for urgent methane mitigation, it is necessary to emphasize the importance of immediate mitigation to comply with the temperature goal in the Paris Agreement—particularly taking into account potential Earth system feedbacks," says Claude-Michel Nzotungicimpaye, former Ph.D. student at SFU, researcher on Zickfeld's team, and the study's lead author.

In their study, Zickfeld's team uses an Earth system model with a coupled methane cycle to examine the importance of immediate versus delayed methane mitigation to fulfill the 2°C threshold. They investigate the role of feedback in carbon and methane cycles in the timing of methane mitigation to achieve the Paris Agreement climate goal, as well as the long-term [climate](#) impacts of delaying or failing to mitigate methane in the current century, which has not previously been studied.

As per the group's findings, every 10-year delay in methane mitigation will result in an additional peak global warming temperature of approximately 0.1°C.

Their results emphasize the need for immediate cuts in anthropogenic methane emissions across the world, along with stringent CO₂ mitigation, to increase the likelihood of holding the rise in average global temperatures to well below 2°C above pre-industrial levels.

More information: Claude-Michel Nzotungicimpaye et al, Delaying methane mitigation increases the risk of breaching the 2 °C warming limit, *Communications Earth & Environment* (2023). [DOI: 10.1038/s43247-023-00898-z](https://doi.org/10.1038/s43247-023-00898-z)

Provided by Simon Fraser University

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