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**New Global Warming Model Highlights Strong Impact of Social Learning**

*Researchers account for feedback between climate change and human behavior*

A new climate modeling approach suggests that social processes strongly affect global warming predictions, and mitigation efforts should account for this influence. Thomas Bury of the Universities of Waterloo and Guelph, Canada and colleagues present these findings in *PLOS Computational Biology*.

Human behavior influences a wide range of complex systems, including ecosystems, social networks, and the climate. Moreover, these systems impact human behavior, creating a feedback loop. Human behavior is a driver of climate change, but climate models often neglect how climate change in turn affects human behavior.

In an effort to improve climate change predictions, Bury and colleagues developed a mathematical model that captures key features of social and climate systems, while also incorporating how climate change and mitigation efforts impact human behavior. The researchers then used the model to investigate how human behavior might influence climate change dynamics.

Their analysis suggests that the rate at which people learn about climate mitigation strategies via social interactions, such as hearing that a friend bought a hybrid car, strongly influences climate outcomes. Social learning takes time, so plausible values of this rate alone could raise warming predictions by over 1 degree Celsius.

On the contrary, the model suggests that social norms do not protect against rising temperatures. They initially act against adoption of mitigation behaviors, even when such efforts are strongly justified by rising temperatures, and they do not significantly speed the transition to an emission-free world once mitigation becomes the norm.

The researchers also ran the model with different parameters to explore how mitigation efforts could be optimized. “Our socio-climate model indicates that an increase in social media and other campaigns to raise awareness, such as climate marches and international reports, should ideally be followed by governmental and other incentives to reduce carbon emissions,” Bury says.

Senior author, Madhur Anand states that “There are pathways for humans to mitigate climate change, but processes driving behavior and norms at the individual and societal level will be essential to all of them, and our longstanding work on coupled human-environment systems applied here to climate change is providing direction in this regard”.

The researchers note that their model is relatively simple and future research efforts should assess whether models of a higher complexity produce different forecasts. Collaborating author, Chris Bauch says “Mathematical models that capture social dynamics and their interaction with climate trends will become increasingly used in climate research”. Models that accurately capture the interplay between population behavior and climate change could improve predictions and inform mitigation strategies.

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