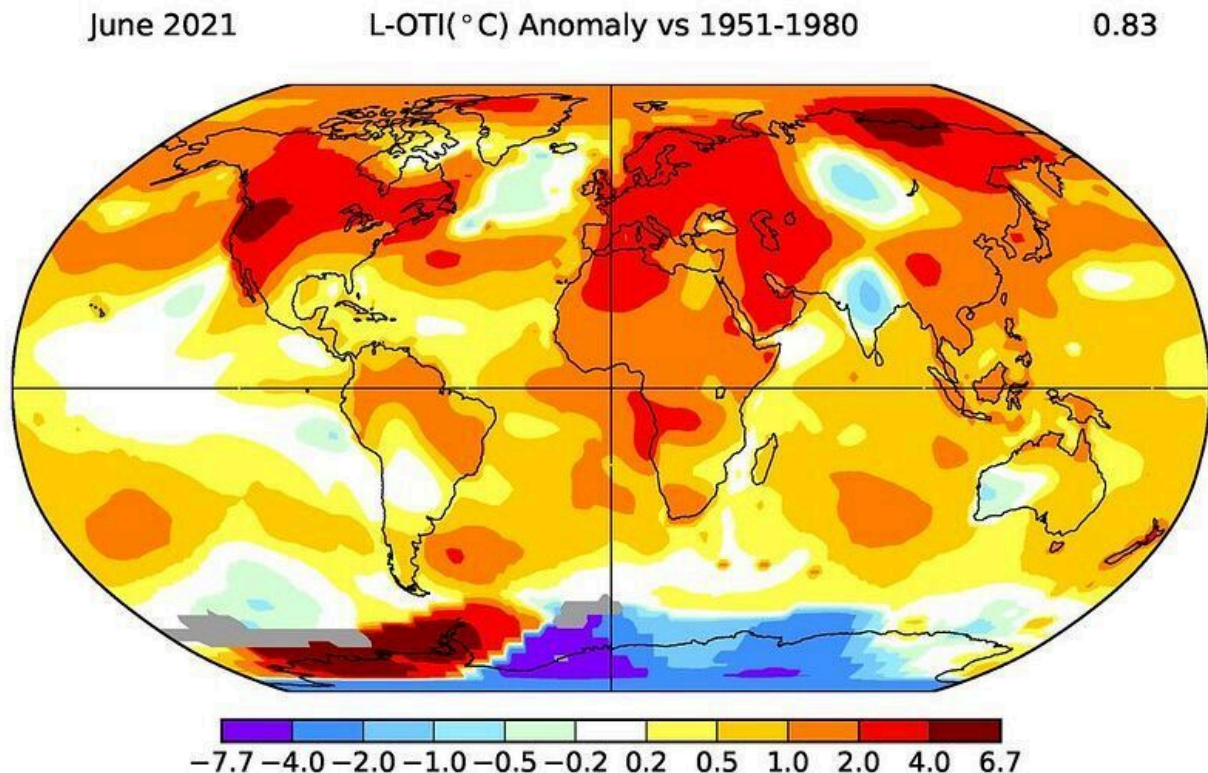


Earth's vital signs worsen amid business-as-usual mindset on climate change

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Twenty months after declaring a climate emergency and establishing a set of vital signs for the Earth, a coalition headed by two Oregon State University researchers says the updated vital signs “largely reflect the consequences of unrelenting business as usual.”

Authors led by OSU’s William Ripple and Christopher Wolf, in a paper published today in *BioScience*, are calling for a phase-out of fossil fuels in response to the climate crisis. They also want strategic climate reserves for the storage of carbon and the protection of biodiversity, and a global price for carbon high enough to induce “decarbonization” across the industrial and consumption spectrum.

The scientists note an unprecedented surge in climate-related disasters since 2019, including devastating floods, record-shattering heat waves and extraordinary storms and wildfires.

“There is growing evidence we are getting close to or have already gone beyond tipping points associated with important parts of the Earth system, including warm-water coral reefs, the Amazon rainforest and the

West Antarctic and Greenland ice sheets,” said Ripple, distinguished professor of ecology in the OSU College of Forestry.

2020 was the second hottest year in history, with the five hottest years on record all occurring since 2015. And three key greenhouse gases – carbon dioxide, methane and nitrous oxide – set records for atmospheric concentrations in 2020 and again in 2021.

In April 2021, carbon dioxide concentration reached 416 parts per million, the highest monthly global average concentration ever recorded.

“Priorities need to shift toward immediate, drastic reductions in greenhouse gases, especially methane,” said Wolf, a postdoctoral scholar in the College of Forestry.

“We also need to stop treating the climate emergency as a stand-alone issue – global heating is not the sole symptom of our stressed Earth system,” Ripple said. “Policies to combat the climate crisis or any other symptoms should address their root cause: human overexploitation of the planet.”

With its myriad economic interruptions and shutdowns, the COVID-19 pandemic had the side effect of providing some climate crisis relief but only of the ephemeral variety, the scientists say.

“Global gross domestic product dropped by 3.6% in 2020 but is projected to rebound to an all-time high,” Ripple said. “Likely because of the pandemic, fossil fuel consumption has gone down since 2019, as have carbon dioxide emissions and airline travel levels. All of these are expected to significantly rise with the opening of the economy.”

A major lesson of the pandemic, the authors say, is that even colossally decreased transportation and consumption are insufficient to tackle climate change and instead transformational system changes are required, even if politically unpopular. Despite pledging to “build back better” by globally directing COVID-19 recovery investments toward green policies, only 17% of such funds had been allocated that way as of early March 2021.

“As long as humanity’s pressure on the Earth system continues, attempted remedies will only redistribute the pressure,” Wolf said. “But by halting the unsustainable exploitation of natural habitats, we can reduce zoonotic disease transmission risks, protect carbon stocks and conserve biodiversity, all at the same time.”

Other key vital signs the authors highlight:

- Ruminant livestock now number more than 4 billion, and their total mass is more than that of all humans and wild animals combined.
- Brazilian Amazon annual forest loss rates increased in both 2019 and 2020, reaching a 12-year high of 1.11 million hectares deforested in 2020.
- Ocean acidification is near an all-time record. Together with thermal stress, it threatens the coral reefs that more than half a billion people depend on for food, tourism dollars and storm surge protection.

“All climate actions should focus on social justice by reducing inequality and prioritizing basic human needs,” Ripple said. “And climate change education should be included in school core curriculums around the world – that would result in greater awareness of the climate emergency and empower learners to take action.”

Ripple, Wolf and OSU colleagues Bev Law and Jillian Gregg, along with collaborators from Massachusetts, Australia, the United Kingdom, France, the Netherlands, Bangladesh and Germany, call for a “three-pronged near-term policy approach” that includes a globally implemented serious carbon price, a phase-out and eventual ban of fossil fuels, and strategic climate reserves to safeguard and restore natural carbon sinks and biodiversity.

“The carbon price needs to be linked to a socially just fund to finance climate mitigation and adaptation policies in the developing world,” Ripple said. “We need to quickly change how we’re doing things, and new climate policies should be part of COVID-19 recovery plans wherever possible. It’s time for us to join together as a global community with a shared sense of cooperation, urgency and equity.”

The paper by Ripple, Wolf and collaborators comes out as the International Panel on Climate Change prepares to release its report, on the physical science of climate change, on Aug. 9. The IPCC says the report will include an assessment of scientific knowledge about the warming of the planet and projections for future warming.

Joining the OSU scientists on the paper are Thomas Newsome of the University of Sydney; Timothy Lenton of the University of Exeter; Ignacio Palomo of the University of Grenoble Alps; Jasper Eikelboom of Wageningen University and Research; Saleemul Huq of Independent University Bangladesh; Philip Duffy of the Woodwell Climate Research Center; and Johan Rockström of the Potsdam Institute for Climate Impact Research.

The 2019 climate emergency paper, also published in BioScience, at the time had more than 11,000 scientist signatories from 153 countries. The signatories now total nearly 14,000 from 158 countries.

“Almost 2,000 jurisdictions including 23 national governments have declared or recognized a climate emergency,” Ripple said. “But given all of the alarming climate developments, we need to keep providing short, frequent and easily accessible updates on this emergency.”