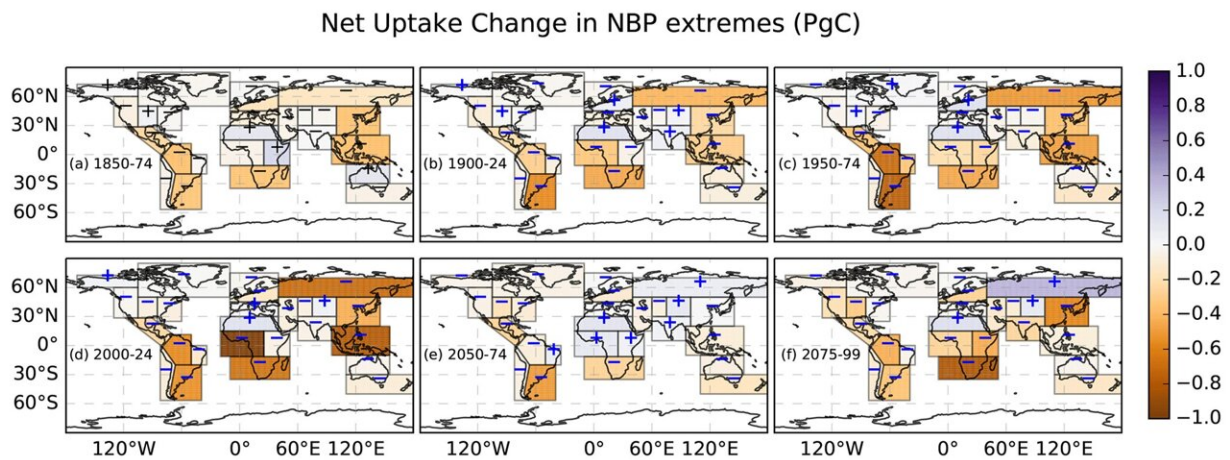


# Modeling climate extremes to show effect on atmospheric carbon

September 14 2023, by Reece Brown



The sum of the magnitude of positive and negative NBP extremes during 25-year periods. The figure shows the total integrated net impact of carbon cycle extremes (PgC) across SREX regions for the following periods: (a) 1850–1974, (b) 1900–1924, (c) 1950–1974, (d) 2000–2024, (e) 2050–2074, and (f) 2075–2099. A net gain in carbon uptake during extremes is represented by a purple color and a "+" sign, and a net decrease is represented by an orange color and a "-" sign. For most regions, the magnitude of negative NBP extremes or losses in carbon uptake were higher than positive NBP extremes or gains in carbon uptake. Credit: *Biogeosciences* (2023). DOI: 10.5194/bg-20-1829-2023

Researchers from Oak Ridge National Laboratory and Northeastern University modeled how extreme conditions in a changing climate affect the land's ability to absorb atmospheric carbon—a key process for

mitigating human-caused emissions. They found that 88% of Earth's regions could become carbon emitters by the end of the 21st century.

The paper is published in the journal [\*Biogeosciences\*](#).

Climate extremes lasting months or years could reduce plant productivity, which governs Earth's capacity to produce food, fiber and fuel. Plus, events such as wildfires could generate bursts of emissions from carbon stored in forests.

The team used the open-source Community Earth System Model to simulate multiple variables, which enabled a holistic understanding of how climatic conditions interact.

"Our results suggest that meteorological extremes will become more frequent, intense and widespread due to the compound effect of high temperature, drought and fire," said ORNL's Bharat Sharma. "Tropical regions may face these to the most extreme degree."

**More information:** Bharat Sharma et al, Carbon cycle extremes accelerate weakening of the land carbon sink in the late 21st century, *Biogeosciences* (2023). [DOI: 10.5194/bg-20-1829-2023](https://doi.org/10.5194/bg-20-1829-2023)

Provided by Oak Ridge National Laboratory

Citation: Modeling climate extremes to show effect on atmospheric carbon (2023, September 14) retrieved 28 April 2024 from <https://phys.org/news/2023-09-climate-extremes-effect-atmospheric-carbon.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.