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WILL LAND-BASED ECOSYSTEMS HAVE TO FACE MAJOR TRANSFORMATION AS A RESULT OF CLIMATE CHANGE?

A recent report from the University of Michigan points to future concern about land-based ecosystems.

WITHOUT DRAMATIC REDUCTIONS IN GREENHOUSE-GAS EMISSIONS, MOST OF THE PLANET'S LAND-BASED ECOSYSTEMS -- FROM ITS FORESTS AND GRASSLANDS TO THE DESERTS AND TUNDRA -- ARE AT HIGH RISK OF "MAJOR TRANSFORMATION" DUE TO CLIMATE CHANGE, ACCORDING TO A NEW STUDY FROM AN INTERNATIONAL RESEARCH TEAM.

With the "business as usual" emissions scenario expected changes would threaten global biodiversity and derail vital services that nature provides to humanity, such as water security, carbon storage and recreation. Credit: © Stephen Bonk / Fotolia

The researchers used fossil records of global vegetation change that occurred during a period of post-glacial warming to project the magnitude of ecosystem transformations likely in the future under various greenhouse gas emissions scenarios.

They found that under a "business as usual" emissions scenario, in which little is done to rein in heat-trapping greenhouse-gas emissions, vegetation changes across the planet's wild landscapes will likely be more far-reaching and disruptive than earlier studies suggested.

The changes would threaten global biodiversity and derail vital services that nature provides to humanity, such as water security, carbon storage and recreation, according to study co-author Jonathan Overpeck, dean of the School for Environment and Sustainability at the University of Michigan.

"If we allow climate change to go unchecked, the vegetation of this planet is going to look completely different than it does today, and that means a huge risk to the diversity of the planet," said Overpeck, who conceived the idea for the study with corresponding author Stephen T. Jackson of the U.S. Geological Survey.

The findings are scheduled for publication in the Aug. 31 edition of the journal Science. Forty-two researchers from around the world contributed to the paper. The first author is geosciences graduate student Connor Nolan of the University of Arizona.

Overpeck stressed that the team's results are not merely hypothetical. Some of the expected vegetational changes are already underway in places like the American West and Southwest, where forest dieback and massive wildfires are transforming landscapes.

Previous studies based largely on computer modeling and present-day observations also predicted sweeping vegetational changes in response to climate warming due to the ongoing buildup of carbon dioxide and other greenhouse gases.

But the new study, which took five years to complete, is the first to use paleoecological data -- the records of past vegetation change present in ancient pollen grains and plant fossils from hundreds of sites worldwide -- to project the magnitude of future ecosystem changes on a global scale.

The team focused on vegetation changes that occurred during Earth's last deglaciation, a period of warming that began 21,000 years ago and that was roughly comparable in magnitude (4 to 7 degrees Celsius, or 7 to 13 degrees Fahrenheit) to the warming expected in the next 100 to 150 years if greenhouse gas emissions are not reduced significantly.

Because the amount of warming in the two periods is similar, a post-glacial to modern comparison provides "a conservative estimate of the extent of ecological transformation to which the planet will be committed under future climate scenarios," the authors wrote.

Under a business as usual emissions scenario, the probability of large-scale vegetation change is greater than 60 percent, they concluded. In contrast, if greenhouse-gas emissions are reduced to levels targeted in the 2015 Paris Agreement, the probability of large-scale vegetation change is less than 45 percent.

For the full article click here.

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